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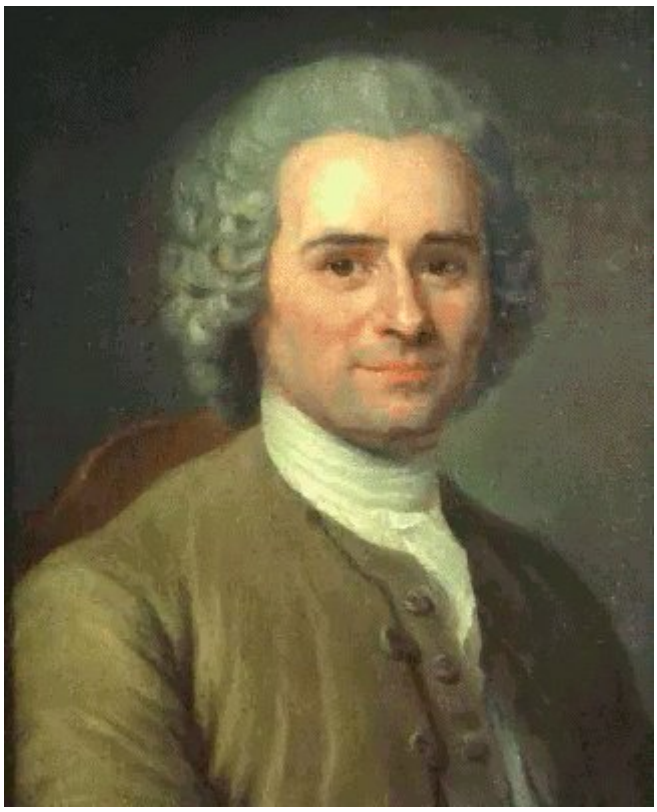
What Good, Art?

Creative Class, Dismissed

Students take the arts' nobility as gospel until they meet a heretic named Jean-Jacques



Recently I've been teaching, in a couple of undergraduate seminars, Jean-Jacques Rousseau's *Letter to d'Alembert on the Theatre* (1758), the most provocative essay on the arts ever written. It is about the unintended effects of theater — which, for Rousseau, stands in for all of the arts — on an audience. The essay is an impassioned rebuttal to the 1757 entry on Geneva, written by Jean Le Rond d'Alembert, in the huge Enlightenment project, *Encyclopédie,* in which d'Alembert says that Geneva would be an even finer city if only it didn't have laws banning theater. Rousseau says that, au contraire, theater would actually be harmful to the citizens of Calvinist Geneva and tries to prove that the prohibition is a good thing.

To my students, Rousseau's astonishing position collides head-on with the TV-drenched, movie-dependent, iPodified, grind-dancing world in which many of them spend a good part of their lives. The idea that their world of stories and entertainment — even in its more respectable precincts such as *Masterpiece Theatre* and U2 benefit concerts — could possibly be harmful to them is the furthest thing from their minds. In studying Rousseau's essay, my students directly confront their stormy love affair with mass culture. They learn the extent to which their youthful values are already in deep conflict with one another. They experience — albeit in fitful spasms — a sense of urgency about their lives, realizing with a kind of awe that their college years mark one of the most significant life passages they will ever face.

In the *Letter*, Rousseau's preoccupation is with how to sustain "virtue" in the face of modernity. "Virtue" is a word that nearly all of my students initially choke on, as its contemporary meaning applies mostly to anachronistic notions of female chastity. None of them have ever thought much about virtue, but Rousseau, drawing inspiration from ancient Greek political philosophy, is deeply attached

to the idea. For him, virtue existed only in communities whose citizens knew how to put aside self-interest for the sake of the whole. The places where Rousseau could find virtue, alas, were confined to a few small, free republics scattered through history, such as ancient Sparta or 18th-century Geneva, and not in freewheeling metropolises such as Paris, awash in urban luxury. Rousseau's essay argues that the twin vices of vanity and competition, born when man left the "state of nature" and formed societies, inevitably destroy virtue and happiness.

Rousseau, the Enlightenment's party pooper, shocks college students by trashing education and reason, science and art, and the advancement of knowledge in general. Most students have come to college at least partly to "make themselves better." Rousseau seems to be telling them not to fool themselves. Their real motives, he implies, are vanity and ambition. And nothing fuels those two vices, Rousseau says, like the arts.

Such a counterintuitive attack on the arts jolts my art students in particular. Since their early childhoods, they've been taught that by making and showing off their finger paintings, class plays, and rhythm-band performances, they're somehow doing a very nice thing for themselves and everyone around them. Although my students readily concede Rousseau's initial premises that theater's purpose is to entertain (that is, to give pleasure) and that it's a luxury rather than a necessity, they have a hard time accepting the possibility that it might be truly deleterious.

But the pleasure that theater provides, Rousseau argues, is based on the display of unruly passions, and it's addictive: Almost everyone who encounters theater wants more and more of it. Worse, Rousseau says, theater "tends everywhere to promote and increase the inequality of fortunes" because it triggers a host of artificial desires. And even when theater is great, and its audience consists of decent people, Rousseau argues, whether or not we're made better by it depends on who we are to begin with. Many of us are made worse by theater precisely because we're introduced to bad ideas we'd never thought of before. The modern media echoes Rousseau's claim regularly, especially after tragedies like that at Virginia Tech: Villains "accustom the eyes of the people to horrors that they ought not even to know and to crimes they ought not to suppose possible."

Theater also engenders in us the fuzzy feeling that we become good people merely by watching other people — none of whom we know personally — pretending to be good or bad people on the stage and then identifying ourselves only with the good ones: "The continual emotion that is felt in the theater excites us, enervates us, enfeebles us, and makes us less able to resist our passions. And the sterile interest taken in virtue serves only to satisfy our vanity without obliging us to practice it."

In short, theater's smoke and mirrors seduce us into substituting art for moral action. And even though theater might keep unvirtuous people in big cities distracted and somewhat in check, Rousseau thinks it causes generally good people to become restless and unhappy with their own lives because it makes their own lives seem, by comparison, boring. In fact, the better theater is, the more inherently debilitating it is to real life. In sum: Theater is slightly good only for bad people, and quite bad for good people.

This conclusion puts my students in a philosophical pickle because they tend to be convinced by Rousseau's logic but still think of their theater-liking selves as essentially good. They're good people, they think, because they're reasonable people getting an education that will make them even more reasonable. But Rousseau, borrowing heavily from Plato, argues that reason, compared to the strong force of habit, is pretty weak in determining human behavior. Habits, Rousseau says, come from three sources: law, pleasure, and — the most powerful of all — public opinion. And habits are, by definition, resistant to change. Even the law is ineffective when it tries to get people to change their ways too rapidly. The best way to change engrained habits lies in gently manipulating public opinion.

Now, most of my students have thought very little about either their own habits or habits in general. In closed societies of the kind Rousseau admired — small republics with strong censorship and active, virtuous citizens who know one another — every member of the community enforces the habits of every other member with spying eyes. My students see communities with spying eyes in terms either of wicked foreign theocracies or small, rural American towns. To them, lives lived in such

communities seem boxed in, if not outright oppressed. But Rousseau teaches the opposite — that these are good lives. Artists, with their vanity and longing for fame, have no business intruding in them. Their meddling — for example, putting on plays — can result only in destabilization and destruction.

Most of my students struggle hard over this idea. They arrive in college assuming education and the distribution of knowledge are, prima facie, good things. The idea that the opposite might be true — that art and science destroy the joy in many people by making their way of life seem stupid and unsophisticated — rattles everyone in the room.

Tucked into the middle of Rousseau's inveighing against theater is a discussion of women that makes the remarks of Larry Summers, Harvard's former president, seem almost conciliatory. Rousseau claims that the equality of the sexes is a foolish, modern idea. The differences between the sexes are there for anyone to see, linked as they are to anatomy. Rousseau will not quarrel with nature's plumbing. Women, he argues, are not only the receivers of sexual advances, but the inherently weaker sex as well. But, he says, nature gave women a weapon to protect themselves from more powerful males: modesty.

For Rousseau, modesty is the means by which women fend off undesirable males and encourage only the ones they regard as potential mates. And once the appropriate male has been snared, Rousseau says, women employ another tool to keep their otherwise hit-and-run mates around for the long haul: love. "Love is the realm of women. It is they who necessarily give the law in it, because, according to the order of nature, resistance belongs to them, and men can conquer this resistance only at the expense of their liberty."

Rousseau turns upside down the ideas my students carry about the sexes. He seems to say that women are fit only to become dutiful, breeding Stepford wives. Most of my students are outraged when they first read this part of the *Letter.* During one of my seminars, students unanimously contended that modesty is imposed on women by insecure men.

As repugnant as Rousseau's precepts about women are, they're crucial to his argument about theater, and, as much as I'd like to, I can't simply sweep them under the rug. He says that going to the theater destroys female modesty and replaces it with vanity (I always bring up the irrepressible female longing for a new dress for a party). When female modesty declines, Rousseau argues, men stop loving women because they no longer trust them. Who else, the husband asks himself, is my wife preening for? Such distrust, Rousseau says, in the end obliterates love.

In class discussion, when my students invariably protest that Rousseau is an outdated chauvinist, I ask why most women in contemporary society wear makeup and most men don't, and why there isn't a store called *Victor*'s Secret. We talk about Jane Austen's women, their trade-offs between true love and men who, however repellent, provide security, and how much of that kind of social survivalism is still practiced today. These discussions are unsettling, I admit, even to me. But whether by habit or nature, I unfailingly wear lipstick to class.

Concepts of the sexes aside, my students can readily see that when Rousseau goes after theater, he's also going after their movies, music, and television. He attacks most of their largely unexamined ideas: that small-town life is stultifying and big-city life is where it's at; that artists and intellectuals are superior to everybody else; that censorship is bad; and that art is uplifting and good for a society. Most upsetting, Rousseau challenges them to look at their reasons for being in college. The platitude pounded into them since kindergarten — "Education is the key" — suddenly seems meaningless. Key to what? No matter how learned or artistically sophisticated we become, Rousseau teaches, we still have but a frail grasp of what it takes to be good or happy.

Most of my students end up reluctantly siding with Rousseau. His rhetorical passion for virtue, coupled with the fact that he follows up general observations with particular, well-chosen examples, can't easily be refuted. But siding with Rousseau leaves them incapable of justifying their lives. To open the window to criticism of Rousseau, I point out what I see to be flaws in his argument — for example,

that he ignores how often small towns wreak misery on good people who happen to be a bit different, which is why they hightail it to big cities. I raise the problem of how often good people have narrow minds.

There's no happy reconciliation of art and morals at the end of reading Rousseau, as there is in, say, Kant or Schiller. There's only a stark question: What do we choose — art or virtue? Generally speaking, my students are fraught with contradictions. They sense that they face the moral job of finding the courage of their convictions — even in speech, in our seminar meetings — but their youthful intellectual blossoming confuses them about exactly what their convictions are. Rousseau teaches that reason and moral conviction are often in tension with each other, and that their reconciliation may not be possible.

Rousseau has an overarching thesis that considers people to be good by nature but corrupted by society. My students like that, since it reassures them that it's not entirely their fault every time they do something bad, but rather that some larger social force "made me do it." And Rousseau articulates the longings in my students for more of a reason to live than competing for who's the best looking and smartest, or who ends up with the most toys.

Many students tell me that reading Rousseau makes them conscious of the fact that ineluctably fascinating human wrongdoing almost always trumps the dullness of virtue, and that people who cheerily trumpet art (especially that which showcases bad behavior as entertainment) are blind to both art's power and its peril. One of my former seminar members recently wrote me that he was glad he'd read *Letter to d'Alembert* because he'd learned from it that, in the end, he prefers being miserable and loving art to his earlier childhood state of being happy and ignorant of it. This student was clear, at least: He was choosing art over virtue.

Whatever their ultimate opinions, I like to think Rousseau's essay humbles my students just a little, in just the right way, and at just the right moment in their lives. It reminds them that the kind of moral person they are becoming will never, ever hinge on the fact that they're getting a college degree. 4

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http://chronicle.com/temp/email2.php?id=HgChDQvvVbGyPZVtJcfhDWQGgm3pbj48

Arts Sustainability Begins With Funding

Sustainable future will come only from new sources of finance

Cathy Hunt and Phyllida Shaw | *January 22, 2008*

EVERY few years a different word works its way into the debate about the future of the publicly funded arts sector: words such as industry, investment, partnership.

These linguistic imports are rarely superficial or coincidental. More often than not they reflect changes in the way governments and their funding agencies perceive the arts sector. Sometimes they signal a shift in the sector's perception of itself.

Sustainability, usually applied to the economy or the environment, is one of the more recent words to insinuate itself. But sustainability in the arts is about much more than money. Questions about the quality of artistic work and services, the efficiency of an organisation and the breadth and depth of its audience are as important as the more familiar ones about funding.

Core to the issue of sustainability is the creation of vibrant art. Without this understanding as a starting point, and as the goal for all artists, organisations and funding agencies, there is no future. Organisations can plan effectively only when they know what they are trying to achieve. Too often they fall into the trap of creating a vision in response to funding policies, and change course to attract program funding that is not core to what they do. The funding system therefore needs to be unambiguous in its expectations and fund only those willing to try to meet them.

Funding agencies also need to consider their support for the range of legal and operating structures that artists may consider best for creating their work. The not-for-profit structure may not be always appropriate.

There are signs that some agencies are prepared to make difficult decisions, to begin to fund fewer organisations at more appropriate levels, and to resist tying this funding to the same group forever. This is a positive step but one that needs to be considered across the ecology of provision for large as well as smaller enterprises.

The more income streams an arts organisation has, the better. Over-dependence on public funding, or on any single source, is clearly risky. The challenge for Australian arts organisations is the shortage of different kinds of funding.

The range of funding available to institutions in Britain - such as the arts councils, the National Lottery, local and regional government, grant-making trusts, commercial sponsors and the European Union - is far broader than that available to most Australian companies. That said, only those organisations willing and sufficiently resourced to invest time and effort in researching sources and making applications reap the benefit.

Attempts to achieve a sustainable arts sector are still a recent phenomenon, but it is already clear that unless the balance of public, private and charitable funding changes significantly, sustainability will require more than tinkering at the edges. For real transformation we must look at changes in the working practices of artists and arts organisations, and at the models we have for funding the arts.

In Australia, in a period of economic boom, with individual wealth and government income from economic growth on the rise, there is clearly an opportunity to do more in the area of tax incentives for those who give to the arts, both at a federal and state level.

Further research could be undertaken into new financial mechanisms, including interest-free and cash-flow loans. The Quickstart Loan Fund, an independently managed fund in Brisbane, has for the past five

years provided low-level, interest-free loans to Queensland artists and creative businesses. It has the potential to grow and be replicated across the country.

The election of a new federal government - particularly one that is looking for new ways of working, stronger partnerships with state governments and new relationships with the private sector - has created an opportunity to consider this transformation.

In its arts policy launch prior to the election, the Labor Party indicated the directions it intended to consider. They included: increasing support to the arts; a move away from historical funding patterns; reducing bureaucracy; and new opportunities for risk and innovation.

Specific initiatives, including investment in "creative communities" that would encourage local participation in arts and cultural activities, and investment in cultural entrepreneurs, could be useful contributions. The education revolution proposed by Prime Minister Kevin Rudd could be an opportunity to implement a national education and arts strategy. But even if governments find new money to strengthen, and in some cases rescue, aspects of the cultural ecology, how much of the money is likely to be used for risk-taking? Won't there still be wranglings within agencies over how much is directly spent on the art (supply), and how much on education and market development (demand)?

Regardless of which party is in power, is it possible for a government to invest in a program that may not show benefits for 10 years? And are the levels of support under consideration really enough for fundamental structural change?

If there is a genuine desire for a more sustainable arts sector, and if governments continue to take some responsibility for how this can be achieved, shouldn't all parts of the sector also take responsibility for thinking a little differently about its development?

While the principle of funding for organisational development is well established in Australia, in Britain the introduction of a completely new funding source for the arts - the National Lottery - has provided the opportunity for significant change, including a wholesale review of the challenge of sustainability. What is required for real transformation is a major initiative with sustainability as its objective. We invite the federal Government to initiate a discussion about establishing an endowment to create a new funding source for the arts in Australia: a future fund for the arts, financed by the federal Government in partnership with the state governments and the private sector, through a special tax incentive linked to corporate and individual investment. There are precedents for this idea. The Howard government established a future fund to help meet the cost of increased publicsector superannuation liabilities, and take responsibility, with the support of the Future Fund Management Agency, for the investment of the Higher Education Endowment Fund.

A future fund for the arts could be independently constituted as a foundation. It could work alongside the Australia Council, state and local governments, and undertake activities that governments and their agencies find problematic but which are vital to sustainability. Specifically, it would have a remit to provide support for artistic and organisational risk and innovation, projects and programs lasting seven years or more, and longitudinal research into the long-term impact of the arts.

As well as injecting significant new investment into the sector every year, a future fund for the arts would free up the existing agencies to concentrate on supporting artistic production and promoting the value of the arts to all Australians. With state, federal and local government funding focused on the short to medium term, and a future fund addressing a longer-term agenda, the sector's sustainability is more likely to be assured. *This is an edited extract from Platform Papers 15, A Sustainable Arts Sector: What Will it Take? (Currency House). Cathy Hunt and Phyllida Shaw are arts management strategists based in Brisbane and Britain. They will speak at public forums in Brisbane on February 6; Sydney, February 9; and Melbourne, February 11.*

http://www.theaustralian.news.com.au/story/0,,23087056-16947,00.html

Music mayhem
Convergence of forces creating new world for fans, industry
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BY AARON BECK
The Columbus Dispatch

David Bruenger, iPod in hand, teaches a class on the influence of technology on pop-music production and marketing.

The music industry's "next big thing" is about more than music.

It's a complicated convergence of economic, social and technological forces, says associate professor David Bruenger, who teaches a new class called "Survey of the Music Industry" in the Ohio State University School of Music.

Such a merger of forces, he explains, "applies as much to rock 'n' roll in the 1950s as it does to Stephen Foster and Tin Pan Alley."

"But the big goal of this class is to get to a place where we can talk about the last 10 years in music. That's where it really gets interesting and relevant."

The 54-year-old professor ("BRING-er") lends a wealth of practical experience to his theories. He is a trombonist who performed with the Temptations, Liberace and several symphonic, ballet and opera orchestras.

He has a doctorate from the University of North Texas and directed the music-industry program at the University of Texas at San Antonio. He is also teaching a course in protest music this quarter at OSU.

Q: The "century-long model of the music industry is falling apart," you say. What factors have led to that?

A: If we were going to point to one thing, it's the empowerment of listeners to choose their own musical menus. What's not new is that people want to use music to build the soundtracks of their lives, but now it's the kind of control we have of what we play.

The choices available are completely unprecedented.

Q: What was the first sign?

A: When (the digital file-sharing service) Napster became publicly available (1999) -- that was the big, flashing red light. There may have been indicators before that; CD sales were flagging. . . . But somewhere between Nirvana's *Nevermind* (1991) and Napster, we were going through another period of growing disenchantment with corporate music.

Q: Why is the initial reaction of the recording industry to new technology always hostile?

A: Part of that comes from this intrinsic stress in the music industry. There's a business side and an art side. On the business side, you are desperately trying to control and replicate success. But in music you're dealing with popular musicians and people in the visual media.

It's like herding cats. You can't really control that kind of creativity.

So, from a business perspective, you lose money on almost everything you produce. You're desperate to control what you can.

I think that kind of stress produces a fear-based reaction. When some new technology comes out that seems to suggest that the content is now free, that would terrify me -- if I had millions and billions invested in an infrastructure, that some college kid says, "Well, it doesn't matter anymore. I invented a thing that makes all of that irrelevant."

That's terror.

It's historically been that way. Radio terrified the record companies in the 1920s. They felt, "Well, if the content is going to be free, why do people need to buy this product anymore?"

The terms are different, but it's the exact same argument.

Q: What did you think of the way the band Radiohead released In Rainbows in October -- digitally, for whatever price fans wanted to pay?

A: It made a lot of sense to me. I thought, "That particular band isn't risking a whole lot by doing this. It's probably going to work for them."

What surprised me was how many people in various parts of the industry seemed shocked and offended by it. Somebody's got to try it, and it made sense for those guys.

Q: Will we see more and more bands doing it Radiohead's way?

A: Maybe, but it raises the question of a band's relationship with its particular audience.

Radiohead has a particular relationship with its audience that's not the same as, say, Aerosmith and its audience. Some bands develop a community relationship with their fans. For those bands, I think they can go direct. Radiohead proved that.

Now, whether Metallica could at this point, maybe not. They've maybe burned that bridge, and (for) somebody who has a more conventional-pop relationship with their audience, I don't think that could work. But I think it's going to be inevitable that people explore it.

Q: Has modern-day technology affected the way pop music is created and recorded?

A: The basic three-minute-or-so song length has held up surprisingly well considering radio play is not the factor it used to be. . . . The nature of music itself is shifting -- that's going to take longer because people are still listening to Led Zeppelin. It's part of our cultural vocabulary still. It's going to take however many years with them to sound hopelessly outdated.

Q: We have more music choices and access to music than ever. Is that good?

A: Filtering serves a social purpose. People don't have time to listen to all the music that's available, but do you rely on corporations to filter that through? Do you trust the wisdom of crowds to do it?

I think (choice) is a good thing. It makes the business model much more complicated, but culturally, it's a great thing.

It's not going to last; it'll change and become a more controlled model within the next few years. But while it's lasted, it's been chaotic and interesting.

Q: What does the recording industry need to do to survive?

A: One thing that has to happen is they have to be able to think outside the box of the blockbuster model of success. As long as we're looking for the next Michael Jackson, it's going to be impossible to look at what people actually care about in music or maybe what music's available.

Q: Will the compact disc soon be a thing of the past?

A: Man, I don't know. People still like a physical product. I think the fact that Radiohead sold over 100,000 (copies) the first week they put their record in stores (Jan. 1) -- after making it free online -- says

something about the enduring legacy of a physical product. But I wouldn't be counting on the CD as the primary vehicle.

Q: Will the digital version be the primary vehicle?

A: I think it's going to be generational for a while. People my age are not going to totally invest in digital music.

I'm not so hung up on the medium in which it's presented, but the practical reality is that I have a lot of money invested in CDs. New CDs that come out that seem particularly appealing to me, I'm going to buy them.

Twenty-something people aren't going to be as interested in a physical product. There are going to be people who come along who don't ever buy a CD player, because what's the point?

Q: Are we in the most dynamic era of the music industry?

A: Unquestionably. Sound recording and radio, that was a revolution, but that took 30, 40 years for it to happen.

We've seen a revolution between June (the launch of Napster) and December of 1999 (when the Recording Industry Association of America sued Napster) where everything got turned on its head, and it continues to be in a state of flux. It's incredibly exciting. If I had a huge amount of money invested in a traditional medium, I'd be scared to death.

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Founders' letters lag in delivery

Slow publication vexes scholars.

By Edward Colimore

Inquirer Staff Writer

SARAH J. GLOVER / Inquirer Staff Photographer

From sunrise until about 2 p.m. each day, he was "drudging at the writing table."

"The letters of a person," he once wrote, ". . . form the only full and genuine journal of his life."

In his 83 years, Thomas Jefferson penned nearly 20,000 pieces of correspondence, many in Philadelphia. The prolific framer of the Declaration of Independence wrote about politics, science, math and horticulture.

But about half his papers have never been published.

Despite various efforts by dozens of scholars since 1943, vast portions of the letters written by and to America's Founding Fathers are unavailable to the public. Some of the documents won't be readily accessible until the middle of the century.

The slow pace of their publication - largely attributed to insufficient funding and staff - has provoked the ire of scholars, Pulitzer Prize-winning historian David McCullough, and federal officials who describe the delay as shameful.

The critics have called on Congress to supply more money for the effort, known as the Founding Fathers Project, which includes the work of Jefferson, George Washington, Benjamin Franklin, John Adams and James Madison.

And they successfully pressured Congress to have the national archivist devise a plan by March 25 to expedite the papers' availability online.

"We can put a man on the moon. We should be able to get the words of our Founding Fathers published along with the scholarship," said Rebecca W. Rimel, president of the Philadelphia-based Pew Charitable Trusts, which has contributed $7.5 million to the project since 1981.

The delay in publication is "a national embarrassment," Rimel said, "though I'm not blaming the people who have been toiling in the vineyards for so long."

Researchers working on the papers, mostly at major universities, have been thrilled by some of their discoveries. But they say their scholarship and annotations cannot be rushed.

The effort, begun with private funding, was started in 1943 - the 200th anniversary of Jefferson's birth - by Princeton University history professor Julian Boyd, then serving as historian of the Thomas Jefferson Bicentennial Commission. The project was later supported by federal officials, who saw it as a way to help Americans understand what they had fought for during World War II.

Publication of the papers has taken so long, scholars say, because they have had to collect material from hundreds of libraries, archives and private collections around the world.

Transcribing copies of the precious documents, dating them, and providing context have required additional time. And securing sufficient money over the decades has often been a problem.

Franklin's papers are expected to be completed by 2016, Washington's by 2023, Madison's between 2020 and 2026, and Jefferson's by 2026. Adams' are unlikely to be finished until about 2050. Some documents are now online.

Only the papers of Alexander Hamilton have been completed. His writing days were cut short in a fatal duel with Aaron Burr when Hamilton was 49.

More than $60 million for the Founding Fathers Project has come from Pew, the Andrew W. Mellon Foundation, the federal government, the National Endowment for the Humanities, and other sources. The NEH has awarded more than $10 million and helped leverage an additional $5 million in private funds since about 1980.

A nonprofit, the Papers of the Founding Fathers Inc., was formed in Princeton in 1981 to help raise money for the publication of the papers of Franklin, Washington, Adams, Jefferson and Madison.

"The project has had a long and somewhat difficult history," Rimel said. "We would like the words of the Founding Fathers to be accessible to everyone and, I say laughingly, in our lifetime."

The work could be expedited with "better organization and more money," said McCullough, the presidential historian.

"You can tell a lot about a society from how it spends money," he said. "If this society is unwilling to spend it on something of such immense and colossal importance, then something is seriously wrong."

McCullough sees similarities between the project and construction of the Washington Monument, which ran out of money at one point, temporarily leaving a stone stump.

"These volumes of the founders are more of a monument than anything built in stone," he said.

It is mainly the scholarly community that will depend on the laboriously annotated published editions of the documents, said Princeton professor Stanley Katz, chairman of the board of trustees of Papers of the Founding Fathers.

For the public, however, putting published and unpublished text online "can be done relatively quickly," said Katz, director of the Center for Arts and Cultural Policy Studies at the university's Woodrow Wilson School.

"My suggestion is that the one be made available for online publication while [researchers] take a considerably longer time to produce the annotated editions," he said.

Though the wait for the Jefferson papers has been long - the first volume came out in 1950, during the Truman administration - editing is picking up because of a division of labor between two groups. Researchers call it a model for future endeavors.

Several years ago, Princeton and the Thomas Jefferson Foundation at Monticello split the work, with the school focusing on material through Jefferson's presidency and the foundation concentrating on his retirement.

"I think it's working very well for us," said Barbara Oberg, a Princeton history professor and general editor of the papers.

Princeton has published 34 volumes, with 17 or 18 remaining to be completed. The foundation has published four of 23 volumes. The joint effort is now resulting in two volumes a year, containing the letters with historical context and commentary.

Their contents have often been stunning. Princeton's next volume, to be released in December, provides a record of Jefferson's innoculating his family and slaves against smallpox. It also shows him correctly calculating in 1800 how long the country's population would take to double.

"Jefferson complained that writing was drudgery, but he seemed to thrive on it," said Oberg, who worked previously on the Franklin papers at Yale University. "His handwriting is flowing, consistent, easy to understand, and quite beautiful."

Work by two teams of scholars at the Jefferson Foundation has helped speed publication, said Dan Jordan, director of the foundation, which owns and operates Monticello, Jefferson's home near Charlottesville, Va.

But Jordan said he understood people's frustration.

"It's fair to say everyone is disappointed that it hasn't gone faster," he said. "The country is being denied a core archives, which is not available to teachers, students and the general public.

"The Founding Fathers argued, debated and disagreed, and we live within the framework of their debate. The documents are American scripture," Jordan said.

No one can join a project of this magnitude "and hit the ground running," said Ellen Cohn, editor of the Franklin papers at Yale. "We are working at such a level of detail that the more you know, the more valuable you are."

Many documents have unclear handwriting, no dates and no signatures, Cohn said. Researchers are so familiar with the material, she said, that they are able to date it, determine who wrote it, and place it in context.

"It's a balance between going as fast as we possibly can and not making mistakes," Cohn said.

Franklin's papers have provided surprises, she said, and sometimes changed how history is taught.

Cryptic jottings on the back of a 1783 letter contained a clue that helped scholars determine the date Franklin arrived in Philadelphia: Oct. 6, 1723. As he began work on an autobiography, Franklin used the letter as scratch paper, reconstructing the dates of his youthful travels.

Other research - to appear in a forthcoming volume - revealed Franklin's secret diplomatic maneuvering behind the republic's 1783 treaty with Sweden, the United States' first agreement with a foreign nation after Britain acknowledged American independence.

The new volume will also tell of how Franklin designed, commissioned and distributed his now-famous "Libertas Americana" medal, which he presented in France to the king and queen, ambassadors at court, and friends of the American cause in 1783.

"Most people who haven't actually seen what we do don't have any idea how intricate it is and how easy it is to make mistakes - and how spectacular it is when we do it well," Cohn said.

Scholarly editing "is not an industrial process, but a craft process," Katz added. "If you throw more money at it, you get it done faster, but not with the same standards. If you cut out most of the annotation and publish a third of the documents, it's not the same product."

Some scholars say they were saddled with unrealistic expectations. In the 1960s and early 1970s, when several Founding Fathers projects were launched, organizers predicted the job could be done in two or three decades.

"Somehow that perception stuck and was never revised," said John Stagg, editor in chief of the Madison papers at the University of Virginia and a history professor, who believes that goal was never possible. "Those working on the project [today] are then held responsible for not doing more. That's unfair to the current staffs."

To be sure, patience with the process is wearing thin.

Rimel said the board of the Pew Charitable Trusts had taken a "long-term interest" in the publication of the papers. But "long-term doesn't mean forever," she said. "It would be nice to see how we can expedite this because the public deserves it."

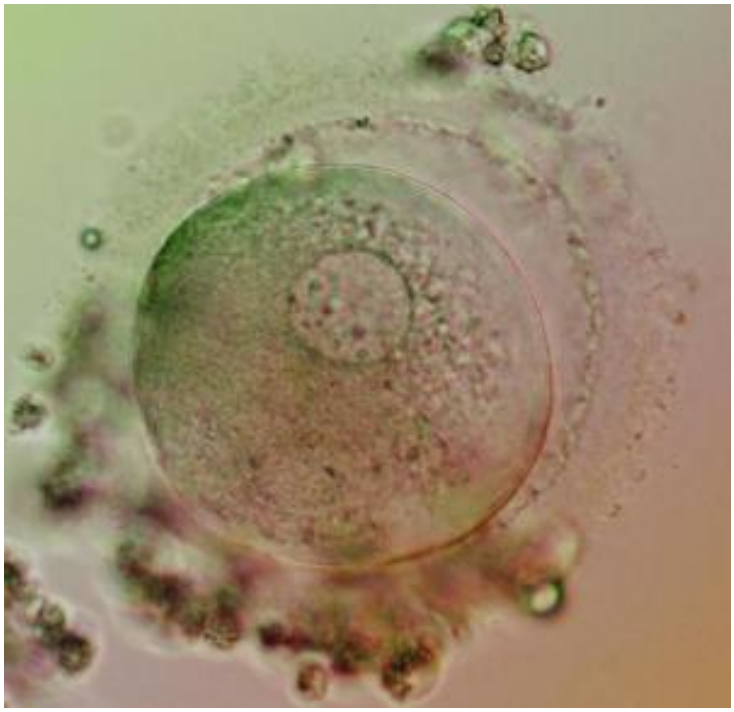
Added McCullough: "I don't want people to wait another 50 years."

To view a video of Princeton professor Barbara Oberg discussing work on Thomas Jefferson's letters, go to **http://go.philly.com/founders**

Contact staff writer Edward Colimore at 856-779-3833 or ecolimore@phillynews.com. To comment, or to ask a question, go to http://go.philly.com/askcolimore.

http://www.philly.com/inquirer/politics/national/20080120_Slow_publication_vexes_scholars_.html

Cloned Human Embryo Created From Skin Cells



(1PN-SCNT) The first sign of successful cloning. The first indication that cloning has been successful is the observation of a single pronucleus, seen here, which contains the donated material from the donor skin cell. (Credit: Image courtesy of Stemagen)

ScienceDaily (Jan. 22, 2008) — Stemagen, a privately held embryonic stem cell research company, announced January 17 it has become the first in the world to create, and meticulously document, a cloned human embryo using somatic cell nuclear transfer (SCNT).

Stemagen CEO Samuel H. Wood, M.D., Ph.D., a co-author of the publication and a donor of the cells from which the embryos were cloned, terms this achievement "a critical milestone in the development of patient-specific embryonic stem cells for human therapeutic use, potentially including developing treatments for Parkinson's, Alzheimer's and other degenerative diseases." Stemagen's research is exhaustively detailed in a paper published in the January 17 issue of the peer-reviewed scientific journal *Stem Cells*.

"This is not merely a technical improvement on previous research in this area," said Andrew French, Ph.D., lead author on the paper, "Development of Human Cloned Blastocysts Following Somatic Cell Nuclear Transfer (SCNT) with Adult Fibroblasts."

"No other scientific group has documented the cloning of an adult human cell, much less been able to grow it to the blastocyst stage, the stage at which it is the adult donor cell that is driving embryonic development, the stage that yields the cells (the inner cell mass) from which embryonic stem cell lines are made," said French, who is Stemagen's Chief Scientific Officer.

Five blastocysts were developed from 25 donated mature oocytes. Three were confirmed to be clones based on DNA fingerprinting demonstrating the presence of the skin cell donor DNA in the blastocyst, while one was further confirmed to be a clone by an additional mitochondrial DNA (mtDNA) analysis which revealed the presence of oocyte donor mtDNA without any oocyte donor nuclear DNA. For technical reasons, the genetic material in the remaining two blastocysts did not amplify to the extent required for analysis, and so while it is likely they were clones, the evidence required to claim that with certainty was not present. Thus, in this study, cloned blastocysts were successfully created from

approximately 10% of all mature donated oocytes, an unexpectedly high rate given past research in this field.

The oocytes used in this study were donated by egg donors and intended parents undergoing egg donation cycles for reproductive purposes at the Reproductive Sciences Center in La Jolla, a leading fertility center specializing in egg donation and other advanced assisted reproductive technologies. Stemagen and the Reproductive Sciences Center worked closely, over an extended period of time, with a leading independent Institutional Review Board (IRB) to develop procedures ensuring that all parties received comprehensive informed consent and that procedures were in place to protect their confidentiality in the process.

All research procedures, including the culturing of the skin cells (fibroblasts) were performed under clinical laboratory conditions in close cooperation with the Assisted Reproductive Technologies (ART) Laboratory of the Reproductive Sciences Center, directed by Catharine Adams, Ph.D. French notes, "An important reason for the success of our SCNT procedures depended on the close coordination between our laboratory personnel and fertility center laboratory staff. Timing is a critical element in maximizing the probability of success in this type of procedure."

Wood points out that this research was exhaustively scrutinized by some of the world's most respected scientists and underwent an exceptionally rigorous process of verification, "This achievement was so critical to our field, we felt we should spare no effort in the process of establishing the validity of our work."

DNA fingerprinting is the scientifically accepted method for determining if an embryo is a true clone. According to French, "All samples were subjected to this type of analysis to determine their true genetic makeup."

For that, the company turned to Genesis Genetics, a recognized worldwide leader in the field of reproductive embryonic analysis.

Adapted from materials provided by Stemagen.

http://www.sciencedaily.com/releases/2008/01/080118092439.htm

Make art loans, not war

Ownership issues aside, Greece, Italy and other countries can afford to share the wealth.
By Lee Rosenbaum
January 21, 2008

The much-celebrated and hotly contested Euphronios calyx-krater is the Metropolitan Museum's no more. Last week, the Greek two-handled bowl got a one-way ticket to Italy, the country from which it is thought to have been looted. At Rome's presidential palace, it is joining four other objects already relinquished by the Met in a trophy exhibition of 69 works reclaimed by Italy and Greece from four American museums and a dealer. On Friday came the news that a private collector in the U.S., Shelby White, had, like the museums, agreed to hand over works sought by the Italians.

To the victor in the cultural-property wars belong the spoils. But now that American museums have acceded to demands for restitution, it's time to ask not only what "universal museums" can do for antiquities' countries of origin, but also what the source countries can do for the world's encyclopedic museums.

American institutions have been chastened by evidence demonstrating that objects in their possession were probably looted. The ongoing criminal trial of former Getty Museum curator Marion True, charged with trafficking in illegal antiquities, also has been a powerful deal motivator. (With the Getty's agreement to transfer 40 objects to Italy, True is widely expected to be let off the hook.)

Now that source countries have forcefully asserted their claims, the time has come to make loans, not war. Everyone wins when cultural objects are internationally disseminated, studied and appreciated. Even objects that came into the custody of American museums through questionable means should be allowed to remain here on long-term loan, in recognition of the principle that art lovers everywhere should have the opportunity to admire the best of world art. The ownership, but not the venue, of these objects should change, and laws like Italy's -- which limits international loans to four years -- should be relaxed. The 15 Italy-bound pieces of Hellenistic silver that will remain at the Met until 2010 are now labeled "Lent by the Republic of Italy." Why not allow them to stay where they are?

The fact is that source countries, possessing more high-quality artifacts from their ancient pasts than they can adequately display, don't need to get everything back. The Met's senior research associate, Heidi King, organizer of that museum's upcoming show "Featherwork in Ancient Peru," said that Peruvian museums already own ceramics of far greater quality than the pieces that Yale University recently agreed to relinquish from a collection acquired in the early 1900s from the Machu Picchu expedition led by Yale scholar Hiram Bingham III. And it could be argued that the "context" Yale provided these objects for 100 years -- through scholarship and public display -- makes it worth preserving them "in situ" in New Haven.

Aside from being magnanimous lenders, source countries should allow some legally excavated antiquities

to be bought and sold. Lesser objects could be marketed to collectors, dealers and museums, with the proceeds benefiting archaeological projects. Enabling citizens of other countries to appreciate and acquire selected pieces of Italy's, Greece's, Egypt's or China's past is a game that, if played by the rules, can have no losers.

More controversially, I believe that source countries should consider training and licensing citizen archaeologists. The antiquities police can't hope to end all the looting or shut down the black market completely. But if those who make finds are compensated for reporting them and perhaps trained to help excavate them, midnight marauders who mangle masterpieces and destroy archaeological context may become less numerous and destructive. One precedent for the "if you can't beat 'em, join 'em" approach is Britain's financial compensation of metal detector-wielding amateurs who turn over significant finds including gold, silver and prehistoric objects to the proper authorities.

That said, American museums should stop falling back on the "times were different" justification for past antiquities sins. Many collectors and museum curators always knew full well that their activities were ethically dicey. Just ask the previous director of the Metropolitan Museum, Thomas Hoving, who in 1972 was responsible for the $1-million acquisition of the Euphronios krater. In his professional memoir, "Making the Mummies Dance" (1993), Hoving made it clear he had suspected that the vessel "had been illegally dug up in Italy."

In the bad old days, acquirers of antiquities knew, or at least suspected, that what they were doing was problematic. What's changed now, thanks to aggressive enforcement by the source countries, is that it's become much harder to get away with it.

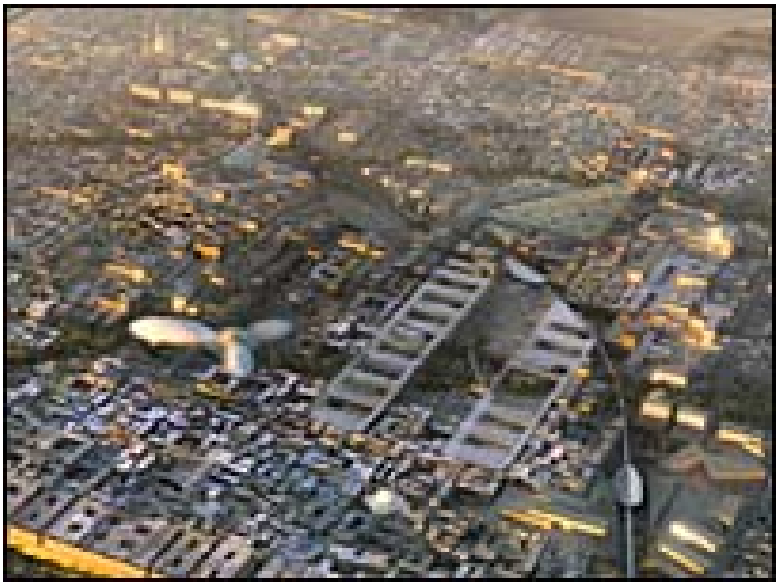
Lee Rosenbaum is a contributing editor of Art in America magazine and blogs as CultureGrrl. (artsjournal.com/culturegrrl).

http://www.latimes.com/news/printedition/opinion/la-oe-rosenbaum21jan21,1,2374614.story?coll=la-news-comment&ctrack=2&cset=true

Abu Dhabi plots hydrogen future

By Richard Black
Environment correspondent, BBC News website

The government of Abu Dhabi has announced a $15bn (£7.5bn) initiative to develop clean energy technologies.



The Gulf state describes the five-year initiative as "the most ambitious sustainability project ever launched by a government".

Components will include the world's largest hydrogen power plant.

The government has also announced plans for a "sustainable city", housing about 50,000 people, that will produce no greenhouse gases and contain no cars.

The $15bn fund, which the state hopes will lead to international joint ventures involving much more money, is being channelled through the Masdar Initiative, a company established to develop and commercialise clean energy technologies.

It shows that you can generate hydrogen without carbon release from fossil fuels
Professor Keith Guy

"As global demand for energy continues to expand, and as climate change becomes a real and growing concern, the time has come to look to the future," said Masdar CEO Dr Sultan Al Jaber.

"Our ability to adapt and respond to these realities will ensure that Abu Dhabi's global energy leadership as well as our own growth and development continues."

Technology bridge

The portfolio of technologies eligible for funding under the Masdar Initiative is extensive, but solar energy is likely to be a major beneficiary.

The hydrogen plant, meanwhile, will link the world's currently dominant technology, fossil fuel burning, with two technologies likely to be important in a low-carbon future - carbon sequestration and hydrogen manufacture.

Hydrogen will be manufactured from natural gas by reactions involving steam, producing a mixture of hydrogen and carbon dioxide.

The CO2 can be pumped underground, either simply to store it away permanently or as a way of extracting more oil from existing wells, using the high-pressure gas to force more of the black gold to the surface.

When hydrogen is burned, it produces no CO2. Eventually hydrogen made this way could be used in vehicles, though in Abu Dhabi it will generate electricity.

"It's important because it shows that you can generate hydrogen without carbon release from fossil fuels," commented Keith Guy, an engineering consultant and professor at the UK's Bath University.

"When you look at how hydrogen could be made economically, the route that many people have been looking at, through electrolysis of water, is incredibly expensive."

The Masdar Sustainable City, another component of the Abu Dhabi government's plans which is being designed with input from the environmental group WWF, is envisaged as a self-contained car-free zone where all energy will come from renewable resources, principally solar panels to generate electricity.

Buildings will be constructed to allow air in but keep the Sun's heat out. Wind towers will ventilate homes and offices using natural convection.

The fund and the Masdar City plans were formally unveiled at the World Future Energy Summit in Abu Dhabi.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7200052.stm

Published: 2008/01/21 13:48:43 GMT

Mobiles linked to disturbed sleep
Using a mobile phone before going to bed could stop you getting a decent night's sleep, research suggests.

The study, funded by mobile phone companies, suggests radiation from the handset can cause insomnia, headaches and confusion.

It may also cut our amount of deep sleep - interfering with the body's ability to refresh itself.

The study was carried out by Sweden's Karolinska Institute and Wayne State University in the US.

This research suggests that if you need to make a make a phone call in the evening it is much better to use a land line
Alasdair Philips
Powerwatch

Funded by the Mobile Manufacturers Forum, the scientists studied 35 men and 36 women aged between 18 and 45.

Some were exposed to radiation equivalent to that received when using a mobile phone, others were placed in the same conditions, but given only "sham" exposure.

Those exposed to radiation took longer to enter the first of the deeper stages of sleep, and spent less time in the deepest one.

The scientists concluded: "The study indicates that during laboratory exposure to 884 MHz wireless signals components of sleep believed to be important for recovery from daily wear and tear are adversely affected."

Researcher Professor Bengt Arnetz said: "The study strongly suggests that mobile phone use is associated with specific changes in the areas of the brain responsible for activating and coordinating the stress system."

Another theory is that radiation may disrupt production of the hormone melatonin, which controls the body's internal rhythms.

Electrosensitivity

About half the people in the study believed themselves to be "electrosensitive", reporting symptoms such as headaches and impaired cognitive function from mobile phone use.

But they proved to be unable to tell if they had been exposed to the radiation in the test.

Alasdair Philips is director of Powerwatch, which researches the effects of electromagnetic fields on health.

He said: "The evidence is getting stronger that we should treat these things in a precautionary way.

"This research suggests that if you need to make a phone call in the evening it is much better to use a land line, and don't have your mobile by your bedside table."

Mike Dolan, executive director of the Mobile Operators Association, said the study was inconsistent with other research.

He said: "It is really one small piece in a very large scientific jigsaw. It is a very small effect, one researcher likened it to less than the effect you would see from a cup of coffee."

Last September a major six-year study by the UK Mobile Telecommunications and Health Research Programme (MTHRP) concluded that mobile phone use posed no short-term risk to the brain.

However, the researchers said they could not rule out the possibility that long-term use may raise the risk of cancer.

In the UK, mobile services operate within the frequency ranges 872 to 960 MHz, 1710 to 1875 MHz and 1920 to 2170 MHz.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7199659.stm

Published: 2008/01/21 09:01:48 GMT

'Safe Ebola' created for research
Scientists have made the lethal virus Ebola harmless in the lab, potentially aiding research into a vaccine or cure.

Taking a single gene from the virus stops it replicating, US scientists wrote in the Proceedings of the National Academy of Sciences journal.

Ebola, currently handled in highly secure labs, kills up to 80% of those it infects.

However, one expert said the new method may not yet be a fail-safe way of dealing with the virus.

We wanted to make biologically contained Ebola virus
Yoshihiro Kawaoka
University of Wisconsin at Madison

The need for a "biosecurity level 4" (BSL4) laboratory for any work involving Ebola means that very few research institutions are capable of doing this.

Researchers wear biosafety suits with their own air supply, and the air pressure in the room is less than the pressure outside, so any leak would mean air flowing inwards rather than outwards.

This makes anything more than small-scale study of the virus very difficult to arrange.

If Ebola could be kept in a viable form, yet with the risk of infection removed, then conventional labs might be able to study it.

The researchers, from the University of Wisconsin at Madison, say that they have found a "great system" to do this.

Key gene

They said that a single one of Ebola's eight genes, called VP30, is the key, as without it, the virus cannot replicate within host cells by itself.

EBOLA
Initial symptoms include high fever, severe headache, muscle, joint, or abdominal pain, severe weakness and exhaustion, sore throat, and nausea
As the infection progresses more serious symptoms include diarrhoea, vomiting blood, organ damage, and internal bleeding

However, the scientists still want the virus to replicate in order to study it, so they developed monkey kidney cells which contained the protein needed.

Because the cell was providing the protein, and not the virus itself, it could only replicate within those cells, and even if transferred into a human, would be harmless.

In an effort to prove this, they used the monkey cells for dozens of "cycles" of infection and replication, without once encountering a form of the virus capable of making another creature ill.

"We wanted to make biologically contained Ebola virus," said Yoshihiro Kawaoka.

"The altered virus does not grow in any normal cells. This system can be used for drug screening and for vaccine production."

Monkey tests

However, not everyone in Ebola research is convinced.

Professor Susan Fisher-Hoch, at the University of Texas Health Science Center at Houston, was among those at the forefront of Ebola study in the early 1980s, at the UK's BSL4 lab at Porton Down.

She said that she would need to see more proof that the modified virus could do no harm.

"I wouldn't be comfortable using it until it had been thoroughly tested and did not cause disease in live monkeys, at a high dose.

"There is no way you can prove that it is non-toxic unless this has been done."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7196812.stm

Published: 2008/01/22 00:45:25 GMT

Gene 'may transform pain relief'
US scientists have developed a gene therapy treatment which they hope could revolutionise pain relief.

Pain vanished for at least three months in rats who were injected in the spine with a gene that triggers endorphins, the body's natural pain killer.

The therapy did not affect the rest of the nervous system, including the brain, potentially preventing the main side-effects of current pain relief.

Studies suggest drugs do not relieve cancer pain in as many as 66% of cases.

The research appeared in the Proceedings of the National Academy of Sciences.

"Chronic pain patients often do not experience satisfactory pain relief from available treatments due to poor efficacy or intolerable side effects like extreme sleepiness, mental clouding and hallucinations," said Andreas Beutler, part of the team who conducted the study at Mount Sinai School of Medicine in New York.

He said that in some circumstances, patients preferred to continue suffering some pain in order to preserve lucidity.

There is also a potential risk of addiction to opiate drugs.

Pain costs

The team used a disabled cold virus to carry the gene into the spinal fluid of the rats, which had been developed to suffer from chronic pain.

> **Once the researchers have shown that in animal models of chronic pain, there is long-standing improvement, one could start speaking of a medical breakthrough**
> Professor Turo Nurmikko
> Pain Research Institute

By blocking the pain impulses travelling up to their brains, the rats remained pain-free for at least three months, the researchers wrote.

"Although this research is at a very early stage, the concept of using gene therapy to deliver pain relief is interesting because it could potentially have fewer side effects than conventional pain relief," said Josephine Querido of Cancer Research UK.

But while cancer patients could be among the main beneficiaries of such a technique, a recent European study suggested that as many as 20% of adults suffer from chronic or intermittent pain for which no satisfactory treatment has been found.

Chronic back pain in the UK alone is thought to cost billions.

Scientists have been trying for many years now to harness gene therapy for pain relief but have hit various problems.

This development is "certainly exciting and promising", says Professor Turo Nurmikko, Director of the Pain Research Institute in Liverpool.

"But it is a little too early to say what the ultimate significance of the results is.

"Once the researchers have shown that in animal models of chronic pain, there is long-standing improvement, one could start speaking of a medical breakthrough."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7200858.stm

Published: 2008/01/22 00:56:40 GMT

Alone in the dark

By Huw Jones
BBC News

What happens if you are left alone in the dark in solitary confinement for days on end? The result is called sensory deprivation and the human mind struggles to cope with it.

Adam Bloom is a stand-up comic, an extreme extrovert who admits he thrives on stimulation.

He is one of six volunteers who have agreed to be shut inside a cell in a nuclear bunker, alone and in the dark. And for Bloom it will be particularly hard.

Within half an hour of being locked up at the start of the experiment, all of the subjects lie down and go to sleep. But the real ordeal will begin when they wake up and find they have no idea what time it is.

> **I remember one occasion waking up and having to squeeze my face and my chest and thinking to myself am I still alive**
> Brian Keenan

Throughout the 48 hours they are being monitored by a psychologist and filmed for a BBC Horizon documentary.

As the hours pass, seeing and hearing nothing, they become increasingly disoriented.

After 24 hours Bloom is suffering. The subjects have been encouraged to describe how they are feeling but know that while their words may be heard, no one will respond.

"Its really hard to stimulate your brain with no light. It's blanking me. I can feel my brain just not wanting to do anything," he says.

Psychological tests

Sensory deprivation is a controversial subject, with allegations the technique has been used at Guantanamo Bay as an interrogation strategy. And thousands of prisoners around the world are kept in solitary confinement, often with a significant degree of sensory deprivation.

The tests are exploring the theory that sensory deprivation makes subjects much more suggestible.

I'm hallucinating! I thought I could see a pile of oyster shells
Adam Bloom

Some of the first research on this subject was carried out after the Korean War in the 1950s. The Canadian military wanted to investigate what had happened to POWs who appeared at international press conferences confessing that they were war criminals. It was thought they had been brainwashed following solitary confinement.

North American scientists paid students to stay in conditions of sensory deprivation for varying lengths of time. Most dropped out after 72 hours, and very few were able to stay more than four or five days. The boredom and oppression of the experiments' conditions became overpowering.

After just 30 hours of the same treatment, Adam is one of several inmates who are pacing up and down their cells, again a common reaction.

"This behaviour of pacing up and down is something we see in animals as well as people when they are kept in confinement," says Prof Ian Robbins, a clinical psychologist at St George's Hospital who is supervising the experiment.

"It could be just seen as something you can do without thinking about it, it may be in part attempting to exercise, but I think it is reaction to the lack of input and you provide the input physically."

Trauma of captivity

Brian Keenan is all too familiar with some of what they are experiencing. He spent four years as a hostage in Lebanon. "I reckon I was in the dark about seven or eight months. I can't be sure; it's very hard to tell the time.

"The nothingness, that was extremely hard. Because the question in your head is how am I going to get through the next 10 minutes? Or months later, how am I going to get through the next day? Is there enough left in my head?"

"I remember one occasion waking up and having to squeeze my face and my chest and thinking to myself 'Am I still alive?'"

After just 30 hours, Adam is in trouble.

"I'm hallucinating! I thought I could see a pile of oyster shells, five thousand oyster shells, empty, to represent all the nice food I could have eaten while I was inside here."

Keenan also experienced periods when his brain conjured up images. One particularly unpleasant time involved musical instruments getting louder and louder.

"I got really afraid and that's when I kind of started banging my head against the wall, just to make this go away.

"You would try and engage your mind forcefully in something else .... it was not comforting. And it went on for a very, very long time."

Back in the nuclear bunker, some of the other guinea pigs have also been hallucinating.

Strange presences

Mickey, a postman is seeing mosquitoes and fighter planes buzzing around his head and it's frightening him.

Claire a psychology student doesn't mind the little cars, snakes and zebras. But she gets scared when she suddenly feels somebody is in the room.

"In the dark room there is nothing to focus on," says Prof Robbins as he monitors their behaviour. "In the absence of information the human brain carries on working and processing information even if there is no information to process and after a while it starts to create that information itself."

Finally Adam and the others are released and given the psychological tests. Suggestibility is measured as the subjects are asked to read out what colour is printed on a card although the letters appear in a different colour, for instance the word black printed in red.

Several of the subjects including Adam show very high levels of suggestibility.

The results give Prof Robbins an insight into "what can happen to people kept in solitary confinement over possibly many months and even years".

"Evidence that has accumulated in those places must be considered very unreliable because people will after a while start to take on board the views of their interrogators," he says.

"Our volunteers were in a sensory deprivation environment for 48 hours and being treated humanely."

After just 48 hours, Adam wanted to kiss the man who opened the door to let him out.

"I was let outside and saw the sun and the sky, for the first time in 48 hours. My senses were overwhelmed totally and utterly by the sights, sounds and smells."

He is glad he did it and proud he didn't give up early. But he would not do it again.

"It was an amazing experience that was very much worth going through once. It taught me to appreciate my senses and all forms of interaction."

Horizon: Total Isolation is on BBC Two at 2100GMT on Tuesday 22 January.

Below is a selection of your comments.

I spent five hours in asesory deprevation experiment whilst at university. Thirty years later I still remeber the disorientation and discomfort. I had to keep count of buzzers and bleeps. In that short time I overcounted by almost double and halucinated about parents and conversations. Quite terrible. I guess that it is used as part of an interrogation because it does make you feel disorientated and thereore reliant on your interrogator. Part of "being broken". Having said that, I would really prefer this as an alternative to permanent physical damage.
Jon Shamah, London, UK

Wonderful concept. For my thoughts, it opens the door to how we understand information, and the thought of, if it is our thoughts that make us or do we make our thoughts.
Howard Palmer, Atlanta, Ga

Our mind is an amazing "computer" that manages all the information given to it. It then starts making it's own information when other the input is lacking. We must not abuse our system
Ghanashyam Master, London, UK

Brian Keenan is a remarkable man: he went to hell - and survived. A modern-day Dante, if you like. His book, An Evil Cradling, will make you value the worth of human life. A masterpiece.
S. Martin, Highbridge, Somerset

As a claustrophobic, subway/elevator avoiding new yorker, I can't think of a more horrible experiment to be part of.
Deborah, New York

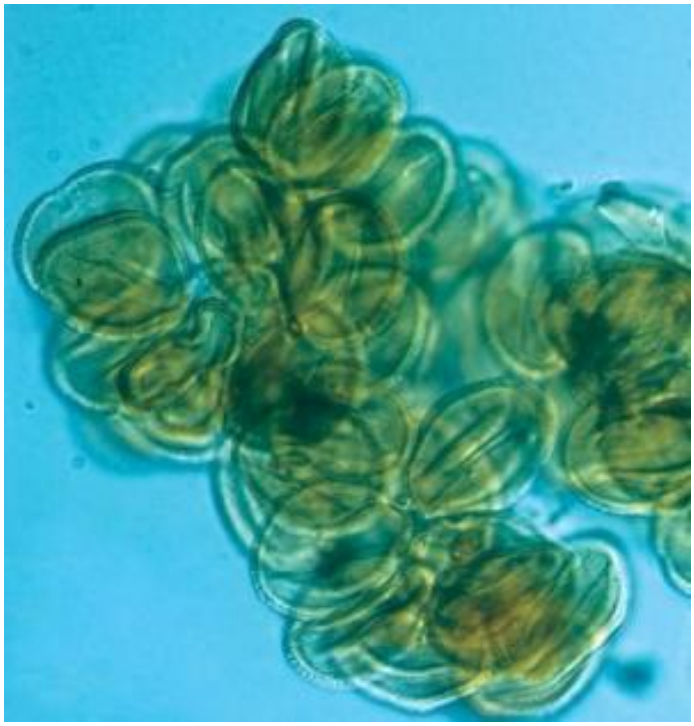
I can't agree with this part: "Suggestibility is measured as the subjects are asked to read out what colour is printed on a card although the letters appear in a different colour, for instance the word black printed in red. Several of the subjects including Adam show very high levels of suggestibility. " The task (aka Stroop Task) measures attention - it requires a good deal of forced attention to overcome the automatic process of reading the word. If you've been hallucinating and (presumably?) food deprived for days on end, then your attention is going to be low, and hard to focus. I don't agree with the methodology cited here.
Nicky, York

It would be interesting to see how this correlates with people living in the arctic where it is dark for months.
Bob Johnson, near Kuopio, Finland

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/magazine/7199769.stm

Published: 2008/01/21 11:13:46 GMT

96-million-year-old Fossil Pollen Sheds Light On Early Pollinators



This 96-million-year-old fossilized angiosperm pollen clump of Phimopollenites striolata was extracted by careful processing of sediment from three sites in Minnesota's Dakota Formation. Each individual grain within the clump in this image measures approximately 14-by-19 microns. Clumping is generally found only in animal-pollinated flowering plants. (Credit: Image courtesy of University of Florida)

ScienceDaily (Jan. 22, 2008) — The collapse of honeybee colonies across North America is focusing attention on the honeybees' vital role in the survival of agricultural crops, and a new study by University of Florida and Indiana University Southeast researchers shows insect pollinators have likely played a key role in the evolution and success of flowering plants for nearly 100 million years.

The origins of when flowers managed to harness insects' pollinating power has long been murky. But the new study, published online this week on the Proceedings of the National Academy of Sciences Web site and appearing in its Dec. 24 print edition, is the first to pinpoint a 96-million-year-old timeframe for a turning point in the evolution of basal angiosperm groups, or early flowering plants, by demonstrating they are predominantly insect-pollinated.

"Our study of clumping pollen shows that insect pollinators most likely have always played a large role in the evolution of flowering plants," said David Dilcher, a graduate research professor of paleobotany at the Florida Museum of Natural History. "It was true 96 million years ago and we are seeing it today with the potential threat to our agricultural crops because of the collapse of the honeybee colonies. The insect pollinators provide for more efficient and effective pollination of flowering plants."

The study provides strong evidence for the widely accepted hypothesis that insects drove the massive adaptive radiation of early flowering plants when they rapidly diversified and expanded to exploit new terrestrial niches. Land plants first appear in the fossil record about 425 million years ago, but flowering plants didn't appear until about 125 million years ago in the Early Cretaceous period.

The study also is the first to describe the biological structure of pollen clumping in the early Late Cretaceous, which holds clues about the types of pollinators with which they were coevolving, said lead author Shusheng Hu, who started the study while at the Florida Museum but is currently at Indiana University Southeast. Hu said previous scientists found examples of early clumped pollen from

a slightly earlier time period but these were interpreted as immature parts of anther from a flower, or dismissed as insect packaging activity or fecal pellets.

"We really had to jump out of the box and think in a new way on these widespread pollen clumps," said Hu, who completed the research in 2006 as part of his UF doctoral work.

Today, flowers specialized for insect pollination disperse clumps of five to 100 pollen grains. Clumped grains are comparatively larger and have more surface relief than wind- or water-dispersed pollen, which tend to be single, smaller and smoother.

"These clumps represent an amazing new strategy in the evolution of flowering plants," Dilcher said. "For me, the excitement here lies in the early times of these fossil flowers, when angiosperms were making these huge evolutionary steps. What we found with the fossil pollen clumps folds nicely into what has been suggested by molecular biologists that those plants that are basal in angiosperm evolutionary relationships seem to have been dominated by insect pollination."

The nine species of fossil pollen clumps, combined with known structural changes occurring in flowering plants at this time, led the researchers to suggest that insect pollination was well established by the early Late Cretaceous — only a few million years before the explosion in diversity and distribution of flowering plant families. Known structural changes include early prototypes of stamen and anther, plant organs which lift pollen up and away from the plant, positioning the plants' genetic material to be passed off to visiting insects.

The researchers sampled pollen from three sites in Minnesota's Dakota Formation, which represents a time period when a shallow seaway covered North America's interior.

Co-author David Jarzen, a Florida Museum pollen scientist, refined existing pollen processing techniques for extracting intact fossil pollen from the calcareous Minnesota limestone and silicate mudstone rock matrix. Co-author David Taylor, a botanist from Indiana University Southeast contributed a statistical analysis of pollination methods among living and early plants.

A Smithsonian Institution paleobiologist, Conrad Labandeira, who specializes in insect-plant associations, and who is unassociated with the study, said that the authors' ability to demonstrate pollen clumping in basal angiosperms adds one more piece to the puzzle of several pollination types established in the mid-Cretaceous.

"These data are very comparable with parallel data such as flower structure, pollen structure, and insect mouthpart morphology, that now documents a wide variety of pollination types that occurred before the Cenomanian," Labandeira said.

Adapted from materials provided by University of Florida.

http://www.sciencedaily.com/releases/2008/01/080117181233.htm

'Tree Of Life' Has Lost A Branch, According To Largest Genetic Comparison Of Higher Life Forms Ever

The four new super-groups of life are Plants (green and red algae, and plants; Opisthokonts (amoebas, fungi, and all animals—including humans; Excavates (free-living organisms and parasites; SAR (the new main group, an abbreviation of Stramenophiles, Alveolates, and Rhizaria, the names of some of its members). (Credit: Image courtesy of University of Oslo)

ScienceDaily (Jan. 22, 2008) — Norwegian and Swiss biologists have made a startling discovery about the relationship between organisms that most people have never heard of. The Tree of Life must be re-drawn, textbooks need to be changed, and the discovery may also have significant impact on the development of medicines.The discovery by Norwegian and Swiss researchers has gained attention from biologists worldwide. The findings come from the largest ever genetic comparison of higher life forms on the planet. Of 5000 genes examined, researchers identified 123 common genes from all known groups of organisms; these common genes have been studied more closely.

Lost a Branch

"The results were pretty astounding. All non-bacterial life on Earth—called eukaryotic life— can now be divided into four main groups instead of the five groups that we have been working with up to now," says Kamran Shalchian-Tabrizi, an associate professor from the University of Oslo's Department of Biology who has also worked with the Department of Zoology and Animal Biology and the Department of Genetic Medicine and Development, at the University of Geneva, Switzerland.The Tree of Life (see illustration) has, through the discovery that the two formerly separated branches share a similar evolutionary history, lost one of its branches, and this will both improve and simplify quite a bit of scientific work in the future.

Important Discovery

"Kinship says a lot about shared traits. Our findings can be important in many fields, such as in the study of the development of life and in the manufacture of new medicines" says Shalchian-Tabrizi in an interview with the University of Oslo's research magazine Apollon.

"Our knowledge of organisms and the development of medicines are often based on comparative studies across species. It is, therefore, essential that we know the relationships between the largest groups in the great diversity of eukaryotes," he adds.

The research group has, for example, found that brown algae and silica algae, and groups of single cell organisms like the malaria parasite, marine foraminifera, and the green sun animalcule (acanthocystis turfacea) actually belong to the same group. Previously, these species were thought to be completely unrelated.

"The work that we published in the August edition of PLoS One means that the description of the Tree of Life must be revised in new textbooks," says Professor Kjetill S. Jakobsen from the University of Oslo's Centre for Ecological and Evolutionary Synthesis (CEES). He is also a member of the Microbial Evolution Research Group (MERG), led by Shalchian-Tabrizi, at the Department of Biology. MERG is one of 16 groups that the Faculty of Mathematics and Natural Sciences believes may have the potential to develop into new Centres of Excellence.

The New Branch

All life on Earth can be divided into two essentially different life forms—eukaryotes and prokaryotes. The eukaryotes gather their genetic material in a nucleus, while the prokaryotes (bacteria and archaea) have their genetic material floating freely in the cell. Eukaryotic organisms—such as humans—can, as a result of the new findings, be divided into the following four categories:

- Plants (green and red algae, and plants)
- Opisthokonts (amoebas, fungi, and all animals—including humans)
- Excavates (free-living organisms and parasites)
- SAR (the new main group, an abbreviation of Stramenophiles, Alveolates, and Rhizaria, the names of some of its members)

"The SAR group has to some extent been identified earlier, but we could not know if it was a correct observation because we lacked statistical data. To get that data, we first had to reconstruct the entire eukaryote tree with the help of these 123 genes. Chromalveolates and rhizaria were clearly separate groups until we published our results," says Shalchian-Tabrizi.

"To make the picture a little less clear, one branch of chromalveolates is still in no man's land. It may be that these also belong to SAR, but we will require additional genes and genomes to study this. We have set our sights on doing that in the course of the next few years," he adds.

Fewer Events

"The Tree of Life tells the story of life on Earth, and our research can say something about how quickly life developed. Our discovery suggests that there were fewer big "events" than we have previously assumed in the development of higher life forms. The more we know about the branches on the Tree of Life, the more we can find out about life's Big Bang, the beginning of life on Earth," says Shalchian-Tabrizi.

Three billion years ago, there was only bacteria and Archaea. Eukaryotic life, which comprises all multi-celled organisms, developed in the sea—probably between 1.2 and 1.6 billion years ago. It was not before about 500 million years ago that the first creatures crept onto land.

"By digging down into the historical layers with the help of phylogenetic reconstruction, where we can find out about kinship between organisms at the genetic level and we can find answers to questions about how new traits developed. We are working, in a matter of speaking, with genetic archaeology. In this manner, we can also discover the cause of the Earth's biological diversity," says Jakobsen.

Adapted from materials provided by University of Oslo.

http://www.sciencedaily.com/releases/2008/01/080121112642.htm

Missing Link Between Belly Fat And Heart Disease?

Normal mice (left) and obese mice without the gene for leptin (right) were essential to the U-M discovery that inflammation in visceral fat is linked to atherosclerosis. (Credit: Image courtesy of University of Michigan Health System)

ScienceDaily (Jan. 23, 2008) — By now, everyone knows that overweight people have a higher risk of heart attacks, strokes and other problems that arise from clogged, hardened arteries. And people who carry their extra weight around their waist -- giving them a "beer belly" or an "apple" shape -- have the highest risk of all.

But despite the impact on human health, the reasons behind this connection between heart disease and belly fat -- also known as visceral fat -- have eluded scientists. Now, a new study in mice gives the first direct evidence of why this link might exist -- and a tantalizing look at how it might be broken.

A team of University of Michigan Cardiovascular Center scientists reports direct evidence of a link between inflammation around the cells of visceral fat deposits, and the artery-hardening process of atherosclerosis.

The researchers also show that a medication often given to people with diabetes can be used to calm that inflammation, and protect against further artery damage.

Although the scientists caution that it's far too early to apply their findings to humans with belly fat, they hope that further research in animals and people will reveal more about how this dangerous link comes about, why it begins, how it can be reversed, and perhaps how it can be diagnosed at an early stage through blood tests.

Until then, the best advice for overweight people who want to reduce their chance of a heart attack or stroke remains the same: Work on losing your belly fat, and your other excess body weight, through a balanced, healthy diet and regular exercise.

The research team is led by Daniel Eitzman, M.D., a cardiologist, laboratory scientist and associate professor in the Division of Cardiovascular Medicine at the U-M Medical School and the VA Ann Arbor Healthcare System.

The discovery came partly by chance. He and his colleagues had been studying mice that lack the gene for leptin, a hormone generated by fat cells that plays a role in appetite and metabolism as well as reproduction. In an effort to get these obese mice to produce some leptin, the team developed a technique to transplant clusters of fat cells from normal mice of the same strain, into the leptin-deficient mice.

The result surprised them. "In addition to producing leptin and preventing obesity, the fat transplants became inflamed, attracting immune cells called macrophages," Eitzman explains. "Since the mice were genetically identical except for leptin, this shouldn't have happened. But the inflammation was there, and it was chronic."

The inflammation occurred around individual fat cells, or adipocytes. Further tests showed it was regulated by the same factors that regulate the inflammation that other researchers have seen in the naturally occurring fat deposits of obese mice -- specifically a chemokine called MCP-1.

But because the fat was transplanted, the inflammation could be attributed directly to the fat, and not to overfeeding of the mice, or the metabolic problems that overfeeding and obesity bring, such as diabetes.

Armed with this discovery, the researchers set out to see what was causing inflammation to occur, and what implications it had. The team included postdoctoral fellow Miina Öhman, M.D., Ph.D., U-M professor Daniel Lawrence, Ph.D., and members of the Eitzman and Lawrence laboratory teams.

They were especially interested to see if there might be any link between the inflammation and atherosclerosis -- the formal name for the process by which blood vessels become stiff, narrowed and lined with plaque formations that can trigger the development of blood clots.

This process, which occurs throughout the body, sets the stage for most heart attacks and strokes. Scientists and clinicians now realize that it is based on inflammation -- the abnormal reaction of the body's immune system to its own tissue -- and in the damage that immune-system cells and molecules can inflict.

Since normal mice don't develop atherosclerosis, the team had to turn to a strain that had been developed to be especially prone to high cholesterol and hardened arteries. These ApoE-negative mice, as they are called, were divided into three groups: two that received fat transplants from normal mice, and one that did not, but that had the same operation that would be used to implant the fat in other mice.

Some of the fat-transplant ApoE-negative mice received transplants of visceral fat, which forms in the belly around the major organs, while others received transplants of subcutaneous fat -- the type that's found just under the skin throughout the body.

Sure enough, the mice that received the visceral fat transplants developed atherosclerosis at a much-accelerated rate, and experienced the same type of inflammation as the leptin-deficient mice had. Meanwhile, those that received subcutaneous fat did not experience an increase in atherosclerosis despite having increased inflammation. The mice that had the "sham" operations developed neither inflammation nor increased atherosclerosis.

"There appeared to be an interaction between the macrophages causing the inflammation in the visceral fat, and the process of atherosclerosis," says Eitzman, who notes that blood vessels far from the site of the fat transplant developed increased atherosclerosis.

Finally, the team attempted to calm the inflammation and curb the atherosclerosis by treating the mice with pioglitazone -- a member of the class of drugs called thiazolidinediones or TZDs that are often used to treat diabetes. While TZD drugs have an impact on metabolism, which makes them useful in diabetes, they also have been discovered to have an anti-inflammatory effect.

And in fact, the drug reduced both the concentration of macrophages and MCP-1, and atherosclerosis, in those mice that received transplants of visceral fat. But the drug had no effect in the other mice.

Now that they have demonstrated the linkage between belly fat, inflammation and hardened arteries, and a potential mechanism for reversing the phenomenon, the team is working on new pieces of the puzzle. Specifically, they're looking for the factors that might trigger macrophages to invade the area and bring on inflammation, and for blood-borne molecules called biomarkers that might be used as a way to identify early warning signs of atherosclerosis. They'll also look at other classes of drugs to see if they might have a protective effect, because TZD drugs act on many systems and cause some side effects.

This research was reported in a paper that will be published online January 22 in the journal Circulation before print publication in February.

In addition to Eitzman, Öhman and Lawrence, the team includes former research associate Yuechen Shen, M.D., former U-M undergraduate Chinyere Obimba, B.S., now a Harvard Medical School student; former U-M undergraduate and current U-M medical student Andrew P. Wright, B.S.; and Mark Warnock, B.S. The research was funded by the National Heart, Lung and Blood Institute.

Adapted from materials provided by University of Michigan Health System.

http://www.sciencedaily.com:80/releases/2008/01/080122102055.htm

Cough Medicine: Not Worthwhile For Children Or Adults?

ScienceDaily (Jan. 23, 2008) — Alert parents know that small children should not take over-the-counter cough medications. Now researchers say the stuff might not help adults much, either.

Over-the-counter medicine is commonly and casually used by millions of cold sufferers every year, but there is no good evidence for or against the effectiveness of OTC cough medicines, concludes a new systematic review of studies.

"I do not give my kids over-the-counter cough medicine," said Thomas Fahey, professor of general practice at the Royal College of Surgeons in Ireland Medical School and review co-author. "I do not advise my patients to do so."

In their review, Fahey and colleagues looked at both children- and adult-focused studies. Some reported that OTC cough medicines helped patients; others said they did not. With conflicting evidence, the various studies presented a non-cohesive picture.

Another issue concerned the researchers, who wrote, "six out of the nine studies that were supported by the pharmaceutical industry showed positive results compared to three positive studies out of 16 trials that did not report any conflict of interest."

On the other hand, "Most preparations appear to be safe based on those studies reporting side effects, which only described a low incidence of mainly minor adverse effects," the researchers found.

The review of the studies appears in the latest issue of The Cochrane Library, a publication of The Cochrane Collaboration, an international organization that evaluates medical research. Systematic reviews like this one draw evidence-based conclusions about medical practice after considering both the content and quality of existing medical trials on a topic.

The Cochrane review encompassed 25 studies, 17 of which involved 2,876 adults and eight of which involved 616 children.

In the adult studies, six compared antitussives medicines used to relieve coughs, such as Robitussin, with placebo and had variable results. Two studies compared an expectorant such as Mucinex, which promotes the discharge of mucus from the respiratory tract, with placebo; one found benefits. Another two studies focusing on combinations of antihistamine and decongestants, produced conflicting results, while three studies found antihistamines were no more effective than placebo in relieving cough.

Three other adult studies compared combinations of drugs with placebo and showed some benefit in reducing cough; one study found that mucolytics, which break down mucus, reduced cough frequency.

In studies involving children, seven -- two with antitussives, two with antihistamines, two with antihistamine decongestants and one with antitussive-bronchodilator combinations -- showed the drugs were no more effective than placebo. (Bronchodilators work to ease coughs by widening air passages.)

In another study of two pediatric cough syrups, Triaminicol and Dacol, both showed "satisfactory" response compared to placebo medicines.

The duration of drug therapy varied from "a single dose treatment to an 18-day course," the authors wrote. "For example, five studies testing antitussives used short-term cough relief after a single dose as an outcome...whereas more relevant outcomes for patients would be the effect after one day, three days or a week."

Because of the variations, there were no broad statistical conclusions. "It wasn't appropriate to pool the data," Fahey said.

During the past decade, physicians have increasingly voiced concerns about these medicines and the potential for overdosing young children. In August, the U.S. Food and Drug Administration warned parents not to give over-the-counter cough and cold remedies to children under 2 years old without a doctor's approval. During a hearing before an FDA panel in October, federal health advisers said that children younger than six years should not take the medicines.

But is it even necessary to cure a cough?

People often worry about a cough if it has not gone away after a week, Fahey said. Actually, the duration of a cough is commonly two weeks in children and three weeks in adults.

"I think there's the laymen's perception," Fahey said. The common conclusion is that "something should be done about it. It [coughing] is troublesome at night. But it is not a bad thing to be coughing. It could be helpful. It is a mechanism for shedding viruses."

Reference: Smith SM, Schroeder K, Fahey T. Over-the-counter medications for acute cough in children and adults in ambulatory settings (Review). Cochrane Database of Systematic Reviews 2008, Issue 1.

Adapted from materials provided by Center for the Advancement of Health.

http://www.sciencedaily.com:80/releases/2008/01/080122203331.htm

Predators Do More Than Kill Prey

A female killifish (Rivulus hartii). (Credit: Pierson Hill, Florida State University.)

ScienceDaily (Jan. 23, 2008) — The direct effect predators have on their prey is to kill them. The evolutionary changes that can result from this direct effect include prey that are younger at maturity and that produce more offspring.

But killing prey also has indirect effects -- rarely characterized or measured -- such as a decline in the number of surviving prey, resulting, in turn, in more food available to survivors.

In a new study characterizing the complex ecological interactions that shape how organisms evolve, UC Riverside biologists Matthew Walsh and David Reznick present a novel way of quantifying these indirect effects by showing that prey adapt to food availability as well as the presence of predators.

"Our study can serve as a model for how humans alter ecosystems when they remove key predators like wolves and bears from land or tuna and billfish from seas," said Reznick, a professor of biology.

He and Walsh compared life history traits between Trinidadian fish communities impacted by the presence of predators. They settled on Trinidadian waterfalls as study sites because the waterfalls serve as barriers to the upstream distribution of predator and prey fish, thereby creating distinct ecological communities in similar habitats only a few hundred meters from each other -- like test-tubes in nature.

First, they used killifish from "killifish-only" localities, above waterfalls, where killifish are the only fish present; and killifish from "high predation" localities, below these waterfalls, where the killifish coexist with a diversity of predators. Second, they reared the grandchildren of these killifish in a lab at UCR to ensure that any differences observed between populations are likely to be genetic, and not environmental, in origin.

To quantify the direct and indirect effects of predation, Walsh and Reznick reared the killifish under multiple food levels that closely approximated the natural differences in food availability that the killifish experienced in Trinidad.

Their results demonstrate how predators' direct and indirect effects shaped the way killifish evolved:

- Killifish from high predation environments are younger at maturity and produce more offspring -- the predicted direct evolutionary response to high mortality rates.

- More food caused all fish to grow faster, then mature at a larger body size and earlier age, plus produce more babies.
- Killifish from high predation environments gained more from high rations -- an indirect evolutionary response to high mortality rates. Their increase in size at maturity, decrease in age at maturity and increase in the number of babies produced were all more pronounced than those seen in killifish from the killifish-only environment -- differences that show that the high predation killifish were better adapted to convert high food rations into the production of more babies.

"Research has generally focused on the evolutionary implications of the direct effects of interactions between predator and prey," said Walsh, a graduate student working in Reznick's lab in the Department of Biology and the first author of the research paper. "But we found that the indirect effects of these interactions can be as important. Clearly, organisms become adapted to a given food level and evolve to best exploit their resources."

The researchers argue that in addition to killing prey, the indirect evolutionary and ecological effects of predators cause a restructuring of the community, which in turn contributes to shaping how killifish evolve.

"Removing predators will not only alter the structure of the ecosystem, but will also cause a wider diversity of evolutionary changes in prey than had been considered," said Reznick, the paper's only coauthor. "Conversely, it means that the reintroduction of predators, which is an ongoing practice, such as in the reintroduction of wolves in the United States, demands more caution than is currently practiced since the prey will have adapted to a new environment in the time that predators were absent and will be ill prepared in more ways than had been imagined for the reintroduction of predators.

"Likewise, the crash that we have seen in the populations of many commercially exploited species of fish, and their failure to recover when fishing pressure is reduced, has been attributed to such indirect restructuring of the ecosystem.

"Since predator-induced indirect increases in resource availability are common in both terrestrial and aquatic ecosystems, the evolutionary consequences of these interactions are potentially a very important component of evolutionary change in nature," Reznick added. "Moreover, biologists have observed evolutionary change occurring on short ecological timescales in nature, on the order of a few years to decades, suggesting that such interactions are contributing to overall ecosystem functioning and health."

Study results appear in the Jan. 15 issue of the Proceedings of the National Academy of Sciences. The two-year study was supported by grants from the National Science Foundation. Next in their research, Walsh and Reznick will continue to evaluate the direct and indirect effects of predators on life history evolution by exploring the influence of guppies on killifish life histories.

Reznick discusses the evolutionary consequences of predator removal in natural communities in a separate research paper published this month in Molecular Ecology. He is joined in that study by Cameron Ghalambor and Kevin Crooks of Colorado State University, Fort Collins, Colo.

Adapted from materials provided by University of California - Riverside.

http://www.sciencedaily.com:80/releases/2008/01/080117164144.htm

Change In Trauma Level Designation Associated With Improved Patient Survival

ScienceDaily (Jan. 23, 2008) — Death rates among patients admitted to a Colorado trauma center appeared to decrease after the center's designation was upgraded, according to a new report.

Trauma centers are accredited through the American College of Surgeons, according to background information in the article. Level designations are based on factors such as surgeon and nurse availability, protocols and research. Level 1 is the highest level of trauma center and most studies report improvements in survival and outcomes for patients admitted to these centers as compared with lower-level centers and non-trauma centers, although some have found no difference between level 1 and level 2 centers.

The trauma center at Swedish Medical Center--a community hospital in Englewood, Colo.--was upgraded from level 2 to level 1 in 2002. Kristin Scarborough, B.S., and colleagues at the hospital studied all 17,413 trauma patients consecutively admitted to the trauma center between 1998 and 2007. The researchers compared death rates of the 9,511 patients admitted when the center was designated level 2 (Jan. 1, 1998, to Dec. 31, 2002) to those of the 7,902 patients admitted after the upgrade to level 1 (Jan. 1, 2003, to March 31, 2007).

After adjusting for several other factors--including age, sex, injury severity, low blood pressure on hospital admission, breathing rate and co-occurring illnesses--3.48 percent of patients admitted during level 2 designation died, compared with 2.5 percent of those admitted during level 1 designation. Among severely injured patients, 14.11 percent of those admitted during the level 2 designation died, compared with 8.99 percent of those admitted during level 1 designation.

"Patients admitted during a level 1 designation with a severe head, chest or abdominal or pelvic injury diagnosis had a significant decrease in mortality [death] (9.96 percent vs. 14.51 percent, 7.14 percent vs. 11.27 percent, and 6.76 percent vs. 17.05 percent, respectively), as did patients who developed acute respiratory distress syndrome during their hospital stay (9.51 percent vs. 26.87 percent)," the authors write.

The results suggest that modifying protocols to send trauma patients to the appropriate trauma facility may improve survival, the authors note. "The number of patients needed to be treated at a level 1 trauma center over a level 2 trauma center to save one life is as follows: overall, 70 patients; injury severity score of 15 or more [severely injured], 22 patients; head injury, 17 patients; chest injury, 20 patients; and abdominal or pelvic injury, eight patients," they write. "In addition, every fourth patient who developed acute respiratory distress syndrome may have been saved had the patient been triaged to a level 1 trauma center."

Journal reference: Arch Surg. 2008;143[1]:22-28.

Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com:80/releases/2008/01/080121164115.htm

Amphibian Skin Agent May Battle Multi-drug Resistant Bacteria

Common Frog, Rana temporaria. (Credit: Image courtesy of Wikimedia Commons)

ScienceDaily (Jan. 23, 2008) — Researchers from Italy found that a naturally occurring agent in frog skin may inhibit multi-drug resistant bacterial strains associated with hospital-acquired infections.

Resistance to current antibiotic therapies is on the rise in both hospital and community settings. With some bacterial strains now resistant to every available drug, a return to the preantibiotic era in regard to such infections is cause for great concern. Researchers have identified antimicrobial peptides (AMPs) as one of the most promising candidates for future therapeutic use and they have found amphibian skin to be one of the richest sources of such AMPs.

Nosocomial infections are linked to various drug-resistant bacterial strains and are commonly acquired in a hospital setting as a secondary illness. In the study researchers tested five AMPs (temporins A, B, and G, esculentin 1b, and bombinin H2) from three different frog and toad species (Rana temporaria, Rana esculenta, and Bombina variegata) for antibacterial activity against multi-drug resistant strains often associated with human nosocomial infections. Initial results showed that all the peptides acted as antibacterial agents against the species tested. Further studies found that the temporins were more active against gram-positive bacteria; esculentin 1b produced an antibacterial response within 2 to 20 minutes of exposure, and bombinin H2 displayed similar activity toward all bacterial isolates.

"This peptide is an attractive molecule for use in the development of new compounds for the treatment of infectious diseases," say the researchers.

Reference: M.L. Mangoni, G. Maisetta, M.D. Luca, L.M.H. Gaddi, S. Esin, W. Florio, F.L. Brancatisano, D. Barra, M. Campa, G. Batoni. 2008. Comparative analysis of the bactericidal activities of amphibian peptide analogues against multi-drug-resistant nosocomial bacterial strains. Antimicrobial Agents and Chemotherapy, 52. 1: 85-91.

Adapted from materials provided by American Society for Microbiology, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080122102502.htm

Genome Scan Shows Polynesians Have Little Genetic Relationship To Melanesians

Women dancers in a village on Ontong Java, an Atoll that is the northernmost tract of land in the Solomon Islands. (Credit: Photo courtesy of Jonathan Friedlaender)

ScienceDaily (Jan. 23, 2008) — The origins and current genetic relationships of Pacific Islanders have generated interest and controversy for many decades. Now, a new comprehensive genetic study of almost 1,000 individuals has revealed that Polynesians and Micronesians have almost no genetic relation to Melanesians, and that groups that live in the islands of Melanesia are remarkably diverse.

The researchers analyzed more than 800 genetic markers (highly informative microsatellites) in nearly 1,000 individuals from 41 Pacific populations, as opposed to prior small-scale mitochondrial DNA or Y chromosome studies, which had produced conflicting results.

"The first settlers of Australia, New Guinea, and the large islands just to the east arrived between 50,000 and 30,000 years ago, when Neanderthals still roamed Europe," says Jonathan Friedlaender, professor emeritus of anthropology at Temple and the study's lead author. "These small groups were isolated and became extremely diverse during the following tens of thousands of years. Then, a little more than 3,000 years ago, the ancestors of the Polynesians and Micronesians, with their excellent sailing outrigger canoes, appeared in the islands of Melanesia, and during the following centuries settled the islands in the vast unknown regions of the central and eastern Pacific.

"Over the last 20 years there have been many hypotheses concerning where the ancestors of the Polynesians came from in Asia, how long it took them to develop their special seafaring abilities in Island Melanesia, and how much they interacted with the native Melanesian peoples there before they commenced their remarkable Diaspora across the unexplored islands in the Pacific," he adds.

According to Friedlaender, one scenario called the 'fast train hypothesis,' which is supported by the mitochondrial evidence, suggests that ancestors of the Polynesians originated in Taiwan, moved through Indonesia to Island Melanesia, and then out into the unknown islands of the Pacific without having any significant contact with the Island Melanesians along the way.

A counter argument called 'slow boat hypothesis,' which the Y chromosome evidence supports, suggests that the ancestors of the Polynesians were primarily Melanesians, and that there was very little Asian or Taiwanese influence. A third position, called the "entangled bank hypothesis," suggests these ancient migrations simply can't be accurately reconstructed by looking at the genetics of today's populations, even in the context of the available archaeological evidence.

In their paper, the researchers state that their analysis is consistent with the scenario that the ancestors of Polynesians moved through Island Melanesia relatively rapidly and only intermixed to a very modest degree with the indigenous populations there.

"Our genetic analysis establishes that the Polynesians' and Micronesians' closest relationships are to Taiwan Aborigines and East Asians," says Friedlaender. "Some groups in Island Melanesia who speak languages related to Polynesian, called Austronesian or Oceanic languages, do show a small Polynesian genetic contribution, but it is very minor -- never more than 20 percent.

"There clearly was a lot of cultural and language influence that occurred, but the amount of genetic exchange between the groups along the way was remarkably low," he says. "From the genetic perspective, if the ancestral train from the Taiwan vicinity to Polynesia wasn't an express, very few passengers climbed aboard or got off along the way."

Friedlaender adds that this study also confirms and expands their findings from previous studies about the genetic diversity of Island Melanesians--among the most genetically diverse people on the planet, showing further that their diversity is neatly organized by island, island size, topography and language families.

The study, "The Genetic Structure of Pacific Islanders," is published in the January issue of PLoS Genetics. It involved researchers from Temple University, University of Maryland, Yale, Binghamton University, the Marshfield Clinic Research Foundation, Victoria University in New Zealand, Mackay Memorial Hospital in Taiwan, and the Institute for Medical Research in Papua New Guinea.

The study was funded by grants from the National Science Foundation, the Wenner-Gren Foundation for Anthropological Research, the National Geographic Society, The National Institutes of Health, Taiwan National Science Council, and Temple, Binghamton, and Yale Universities.

Adapted from materials provided by Temple University.

http://www.sciencedaily.com:80/releases/2008/01/080118093728.htm

RNA Biology Finding Makes Waves By Challenging Current Thinking

ScienceDaily (Jan. 23, 2008) — Case Western Reserve University School of Medicine researcher Kristian E. Baker, Ph.D. challenges molecular biology's established body of evidence and widely-accepted model for nonsense-mediated messenger ribonucleic acid (mRNA) decay with a new study. With her collaborator, Ambro van Hoof, Ph.D. of The University of Texas Health Sciences Center, Baker directly tested the "faux 3' UTR" model and proved it could not explain how cells recognize and destroy deviant mRNA. This landmark discovery will redirect mRNA research and expand opportunities for new discoveries in understanding the cells' ability to protect itself from these potential errors.

In all cells, including human, mRNA is a copy of the information carried by a gene on the DNA. Occasionally, mRNA contains errors that can make the information it carries unusable. Cells posses a remarkable mechanism to detect these aberrant mRNAs and eliminate them from the cell -- this process represents a very important quality control system for gene expression. "A significant amount of past research in this area of RNA biology has collected data to support the 'faux 3' UTR' model for mRNA quality control, and, as a result, has shaped present research directions in the field," said Baker. "Our recent findings preclude this explanation and will, undoubtedly, result in a rethinking by many as to how to experimentally approach this important cellular process."

For decades researchers have been puzzled by cells' ability to differentiate between "normal" mRNA and those carrying certain types of mutations. mRNA transports DNA's genetic coding information to the sites of protein synthesis: ribosomes. Cells are able to identify mRNA carrying a mutation and prevent it from reaching the protein synthesis phase. Once identified, the cell destroys the abnormal, mutated mRNA. This naturally occurring process ensures malfunctioning proteins are not produced.

Using a yeast model system, Baker's research offers a better understanding of this mRNA quality control process which closely mimics the process in human cells.

Baker's research on nonsense-mediated mRNA decay not only provides an advanced understanding of an important process in the regulation of gene expression, but may help lead to new therapeutic strategies in the treatment of genetic diseases. Many inherited conditions, including cystic fibrosis, are a consequence of mutations resulting in the recognition of non-functional mRNA and the subsequent elimination by nonsense-mediated mRNA decay. Because cells eliminate the abnormal mRNA, no protein is produced.

With genetic diseases, researchers are hypothesizing it might be beneficial for the cell to express the protein, even though it is not completely functional. The rational is it will be better for these patients to have protein of some function rather than no protein at all. Cystic fibrosis clinical trials are currently underway with a goal of producing the partially functional proteins, before the cell's natural elimination process takes place. Using Baker's findings, researchers will have a better understanding of how to modulate the recognition of the abnormal mRNAs as to allow the mRNA to remain in the cell and produce the protein.

"This finding is an important step in advancing our understanding of mRNA function," said Baker. "In addition, it emphasizes the important link between basic and clinical science; the more we understand the basic biological processes that are underway in the cell, the better equipped we are to directly address clinical therapies."

This research is published in the January 18th issue of Molecular Cell.

Adapted from materials provided by Case Western Reserve University.

http://www.sciencedaily.com:80/releases/2008/01/080118151710.htm

Mothers Trade Child Quantity For Quality

ScienceDaily (Jan. 23, 2008) — Researchers at the University of Sheffield have shown that mothers are choosing to have fewer children in order to give their children the best start in life, but by doing so are going against millenia of human evolution. The research sheds new light on the decline of modern day fertility.

Researchers Duncan Gillespie, Dr Virpi Lummaa and Dr Andrew Russell, all from the University's Department of Animal and Plant Sciences, studied Finnish church records from the 18th and 19th centuries and traced the reproductive histories of 437 women, their 2888 children and 6470 grandchildren.

They found that fertility of children from large poor families appeared to be constrained, potentially due to a lack of wealth and resources. Children from large wealthy families, on the other hand, went on to have large families themselves. According to the research this has caused a trade-off between offspring quantity and quality with modern women choosing to have fewer children so that they can instead invest in their education or career, gaining resources to give their children the best start in life.

The researchers also found evidence for an evolved relationship between a mother's fertility and the fertility of her children -- the more offspring a woman has, the larger her overall family will be. This means that women having fewer children will ultimately have fewer grandchildren.

Duncan Gillespie said: "Before modern day birth control high fertility was a sign of wealth and families would therefore strive to have large numbers of children. However for poor mothers, having more children did not always lead to more grandchildren, due to economic constraints on their children's fertility.

"In today's society, this has gone even further with wealthy families choosing to invest in fewer children as well. However, this trade-off between offspring quantity and quality has come full circle in that fewer children will ultimately lead to smaller families. This could help explain the decline in fertility in modern society."

The research has been published in Proceedings of the Royal Society B.

Adapted from materials provided by University of Sheffield, via EurekAlert!, a service of AAAS.

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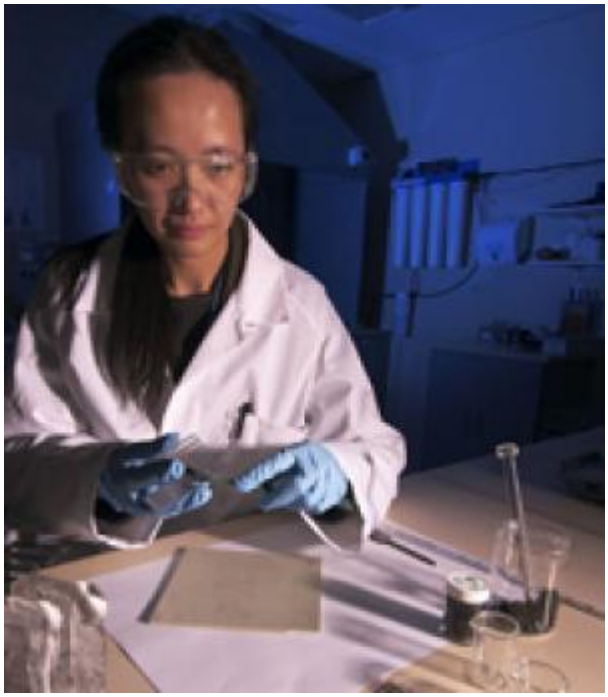
UltraBattery Sets New Standard For Hybrid Electric Vehicles



Researcher, Rosalie Louey, prepares components for the UltraBattery in CSIRO laboratories (Credit: Image courtesy of CSIRO Australia)

ScienceDaily (Jan. 22, 2008) — The odometer of a low emission hybrid electric test vehicle recently reached 100,000 miles as the car circled a track in the UK using the power of an advanced CSIRO battery system. The UltraBattery combines a supercapacitor and a lead acid battery in a single unit, creating a hybrid car battery that lasts longer, costs less and is more powerful than current technologies used in hybrid electric vehicles (HEVs). "The UltraBattery is a leap forward for low emission transport and uptake of HEVs," said David Lamb, who leads low emissions transport research with the Energy Transformed National Research Flagship.

"Previous tests show the UltraBattery has a life cycle that is at least four times longer and produces 50 per cent more power than conventional battery systems. It's also about 70 per cent cheaper than the batteries currently used in HEVs," he said.

By marrying a conventional fuel-powered engine with a battery to drive an electric motor, HEVs achieve the dual environmental benefit of reducing both greenhouse gas emissions and fossil fuel consumption. The UltraBattery also has the ability to provide and absorb charge rapidly during vehicle acceleration and braking, making it particularly suitable for HEVs, which rely on the electric motor to meet peak power needs during acceleration and can recapture energy normally wasted through braking to recharge the battery.

Over the past 12 months, a team of drivers has put the UltraBattery to the test at the Millbrook Proving Ground in the United Kingdom, one of Europe's leading locations for the development and demonstration of land vehicles.

"Passing the 100,000 miles mark is strong evidence of the UltraBattery's capabilities," Mr Lamb said.

"CSIRO's ongoing research will further improve the technology's capabilities, making it lighter, more efficient and capable of setting new performance standards for HEVs."

The UltraBattery test program for HEV applications is the result of an international collaboration. The battery system was developed by CSIRO in Australia, built by the Furukawa Battery Company of Japan and tested in the United Kingdom through the American-based Advanced Lead-Acid Battery Consortium.

UltraBattery technology also has applications for renewable energy storage from wind and solar. CSIRO is part of a technology start-up that will develop and commercialise battery-based storage solutions for these energy sources.

Adapted from materials provided by CSIRO Australia.

http://www.sciencedaily.com:80/releases/2008/01/080118093341.htm

Copper's Not Coping: New Chips Call On Light Speed

ScienceDaily (Jan. 22, 2008) — The tiny copper wires that connect different areas of an integrated circuit may soon limit microchip-processing speeds. So European researchers have developed technologies to produce and combine semiconductor microlasers with silicon wave guides for novel, power-efficient optical connections.

We have all experienced the effect of Moore's Law: almost from the second you unpack a newly purchased computer it is already outdated. The next model – with faster processing power and more advanced features – is already in the shop.

Gordon E. Moore, co-founder of Intel, described the phenomenon of microchip miniaturisation in 1965 when he observed that the number of transistors you can fit into an integrated circuit appeared to double about every two years.

The microelectronics industry still follows this "law", but unless new fabrication or microprocessing technologies are quickly developed this relentless miniaturisation may peter out in less than a decade. Microchips based on silicon wafers are nearing their theoretical limits as physical properties of near nanoscale silicon integrated circuits begin to interfere with their performance.

The speed of data transfer within integrated circuits is one of the major bottlenecks. At present, to pass information from one part of a chip to another, the data packet is sent as electrons through copper wires, known as copper interconnects.

These wires may be just a few millimetres in length, but for the electrons it is like running between underground trains at rush hour. The electrons must all squeeze down narrow tunnels while a crowd backs up at the entrance.

Copper can't cope

"Copper-wire interconnects place serious limitations on the performance of silicon integrated circuits," says Dries Van Thourhout from Ghent University's Photonics Research Group and Belgium's micro- and nanoelectronics research centre IMEC. "It is hard to transmit data down these interconnects in a sufficiently fast, power-efficient way. It is a problem of bandwidth and copper will not be able to cope with the processing power of tomorrow's microchips."

Optical interconnects use light instead of electrons to represent information; they are a highly appealing alternative to copper interconnects, with the potential to be far more efficient, transmitting more data but using the same or even less power.

Instead of travelling along copper wires, photons travel the distance between source and detector along wave guides, like miniature optical fibres. At this scale, however, the wave guides are made out of silicon rather than glass.

"Lots of research has shown that you can etch wave guides for photons into silicon," says Van Thourhout. "This is great because you are using the same materials and fabrication technologies as you do to make integrated circuits. But there is one significant drawback: it is extremely hard to get light out of silicon."

Despite extensive research to exploit many of silicon's peculiar properties, it is highly unlikely that purely silicon-based lasers will reach an efficiency comparable to that of their semiconductor-based cousins for the foreseeable future.

Van Thourhout has coordinated a European consortium that has successfully combined the best of both worlds: silicon wave guides and microscale lasers made from a semiconductor call indium-phosphate. The PICMOS project was a partnership between several European research institutions, universities and two French companies STMicroelectronics and TRACIT Technologies, now owned by Soitec.

Mini-laser system

Part of the research involved the fabrication of a miniaturised laser system small enough to generate light for each interconnect. The PICMOS partners developed a method to etch indium-phosphate lasers with a diameter of just 7µm, sufficiently small to integrate several thousand onto a 2cm x 2cm silicon chip. This is the first time that such compact lasers have been produced in a very practical, cost-efficient way.

The tiny lasers could also have applications in miniature optical sensors, such as strain detectors, or be used to build incredibly cheap, but very powerful optical biosensors. But the biggest breakthrough in the project was the development of a bonding technology that joins the silicon and iridium-phosphate materials together.

“The bonding process, now transferred to TRACIT, effectively 'glues' the silicon and semiconducting indium-phosphate in layers. It is possible to etch out the microlasers and the silicon wave guides and produce an optical interconnecting layer,” says Van Thourhout. “The bonding process and the refinement of the microlaser and the accompanying detectors have been major breakthroughs.”

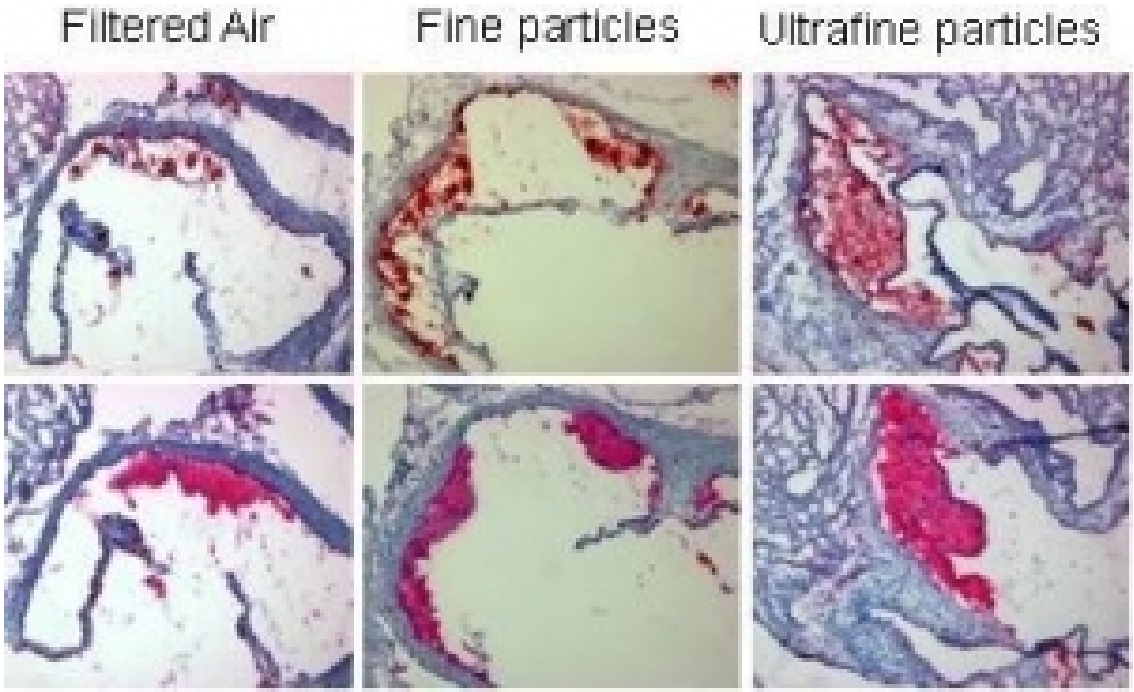
The production cost of the prototype optical interconnect layer is still too high for mass production, although the results from the demonstrator 'chip' have been extremely encouraging. A follow-up project, WADIMOS, will continue to drive the PICMOS platform towards commercialisation. In particular it will develop a pilot line that integrates the fabrication of the optical interconnect layer into the regular integrated circuit manufacturing process.

“We envisage a layer on an integrated circuit that sits on top of the classical etched copper electrical interconnect layer,” says Van Thourhout. “This optical interconnect layer would be less sensitive to temperature, immune from electromagnetic noise, and have lower power consumption. Meanwhile, the bonding system could be adapted for many other electronics applications, for example to stack integrated circuits and in microfluidic technologies. The application of the PICMOS platform could be tremendous for tomorrow's chip technologies and wide-ranging in many other associated applications.”

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com:80/releases/2008/01/080121124509.htm

How Ultrafine Particles In Air Pollution May Cause Heart Disease



Red staining in sections of the aorta represents lipid (top row) and macrophage content (bottom row), which are part of the atherosclerotic plaque development. Exposure to ultrafine particles shows highest degree of plaques. (Credit: Image courtesy of University of California, Los Angeles)

ScienceDaily (Jan. 22, 2008) — Patients prone to heart disease may one day be told by physicians to avoid not only fatty foods and smoking but air pollution too.

A new academic study led by UCLA researchers has revealed that the smallest particles from vehicle emissions may be the most damaging components of air pollution in triggering plaque buildup in the arteries, which can lead to heart attack and stroke.

The scientists identified a way in which pollutant particles may promote hardening of the arteries — by inactivating the protective qualities of high density lipoprotein (HDL) cholesterol, known as "good" cholesterol.

A multicampus team from UCLA, the University of Southern California, the University of California, Irvine, and Michigan State University contributed to the research, which was led by Dr. Andre Nel, UCLA's chief of nanomedicine. The study was primarily funded by the National Institute of Environmental Health Sciences and the U.S. Environmental Protection Agency (EPA).

"It appears that the smallest air pollutant particles, which are the most abundant in an urban environment, are the most toxic," said first author Dr. Jesus Araujo, assistant professor of medicine and director of environmental cardiology at the David Geffen School of Medicine at UCLA. "This is the first study that demonstrates the ability of nano-sized air pollutants to promote atherosclerosis in an animal model."

Nanoparticles are the size of a virus or molecule — less than 0.18 micrometers, or about one-thousandth the size of a human hair. The EPA currently regulates fine particles, which are the next size up, at 2.5 micrometers, but doesn't monitor particles in the nano or ultrafine range. These particles are too small to capture in a filter, so new technology must be developed to track their contribution to adverse health effects.

"We hope our findings offer insight into the impact of nano-sized air pollutant particles and help explore ways for stricter air quality regulatory guidelines," said Nel, principal investigator and a researcher at UCLA's California NanoSystems Institute.

Nel added that the consequences of air pollution on cardiovascular health may be similar to the hazards of secondhand smoke.

Pollution particles emitted by vehicles and other combustion sources contain a high concentration of organic chemicals that could be released deep into the lungs or even spill over into the systemic circulation.

The UCLA research team previously reported that diesel exhaust particles interact with artery-clogging fats in low-density lipoprotein (LDL) cholesterol to activate genes that cause the blood-vessel inflammation that can lead to heart disease.

In the current study, researchers exposed mice with high cholesterol to one of two sizes of air pollutant particles from downtown Los Angeles freeway emissions and compared them with mice that received filtered air that contained very few particles.

The study, conducted over a five-week period, required a complex exposure design that was developed by teams led by Dr. Michael Kleinman, professor of community and environmental medicine at UC Irvine, and Dr. Constantinos Sioutas, professor of civil and environmental engineering at USC.

Researchers found that mice exposed to ultrafine particles exhibited 55 percent greater atherosclerotic-plaque development than animals breathing filtered air and 25 percent greater plaque development than mice exposed to fine-sized particles.

"This suggests that ultrafine particles are the more toxic air pollutants in promoting events leading to cardiovascular disease," Araujo said.

Pollutant particles are coated in chemicals sensitive to free radicals, which cause the cell and tissue damage known as oxidation. Oxidation leads to the inflammation that causes clogged arteries. Samples from polluted air revealed that ultrafine particles have a larger concentration of these chemicals and a larger surface area where these chemicals thrive, compared with larger particles, Sioutas noted.

"Ultrafine particles may deliver a much higher effective dose of injurious components, compared with larger pollutant particles," Nel said.

Scientists also identified a key mechanism behind how these air pollutants are able to affect the atherosclerotic process. Using a test developed by Dr. Mohamad Navab, study co-author and a UCLA professor of medicine, researchers found that exposure to air pollutant particles reduced the anti-inflammatory protective properties of HDL cholesterol.

"HDL normally helps reduce the vascular inflammation that is part of the atherosclerotic process," said Dr. Jake Lusis, study co-author and a UCLA professor of cardiology, human genetics and microbiology, immunology and molecular genetics. "Surprisingly, we found that exposure to air pollutant particles, and especially the ultrafine size, significantly decreased the positive effects of HDL."

To explore if air particle exposure caused oxidative stress throughout the body — which is an early process triggering the inflammation that causes clogged arteries — researchers checked for an increase in genes that would have been activated to combat this inflammatory progression.

"We found greater levels of gene activation in mice exposed to ultrafine particles, compared to the other groups," Lusis said. "Our next step will be to develop a biomarker that could enable physicians to

assess the degree of cardiovascular damage caused by air pollutants or measure the level of risk encountered by an exposed person."

Researchers added that previous studies assessing the cardiovascular impact of air pollution have taken place over longer periods of exposure time, such as five to six months. The current study demonstrated that ill effects can occur more quickly, in just five weeks.

"Further study will pinpoint critical chemical and toxic properties of ultrafine particles that may affect humans," Nel said.

The findings appear in the Jan. 17 online edition of the journal Circulation Research. The research team included investigators from the fields of nanomedicine, cardiology and genetics. Additional co-authors included Berenice Barajas, Xuping Wang, Brian J. Bennett and Ke Wei Gong of the David Geffen School of Medicine at UCLA, and Jack Harkema from the department of pathobiology and diagnostic investigation at Michigan State University.

Additional grant support was provided by the National Institute of Allergy and Infectious Diseases; the National Heart, Lung and Blood Institute; and the Robert Wood Johnson Foundation.

Adapted from materials provided by University of California, Los Angeles.

http://www.sciencedaily.com:80/releases/2008/01/080121084718.htm

Saline Nasal Wash Helps Improve Children's Cold Symptoms

ScienceDaily (Jan. 22, 2008) — A saline nasal wash solution made from processed seawater appears to improve nasal symptoms and may help prevent the recurrence of respiratory infections when used by children with the common cold, according to a new report.

Infections of the upper respiratory tract and sinus infections are common among children, according to background information in the article. "Nasal irrigation with isotonic [balanced] saline solutions seems effective in such health conditions and is often used in a variety of indications as an adjunctive treatment," the authors write as background information in the article. "Although saline nasal wash is currently mentioned in several guidelines, scientific evidence of its efficacy is rather poor."

Ivo Šlapak, M.D., of Teaching Hospital Brno, Brno, Czech Republic, and colleagues randomly assigned 401 children age 6 to 10 with cold or flu to two treatment groups, one receiving standard medication and the other also receiving a nasal wash with a modified processed seawater solution. "Patients were observed for a total of 12 weeks, from January to April 2006, during which health status, symptoms and medication use were assessed at four visits over the course of the trial," the authors write. "Acute illness was evaluated during the first two visits (up to three weeks), prevention during the following two visits (up to 12 weeks). The third visit, scheduled for week eight after study entry, could be conducted over the telephone."

For children in the nasal wash group, the formula was administered six times per day during the first phase and three times per day during the prevention phase, in one of three strengths: medium jet flow (9 milliliters per nostril), fine spray (3 milliliters per nostril) and a dual eye/nose formula with fine spray (3 millimeters per nostril).

A total of 390 children completed the study. By the second visit, the noses of patients using saline were less stuffy and runny. During the prevention phase, eight weeks after the study began, those in the saline group had significantly less severe sore throats, coughs, nasal obstructions and secretions than those in the standard treatment group.

In addition, during the prevention phase, fewer children in the saline group were using fever-reducing drugs (9 percent vs. 33 percent), nasal decongestants (5 percent vs. 47 percent), mucus-dissolving medications (10 percent vs. 37 percent) or antibiotics (6 percent vs. 21 percent). During the same period, children using saline had fewer days of illness, missed school days or complications.

The nasal wash was well tolerated, although participants reported less discomfort using the fine spray formulations. "We did not hear substantial complaints about compliance, and good compliance seemed to be confirmed by the weight of returned empty bottles," the authors write.

Saline washes may work by reducing the production of inflammatory compounds or by creating a favorable environment for cilia, tiny hairs in the respiratory system, to sweep away mucus and particles. "It is not clear whether the effect is predominately mechanical, based on clearing mucus, or whether salts and trace elements in seawater solutions play a significant role," the authors write.

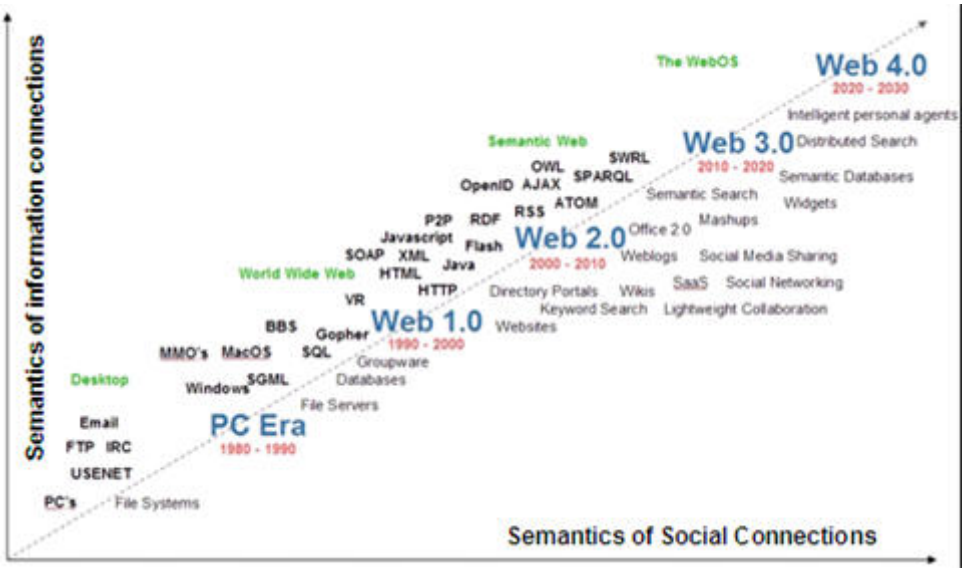
Journal reference: Arch Otolaryngol Head Neck Surg. 2008;134[1]:67-74.

This study was funded by Goemar Laboratoires La Madeleine, Avenue du Général Patron, France.

Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com:80/releases/2008/01/080121164118.htm

Web 3.0: User-generated Networks?



ScienceDaily (Jan. 22, 2008) — European researchers took the concepts of Web 2.0, like user-generated content and social networking, into the real world. They hope to create user-generated physical networks so internets could be set up, by anyone, anytime. It's radical and, surprisingly, fairly realistic. Welcome to Web 3.0.

The internet, Web 1.0, is so incredibly powerful that even now, almost 20 years later, we have only begun to explore its potential. Web 2.0, with its YouTube, Facebook, Flickr and blogs galore is even younger and shows even more potential.

Now, thanks to the work of the WIP project, we may be on the brink of a new internet, a new world wide web. One where users can spontaneously create their own networks, in minutes, and with any kind of data device – mobile or fixed, handheld or deskbound. It means completely reinventing the internet, retooling its underlying technology, creating new operating principles and defining wholly new communications protocols so that it all works with any technology.

"When the internet first emerged, it assumed devices would be fixed in place and linked by wires," remarks Marcelo Dias de Amorim, a researcher with the WIP project. "But that's no longer true. A large number of devices are mobile and equipped with wireless communication capabilities."

Many of the fundamental assumptions of the original internet have been superseded and many other pillars of the web are simply ad hoc (even bootstrap) solutions to discrete problems. It all appears rather accidental.

WIP wants to change all that, reinventing the internet and its underlying methods in what they cheerfully describe as disruptive technology. It is revolutionary, radical, but is it realistic?

DIY networking

"We're not looking to replace the internet with the flick of a switch," warns Dias de Amorim. "What we're proposing is a robust, flexible, optimised and above all user-friendly set of technologies and standards that will mean any user, anywhere, can identify and network with any nearby devices. Without any technical expertise whatsoever."

An example helps illustrate the concept. You live in an apartment building. You find neighbour's wifi connections and invite them to join a new 'building network' with a few clicks. Now you can share and communicate with everyone.

You all have internet connections via an ISP, ranging from 1, 2 and 5 megabits/second (Mbits/s). You decide to pool your money and rent a fibre-optic line that handles voice, data and TV for the whole building. Suddenly you all have 10Mbit/s connections.

Another scenario. You go to a gig with some friends, set up an ad hoc network, and you can all communicate via text, voice or image for the rest of the day, all for free.

It's a radical concept that must overcome some major design flaws of the current internet. One simple example: an IP address governs the routing of information and the identity of the recipient. "That works fine in wired networks, but what happens if the user moves. Their address has changed, not the identity," reveals Dias de Amorim.

"But if separate values are used for identity and routing, then this isn't a problem, even if the user is walking through a park. We've successfully separated the two functions."

That is just one of dozens of challenges the WIP project has responded to during its research. It is a radical rethink of the current state of the art, but can it replace the internet?

"That's not what we're saying," says Dias de Amorim. "It does address the basis of networking, but it can happily plug into the internet itself… That said, if everybody, or even the majority, is using WIP to create internets, then WIP is the internet!"

The project is not quite there yet, but it has made enormous progress. The project split the multitude of technical challenges into three grand strands: user applications and interface, routing protocols, and physical technology innovations. They fit hand in glove to allow users to set up the network, allow the protocols to communicate with any device, and allow the devices to keep up with requirements. It is plug-and-play networking for grown-up applications.

Remarkably, WIP is already in testing phase, using laboratories especially set up for the task, with many of the components of the system. Over the next year, it will finalise some elements and integrate them all together. Finally, it hopes to seed the technology in promising communities to kick-start its adoption.

And then we may see the beginnings of Web 3.0.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com:80/releases/2008/01/080121130202.htm

The Rough-and-Tumble Online Universe Traversed by Young Cybernauts
By FELICIA R. LEE

A baby-faced eighth grader, viciously bullied online, hangs himself. With a click of her mouse, a young woman with anorexia uses cyberspace to find tips on starving. A high school student, with a world of plot outlines available on the Internet, admits that he cannot recall ever actually reading a book.

If 21st-century parenthood is not scary enough, "Growing Up Online," a documentary to be broadcast on the "Frontline" program on most PBS stations on Tuesday night, uses those real-life stories to ask an increasingly important question: What does it mean to be part of the first generation coming of age steeped in a virtual world seemingly outside parental control? The documentary touches on the much discussed fear of online sexual predators, as well as concerns about the ease of cut-and-paste plagiarism, using the Internet. It also examines how notions of privacy and the meaning of friendships change when a computer button can ferry your words and your images to strangers.

"It's one of those societal shifts that's happening so quickly there's not a lot of good data on what this means for our kids' brains or hearts," said Rachel Dretzin, the writer of "Online." Her documentary credits include "Failure to Protect," a series about Maine's child welfare system, and "Hillary's Class," about the 1969 Wellesley College graduating class that included the future Senator Hillary Rodham Clinton. (Ms. Dretzin has also produced a 15-minute video on middle-aged sexuality for nytimes.com.)

Ms. Dretzin co-produced and directed "Online" with John Maggio, whose documentary work includes "Ten Days That Unexpectedly Changed America: Einstein's Letter," part of a series on the History Channel."We came out of it feeling, you find what you're looking for online," Mr. Maggio said of making the film, adding that parents had a distorted fear of the online boogeyman. "If you're basically a grounded kid, you're going to be fine," he said. "We need to teach people good citizenship, a sense of morality, right and wrong, that transfer to the Internet."

Mr. Maggio and Ms. Dretzin, who are parents, maintain that for most young people, being online is no disaster and can be a source of creativity and information. In any case, there is no going back. "Growing Up Online" estimates that more than 90 percent of teenagers use the Internet.

The film begins with a look inside some homes and classrooms in Morris County in northern New Jersey. There affluent youths have their own computers, and the ones who live in housing projects crowd around computers at community centers. In each group some youngsters play war games, tweak their personal profiles, pose for racy photographs.

In one home a 7-year-old, Kurt, goes to the Club Penguin Web site (clubpenguin.com) to socialize, while upstairs his 13-year-old brother, Clay, picks the last name Calamity to freshen his MySpace profile.

Such behavior on its own is benign, but from a parent's perspective, it opens the children to an unknown world. "It's really hard to control what our kids are doing online," says Anne Collier, a writer who provides online safety information for parents. "What we have here is really kind of the new Wild West. Nobody is really in charge."

This is a virtual Wild West, though, conducted through cellphones, MySpace and Facebook. "I have had, like, relationships with guys online, but, like, in school or in public, we're not actually friends," says a 16-year-old identified as Sara. She has an eating disorder and visits sites that celebrate anorexia.

Sara's parents knew nothing of her eating disorder until after her interview with "Frontline." Similarly, Greg Bukata, a teenager who lives in Chatham, N.J., reveals the tricks he employs to wriggle out of his father's attempts to monitor his computer use.

"I'd go on my way and do what I wanted, and he'd think I'd be researching monkeys or something," Greg says. He also says that he can't remember the last time he read a book. Recently, he adds, he took five minutes to read an online condensed version of "Romeo and Juliet."

At Chatham High School, Michael LaSusa, a co-principal, concedes that the classroom must compete with the flash of cyberspace."We have to be interactive because they're accustomed to sitting in front of a screen and they've got five windows up and they're talking to three people at the same time," Mr. LaSusa says.

The younger generation regards online not as a separate place "but as just a sort of continuation of their existence," says Danah Boyd, a fellow at the Berkman Center for Internet and Society at Harvard Law School.

"Cyberspace mirrors and magnifies offline behaviors, scaling up both the good and the bad," Ms. Boyd said in an e-mail message. "On one hand, this is terrifying. On the other, it provides a great opportunity for parents, educators, social workers and other concerned professionals to understand and reach out to youth at an entirely new level."

"Growing Up" shows one young woman with body piercings using the Internet to find the popularity and acceptance that have eluded her elsewhere, but it also shows the Halligan family of Essex Junction, Vt., confronting the very worst. Their son, Ryan, 13, killed himself in October 2003 after enduring online bullying.

After his son's death, John Halligan logged on to Ryan's computer to discover that he had been caught in a smear campaign of rumors about his sexuality. A popular girl at school flirted with him, using instant messaging, and then announced that the flirtation was a joke, Mr. Halligan learned. And Ryan had made an online friend with whom he visited a Web site that discusses the best suicide methods.

"The computer and the Internet were not the cause of my son's suicide, but they helped," Mr. Halligan says. "I believe they helped amplify and accelerate the hurt and pain that he was trying to deal with that started in person, in the real world."

By the end of "Online," Greg Bukata, for one, has quit the Internet, if only temporarily. He is seen graduating from Chatham High School, with plans to attend the United States Coast Guard Academy, where Internet use is prohibited for several weeks. "It'll be hard, but I need to disconnect," he says. "I need to just pull the plug on this Internet life for a little bit and see what it's like."

http://www.nytimes.com/2008/01/22/arts/television/22front.html?_r=1&ref=arts&oref=slogin

Art attack

Peter Kennard

Published 17 January 2008

Banksy attracts the press attention, but around him is an increasingly influential movement of political artists operating outside the mainstream

The phone rings; the number is withheld. It's Banksy. He wants to know whether I can go to Bethlehem over Christmas. He is putting on an exhibition, bringing together like-minded artists from all over the world to raise awareness of the situation in Palestine. Like the annual guerrilla art shows that have taken place in London for the past six years, it will be called "Santa's Ghetto". Two weeks later, I find myself involved in an experience that transforms my ideas about what artists can do in the face of oppression.

We are living through an exciting time for political art. I have been an artist for 40 years, and my work has always focused on political and social issues. In the 1970s, I started making photo montage work, drawing on imagery from the Vietnam War and the row over nuclear armaments (a retrospective opens at the Pump House Gallery this month). Since the build-up to the Iraq War in 2002, I have been collaborating with a younger artist, Cat Picton Phillipps, developing new techniques and using digital technology to expose the lies that led to the invasion and the subsequent humanitarian disaster.

Over this period, our work has become linked to a group of young artists who work outside the official art world. Most of them started out painting graffiti on walls. The central figure in this group is Banksy, but although he attracts most of the press coverage, he is surrounded by a growing band of talented, politically committed artists. Our associates come from Spain and Italy, the US, Britain and Palestine. Since the era of the Bush/Blair war in Iraq, this movement has become increasingly politicised, just as my generation was politicised by the war in Vietnam. These are artists who want to

connect with the real world, rather than work for the market, which has more of a stranglehold on art than ever. They combine creativity with protest, insisting that art should be more than the icing on the cake for the super-rich.

We arrived in Bethlehem with four fellow artists: Blu, an Italian who has painted on walls from Bologna to Buenos Aires; Sam3, from Spain; the long-standing Banksy collaborator Paul Insect, from Britain; and Gee Vaucher, another Brit and the only other artist of my generation. The rest are all in their thirties and come from street-art backgrounds. All of them are well informed about the Middle East and came to Bethlehem to show their solidarity with the Palestinians.

Banksy had been to the West Bank a number of times to paint on the Separation Wall. He knows and understands the situation and had a team of focused, sussed people working with him. They found a disused fast-food joint in Manger Square and managed to rent it. The idea was to show a combination of western and Palestinian artists. The art was available to buy on site only, so if you wanted to get hold of the latest Banksy or any of the other artworks, you would have to travel to Bethlehem to place a bid. This was important, because Bethlehem is being starved of its tourist trade as visitors are bussed in to see the Church of the Nativity and bussed out an hour later back to Israel. All proceeds from the sale, which exceeded $1m, went to local charities.

For our contribution, Cat and I decided to print a dollar bill across 18 sheets of the *Jerusalem Post*, ripped through to expose images of pre-Naqba Palestine. The pictures show the richness of Palestine's history and the diversity of its culture - a sobering antidote to the stereotype of a violent, irrational people that we so often see on the news. We wanted to make the work in Bethlehem because taking finished pieces over would be difficult, given Israel's heavy and ever-changing restrictions on what and who can travel in to the Palestinian territories.

We teamed up with a group of Palestinians, who helped to get hold of materials and sort out logistics. They also gave us all a window on life in the West Bank, with looming Israeli settlements and endless checkpoints. Every night we would pile into a kebab restaurant, where we would drink and dance, arguing over and discussing that day's work. One night over dinner, the Palestinians recounted how they had been held and tortured by the Israeli authorities while they were still in their mid-teens. It was extraordinary how welcoming they were to this motley band of artists. All the privations and restrictions have only increased the Palestinians' resilience and their desire to communicate with the outside world.

Through these friends we found a commercial printing house in Hebron, which got involved in sorting out our highly unconventional printing needs. This involved printing a giant dollar across many sheets of newspaper and also making a giant print to plaster on the Separation Wall. The printers immediately committed their time and energy to the project, and ended up printing for Banksy and the other artists.

Through this process of making, the people of Bethlehem became involved in what the work was saying. After we pasted our picture on the wall, we went for tea in the cafe opposite. The cafe owner, whose business has been destroyed by the wall, told us he appreciated the statement we had plastered on to the cement that he has to stare at every day of his life.

Sticking up a poster or painting the Separation Wall in the West Bank might sound inconsequential, but these are highly practical ways to help, in contrast to the intellectual interventions prevalent in much contemporary art. They contribute to a town and a people that are having their lifeblood strangled out of them.

In this context, it is important that the work communicates directly to the Palestinian people. While there has been a move to take on contemporary issues in a direct way in the theatre, in visual art the idea still holds that if you have something to say about the world, you have to hide it behind theory and obscurity. It sometimes seems that Britain's art colleges turn out experts in camouflage, rather than fine art.

The pressure of world events is so great that it is increasingly difficult to sustain the idea of art for art's sake. Radical art and politics converge in times of crisis, and that is happening now. I know, from my experience as a tutor at the Royal College of Art and at the University of the Arts in London, that the ironies of the Nineties YBA movement are now a thing of the past. Many art students and young artists are searching for ways to make a direct connection between their awareness of how things are in the world and their own art practice.

This involves thinking about not only the form of the art itself, but also the process of making. There are many collaborations taking place across media and disciplines, and artists are looking for new methods of distribution.

Unlike in my youth, there is no organised "left" into which artists can slot, but there is a concrete wall, 425 miles long, and we can turn it into an international canvas of dissent.

"Uncertified Documents", a retrospective of work by Peter Kennard, opens at the Pump House Gallery, Battersea Park, London SW11 on 30 January. For more information, log on to: www.wandsworth.gov.uk/gallery

Blu burst on to the public-art scene after the success of his contributions to the "Urban Edge" show in Milan in 2005. His reputation is built on expansive, surreal, often aggressive wall and pavement murals. Though renowned for his playfulness, acclaimed pieces from 2007, such as Fantoche in Switzerland, Letter A in New York and Reclaim Your City in Berlin, have a more macabre tone.

Suleiman Mansour co-founded al-Wasiti Art Centre in east Jerusalem, which he now directs, and went on to lead the New Vision artists' group, which proved influential during the first intifada. A pioneer of resistance art, Mansour makes work that revolves around the Palestinian struggle. He was head of the League of Palestinian Artists for four years, and won the Nile Award at the 1998 Cairo Biennale as well as the Palestine Prize for the Visual Arts the same year. He is famous for using locally sourced materials, such as mud and henna, in his pieces.

Sam3 (Samuel Marín) comes from Granada in southern Spain, where his ephemeral long, black silhouettes haunt the cityscape. Famous works include his 12 Shadows project for AlterArte and the iconic Erase Yourself, a silent protest against the civic legal authorities for removing graffiti in Barcelona.

Paul Insect is a London-based ex-designer whose pioneering of "steampunk", a mixture of Gothic Victoriana and futuristic themes, has proved popular with the British arts intelligentsia. In July last year, Damien Hirst bought his entire "Bullion" show at the Lazarides Gallery in Soho. His painting Unicorn sold for an estimated £24,500 at Sotheby's last month.

Ben du Preez

http://www.newstatesman.com:80/200801170028

EU reveals energy plan of action
European Commission President Jose Manuel Barroso has announced "historic" plans to make Europe "the first economy for the low-carbon age".

He said Europeans wanted "a vision and a plan of action" against climate change and the measures would cost 3 euros (£2.10) a week for every citizen.

The aim would be a 20% cut in the EU's greenhouse gas emissions by 2020, which could rise to 30% with a global deal.

He told the European Parliament there was a cost, "but it was manageable".

'Not a bad deal'

Mr Barroso put the figure at 60bn euros a year until 2020: "a real commitment, but not a bad deal." It would mean a rise in electricity prices of 10-15% but there would be less reliance on energy imports.

He said work had to start to cut global emissions in half by 2050 and he said Europe could lead the way.

Addressing business critics who have complained that the proposals might drive industry away from the European Union, the commission president said energy-intensive industries would be give emission allowances free of charge.

He told MEPs the package was "not in favour of the environment and against the economy".

"We don't want to export our jobs to other parts of the world," he said.

Carbon allowances

Environmental groups believe the commission should be planning for the higher target of 30%.

"Scientists warn that a cut of at least 30% is required to prevent a climatic catastrophe," said Tony Juniper, director of Friends of the Earth UK.

"The solutions already exist. What we lack is political ambition and courage."

EU'S 20/20/20 VISION: KEY AIMS AND POTENTIAL CHALLENGES
AIM: reduction in greenhouse gas emissions by 2020
AIM: reduction in energy imports, saving money and increasing energy security
AIM: world leadership in renewable energy technology
CHALLENGE: government and companies may try to weaken their emissions targets
CHALLENGE: some countries likely to find renewables targets very ambitious
CHALLENGE: wrangles likely over technicalities of ETS

The commission's proposals would see the Emissions Trading Scheme (ETS) extended to include more industrial sectors in the years between 2013 and 2020.

Apart from a few exempt industries, the power sector would lose the right to free emission allocations and have to buy all its permits at auction from 2013. Aviation and other industries would move gradually to a full auction.

Companies' carbon allowances would be decided at European level, replacing the current system where nations submit bids to the commission.

The aim would be to reduce allowances so that by 2020, emissions from the sectors included would be about 21% below the level they were when the ETS started in 2005.

For emissions not covered by the ETS, such as transport, buildings and agriculture, the commission has proposed national targets.

Richer nations would have to cut their emissions: the target for Denmark and the Irish Republic is a 20% reduction and the UK's is 16%. The poorest would be allowed to increase emissions, Bulgaria by 20% and Romania by 19%.

Carbon savings

Each country has been given a national target for renewable energy.

The UK's is 15%. Sweden which already has a thriving renewables industry has been given a tougher figure of 49%.

Countries would be allowed to trade investment in renewables facilities.

The target of powering 10% of Europe's road transport with biofuels has been retained.

But the Commission has drawn up a set of criteria designed to ensure the fuels used bring carbon savings of at least 35% compared to petrol or diesel, without causing other environmental problems

Before the commission's proposals are adopted, they will have to be endorsed by MEPs and member states. The final package might not come into force before the end of 2009.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/7203514.stm

Published: 2008/01/23 16:03:49 GMT

Detailed gene map 'within grasp'

By Helen Briggs
BBC News science reporter

One thousand people are to have their genomes mapped in a major effort to understand how genes influence disease.

To date, only a handful of humans have had their genes analysed in this way, including scientists Craig Venter and James Watson, and anonymous volunteers.

Teams in the UK, US and China say the project will create the most useful catalogue ever of genetic variation.

Any two humans are genetically more than 99% identical: variations can explain why some get certain diseases.

Current catalogues of human genetic variation have led to the discovery of more than 100 regions of the genome - the complete package of genetic material in a living thing - that could explain susceptibilities to diseases such as diabetes, breast cancer and rheumatoid arthritis.

> **We can do 100 times as much sequence today as before for the same amount of money**
> Dr Richard Durbin

The international research consortium behind the 1,000 Genomes Project aims to build on this work by providing a much more detailed map of disease-related differences for use by all scientists.

"The dream of people working in the field would be to have a picture of all the places in our DNA sequence where there are differences between people, and how these fit together when they are inherited," Dr Richard Durbin of the Wellcome Trust Sanger Institute, who is co-chair of the consortium, told BBC News.

"We can do 100 times as much sequence today as before for the same amount of money," he explained.

"That allows us to think about sequencing 1,000 people in order to see directly all those differences between people and to provide a foundation for future human genetics."

Knowledge gap

The map is designed to fill in the gaps in our knowledge about how genetic variation is related to disease.

The 1,000 Genome Project
Cost: $30m to $50m
Will read 6 trillion DNA building blocks
Includes populations from Africa, Asia, America and Europe

Most current research focuses on rare genetic changes in the human code that run in families and cause severe inherited diseases such as cystic fibrosis, or common differences that appear to underpin a host of major diseases.

"Between these two types of genetic variants - very rare and fairly common - we have a significant gap in our knowledge," said Dr David Altshuler, the other co-chair of the consortium.

"The 1,000 Genomes Project is designed to fill that gap, which we anticipate will contain many important variants that are relevant to human health and disease."

Anonymous samples

The work to sequence (read) human DNA will be carried out by the Sanger Institute in Cambridge, Beijing Genomics Institute in Shenzhen, and the National Human Genome Research Institute (NHGRI), which is part of the US National Institutes of Health (NIH).

They will use samples from volunteer donors who gave informed consent for their DNA to be analysed and placed in public databases.

Only a handful of people in the world have had their genomes mapped by science: the public Human Genome effort used bits of DNA from 12 unnamed volunteers, while private efforts in the US have unravelled the genetic code of US scientist Craig Venter and Nobel prize winner James Watson.

The data gleaned by the 1,000 Genomes Project will be made available to the worldwide scientific community through freely available public databases.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/7201994.stm

Published: 2008/01/22 13:00:33 GMT

Labels 'key to tackling obesity'
Ministers have told the food industry a "single, simple" product labelling system is the key to tackling obesity.

Major retailers and food producers use a combination of systems from traffic light codes to guideline daily amounts.

But the government has said it wants them to agree to abide by the findings of an independent expert panel which is currently looking into the issue.

It comes as ministers prepare to unveil a range of measures making up their anti-obesity strategy for England.

The cross-government strategy for England will make it clear that a uniform approach is needed to food labelling.

> **We are a super-tanker heading in the wrong direction and it will take time to turn that around**
> Professor Mike Kelly, of the National Institute for Health and Clinical Excellence

The Food Standards Agency favours a traffic light system which uses red, amber and green labels to signify whether the food is good for you.

But the watchdog has failed to get the agreement of industry, which has used a mix of different methods.

Many favour guideline daily amounts, which are percentages of sugar, salt and fat per serving.

Consumer groups have complained that such systems are too complicated.

Major retail groups, including Tesco and Asda, have told the BBC they are not yet prepared to abide by the findings of the independent group examining the issue, despite the government's call.

Consensus needed

Health Secretary Alan Johnson said: "In this country we are probably ahead of the world in food labelling.

"Our retailers and our food manufacturers have looked at this in a very clear way and said 'Our consumers do want information'.

"The problem is there are three systems. We are saying we want to work with the industry and have an independent review by experts to see which of these three systems is the most effective. Then we hope that we can convince the industry to go for one system."

Shadow Health Secretary Andrew Lansley said the traffic light system was too simplistic.

"If we are going to achieve a consensus in this country which we can then try to drive through on a Europe-wide basis, the thing we are going to need is combined traffic light and guideline daily amounts to help people construct their diets."

Mr Johnson will unveil government's obesity strategy in parliament on Wednesday afternoon.

He told the BBC that obesity was "probably the biggest public health threat that we face."

Increases

In the UK, nearly a quarter of adults and over a tenth of children are obese after sharp increases in the last decade.

The strategy is likely to include measures to encourage cookery lessons in schools and allocate £30m to help create a series of healthy towns with comprehensive cycle routes and pedestrian areas.

Ministers also want to see councils use their planning powers to prevent fast-food outlets setting up near schools.

It comes as the NHS advisory body, the National Institute for Health and Clinical Excellence, has made recommendations about how planners, designers and architects can help create an environment that promotes physical activity.

STEPS TO IMPROVE ACTIVITY
Durham - In the first 12 months following introduction of road charging there was a 10% rise in pedestrian activity
Central London - Improvements to cycle network led to 30% increase in cycling over three years
Skjovoeland (Norway) - Handful of streets turned into no-go areas for cars - prompted a steep rise in cyclists and pedestrians

The advisers said more priority should be given to cyclists and pedestrians when it comes to street design, including narrower roads, more cycle networks and wider pavements.

The advisers also pointed out simple measures such as signposting where stairs are rather than just highlighting lifts could make a difference.

NICE official Professor Mike Kelly said society had now reached a "watershed".

"We are a super-tanker heading in the wrong direction and it will take time to turn that around."

But public health experts questioned the government's track-record on tackling obesity.

The topic was a central plank of the government's 2004 public health White Paper, but the Faculty of Public Health said less than half of the promised £300m extra funding materialised.

Professor Alan Maryon-Davis, president of the Faculty of Public Health, which represents public health specialists, said: "We have had a lot of rhetoric on tackling obesity.

"But what we need now is good local schemes in place. That requires both financial and strategic support."

TRAFFIC LIGHT LABELLING

	Low Per 100g	**Medium** Per 100g	**High** Per 100g
Fat	0-3g	Between 3g and 20g	20g and over
Saturated fat	0-1.5g	Between 1.5g and 5g	5g and over
Total sugars	0-5g	Between 5g and 15g	15g and over
Salt	0-0.3g	Between 0.3g and 1.5g	1.5g and over

Source: Food Standards Agency

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/health/7202589.stm

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Transplant goal 'one step closer'
Scientists appear to be a step closer to transplanting a kidney without the need for a lifetime of drugs.

Two separate US techniques have seen recipients recovering without the need for powerful drugs, which carry many side-effects - including a cancer risk.

Unless the organ comes from an identical twin, the body's reaction is to reject it as a foreign invader.

UK experts said the findings were exciting, but warned a lack of donor organs remained the principal problem.

The idea of getting off drugs holds tremendous appeal for patients
John Scandling
Stanford School of Medicine

Close matches require a lifetime of immunosuppressive drugs which increase the risk of infection, high blood pressure and cholesterol.

They can also increase the risks of certain types of cancer.

Doctors have been working for years on ways to stop this process of rejection and reduce the need for drugs.

While most transplant units in the UK have managed to cut the dosage by about 50% in the last five years, the risk of side-effects remains.

The results of both studies appear in the New England Journal of Medicine.

In the first study at Stanford University, a man who received his brother's kidney has gone for two years without drugs after his doctors tweaked his immune system with irradiation and antibody treatments.

He then received an infusion of his brother's blood cells. This combined treatment created a kind of "peacekeeping" immune cell, which appeared able to avert the attack on the foreign organ.

"The idea of getting off drugs holds tremendous appeal for patients," said the study's lead author, Professor John Scandling.

"So far, there is hope, but we still have a long way to go."

Destroying bone marrow

The second study was conducted at Massachusetts General Hospital.

> **As in all parts of the world, the main problem in transplantation is the shortage of organs**
> Robert Higgins
> Renal specialist

Five patients were given treatment that partially destroyed their bone marrow and with it the white blood cells which cause rejection.

This bone marrow was then replaced with a bone marrow graft from the donor, and the kidney followed.

One of the five rejected the kidney, but the other four have so far been able to live with normal kidney function and without drugs - the longest for over five years.

Dr Robert Higgins, a specialist in renal transplantation, said while both studies were exciting, he had particular concerns about the one carried out in Massachusetts.

"While these early results are encouraging, the treatment involved in destroying the bone marrow can be life threatening, and there are other risks, such as the bone marrow graft trying to 'reject' the patient."

He added: "As in all parts of the world, the main problem in transplantation is the shortage of organs."

In the UK, the prime minister has thrown his weight behind plans to put everyone automatically on the organ donor list, as is done in countries such as Spain, rather than relying on people to sign up.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/health/7205094.stm

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Choreographer moving to a new beat

As a 30-year veteran, Bill T Jones welcomes audience feedback and is embracing ambivalence about political activism, writes Sarah Wildman

Wednesday January 23, 2008
Guardian Unlimited

Bill T Jones. Photograph: Eamonn McCabe

Late on a wintry Tuesday afternoon in December, choreographer Bill T Jones and his partner, Bjorn Amelan, stopped in at the Tony Shafrazi Gallery in Manhattan.

> The men pointed to a pair of Keith Haring's subway drawings sketched in white chalk on black paper. A Haring-graffitied vase stood in the middle of the floor. The latter was from the Jones-Amelan home; at the gallery it was on display, and for sale. "Keith was supposed to have been for my company what the artist Robert Rauschenberg was for [the choreographer] Merce Cunningham," Mr Jones recalled.

His company is the Bill T Jones/Arnie Zane Dance Company, and he meant that Haring, the talented and celebrated artist who was central to the New York art boom of the 1980s, was to be an artistic advisor, creative partner and inspiration. "It was such a disappointment when he got sick."

> Mr Haring died of Aids in 1990. Mr Jones, now 55 and a veteran of the American dance scene, is a survivor - both of the fickle art world and of the epidemic that took friends and his partner, Mr Zane. Long seen as one of the most provocative American choreographers for his frank melding of dance with critiques of social justice and equality - "they accused me of being political," he says with bemusement, "of having a social conscience" - in recent years Mr Jones has remained sharp in his criticism of apathy, refusing to turn his unwaveringly critical eye away from the audience or himself.
>
> Yet he has also redefined and refined his activism, following an "almost Buddhist philosophy," which he calls "Right Action." "I have two feelings," Mr Jones mused earlier that afternoon. "One is that we can't really change anything and the other is that we must try. How do those two notions cohabit? They can live on the stage together, but can they live in life together?"
>
> That intersection of choreography-meets-activist-meets-Ethics of the Fathers (an ancient Hebrew tract of ethical maxims) underwrites his work.

Recent pieces, including 2004's Blind Date -- created as a response to the Iraq war and the run-up to the last U.S. election -- and the currently touring Chapter/Chapel look at the moral properties of patriotism in the time of war and reflect the choreographer's exploration of the Sisyphean nature of political consciousness.

"Maybe I am at last achieving what I always wanted, even the most literal things I did to do," Mr Jones said, sipping an Irish coffee and wearing his strong black-framed signature glasses. "To talk about ambivalence. To talk about that realm where art actually is encountered .... And trying to make one's peace with that. To enjoy it, even." For one of America's most politically challenging artists, now 55 and a 30-year veteran of the dance world, the current moment is yet another critical juncture.

"What does it mean to be a modern dance company right now?" Mr Jones asked. He speaks in almost preacher-like tones - slow, defiant, occasionally Socratic. "What do I want it to mean? How does it work? How does it find an audience, and once it finds an audience what is the contract with that audience?"

Mr Jones has reached a level of popular success he would have mocked once-upon-a-youth ago - in 2007 he won a Tony award for choreographing the sexual-coming-of-age Broadway frolic "Spring Awakening," and in November he became the first dancer to perform a piece-widely acclaimed-at the Louvre.

He has come to terms with the peculiarity - and unlikelihood - of success in modern dance, and what that success means for his personal political expression. "There was a time when maybe I would have said - and I know people I respect would have said - that one should never be concerned about the audience," Mr Jones said.

"Now I have accepted the world doesn't need another modern dance company. People certainly vote with their pocket books and modern dance often takes a drubbing at the box office. Maybe I have to reexamine what that relationship is. If I want to be in this world, what do I have to do to be in this world? And what are the values that must stay intact even as I try to meet people?"

Part of meeting people is quite literal. Mr Jones likes to keep an audience overtime to discuss a new work - live, in front of him - using their feedback, working with it and against it.

Two weeks before we met in Manhattan, he premiered the company's newest piece - A Quarrelling Pair - at the Alexander Kasser Theater in Montclair, New Jersey, a small, middle-class, liberal-leaning suburb about 10 miles outside of Manhattan.

The audience was a cross section of race and class in a way rarely seen in American social life, except, perhaps, at a Bill T Jones dance performance. Afterwards, the entire audience stayed an extra hour to talk.

A Quarrelling Pair is a pithy 1946 Jane Bowles puppet play about two sisters, Harriett and Rhoda, who argue endlessly about the world and their place in it. Is it better to stay at home, the play asks, or to go out into the world to save it?

Bowles trapped the sisters in an endless Sartre-esque cycle - the sister who wanted to stay home harangues the sister who wants to, but never can, leave. Mr Jones sets Miss Rhoda free in a vaudeville-structured theater-meets-dance piece that challenges the merits of activism.

After the show the entire creative team came out on stage, sat down on folding chairs and asked the audience for feedback.

Emboldened audience members stood up. Some hated the canned laughter and applause fed in at points in the story, a part of the show-within-a-show; some overrelated to the piece, telling the entire auditorium about their own life hardships. Others said they were "moved," "entertained," "upset."

Mr Jones pushed each speaker to give him more. Should they get rid of the canned applause? He asks for a show of hands.

No one noted the political aspects of the piece, even though at points it is blatantly so: videographer Janet Wong's background film flashes images of marching Burmese monks, and an entire five-minute segment coupling and uncoupling groups of dancers moving briskly through a grey on white space, in triplets, dancing to Bob Dylan's 1962 cautionary ballad A Hard Rain's a-Gonna Fall.

"The song is almost easy to parody," says Mr Jones. "Or, not. Here is folk music, this is Dylan in his acoustic period and he is singing his heart out. And 'I know my song well before I start singing.' That sort of self-righteousness of youth and all, which they always accused me of -'Oh, he's so political, so self righteous.'"

In 1992 Mr Jones choreographed Still/Here, a stark message about his own HIV status, and those who were dying or already lost. Images and videos of dying Aids patients were incorporated into the piece.

Arlene Croce, writing for the New Yorker, refused to review the piece and accused Mr Jones of playing victim politics - of creating something outside of and above the realm of art and art criticism.

Ms Croce's unusual and aggressive rebuke sparked a debate in the dance world; it was a low point of the culture wars, and Jones has said it was one of the worst moments of his career.

In Mr Jones' A Quarrelling Pair, Miss Rhoda, the sister with the "big heart", takes to the streets to save the world.

"Is it sincere?" asks Mr Jones, "And the question is now where am I? And I hope that is the next question for people. Am I, quote, an old lefty for whom everything is nostalgia? Or as real for me as the monks in the streets? Or as Miss Rhoda feels when she is never going back home? 'Never never never,' she says. So I am always hoping that people will see it and maybe even get the joke but realize it is not a joke. And so why this homely little four-page play? You know? About two middle-aged sisters and their milk? It's almost to say that you can start anywhere with this discussion."

Mr Jones liked the fact that neither sister is the clear protagonist. "Before, I had this fire in the gut about right and wrong. Now in middle age I am more ambivalent. And I think that ambivalence has something rich about it. I think that might be the unifying idea of my time, actually.

"I think liberal people have a hard way to go right now. People who believe that all ideas are allowed. People who believe in the discourse, people who believe in freedom of speech. Every day there are instances where freedom of speech and liberal notions are an entrée to brutes, killers, murderers.

"If all ideologies are allowed in the abstract, then ideologies that oppress women that kill innocent people are also ... Those of us liberals, if you want to talk about progressive values, have a hard way to go. We don't throw in the towel but it makes us more sophisticated? Maybe more measured? More profound in our opinions? And I'm trying to do that in the work. So that's why I'm glad you smelled something political in it. And everything is political to me. But that can't be all that it is."

http://arts.guardian.co.uk:80/theatre/dance/story/0,,2245559,00.html

The Sistine Chapel was created 500 years ago by Michelangelo...or was it?

It is one of the wonders of the world. It covers 550 sq m, took three years of back-breaking work to create, and has been marvelled at by millions. Now, a controversial study is throwing new light on the 'inspiration' behind Michelangelo's greatest masterpiece.

By Peter Popham

Thursday, 24 January 2008

In contrast to other great Renaissance figures such as Shakespeare, of whose lives we know practically nothing for certain, Michelangelo was intimately chronicled during his own lifetime – in dozens of letters he wrote to his beloved father and brothers, and in two biographies, one by Vasari. We know in vivid detail what the great artist was up to month by month, often day by day. His tortured relationship with the warrior pope who was his greatest patron emerges vividly from the chronicles of his age.

We can even picture him at work, thanks to a sketch he drew illustrating a humorous poem on the torment of painting the ceiling – head thrown back, bottom thrust out to give him support, "belly hanging like an empty sack,/ beard pointing at the ceiling... my face, from drips and droplets/patterned like a marble pavement..."

We can also readily imagine the speed at which he worked, slapping paint on to wet plaster, driving himself across the enormous surface to get it covered in time.

The critic Waldemar Januszczak, who had the chance to scrutinise the ceiling from close quarters from the top of a television scaffold, wrote: "I could see the bristles from his brushes caught in the paint, and the mucky thumbprints he'd left along the margins. The first thing that impressed me was his speed. Michelangelo worked at Schumacher pace. Adam's famous little penis was captured with a single brushstroke: a flick of the wrist, and the first man had his manhood."

But behind the rich, almost cinematic certainties that history has given us about the painting of the ceiling – concerning the people, the relationships, the materials, the time frame, the technology – lies an impenetrable area of shadow.

Before he dipped the brush in the paint and set to work on his God and Christ, his Adam and Mary and all the rest, how did Michelangelo prepare himself? We know that, unlike his peers and predecessors, he did not use cartoons to transfer existing designs directly on to the wet plaster, because there are no the telltale peg marks left in the plaster's surface. We know that in some cases he worked from small drawings because a grid can be discerned over the finished work, indicating that he upscaled from a smaller sketch.

But what the norm for his preparation was we simply don't know – because Michelangelo didn't want us to know. Throughout his life he hated showing drawings to outsiders. Vasari claimed that this was because they revealed the endless effort he expended in reaching the perfection at which he aimed. Though he was dependent, like all Renaissance artists, on the patronage of the powerful, even men like Cosimo I were unable to get him to part with a single drawing. Before moving from Rome to Florence in 1518, he burned all the drawings in his house in Rome. Another terrible bonfire took place, on his instructions, at his death. Even Michelangelo's closest friends possessed only a tiny number of drawings, all of them highly finished.

Yet despite this well-documented niggardliness, the world's great museums are awash in Michelangelo drawings: the consensus among Anglo-American and Italian scholars is that there are around 800 in existence, including those of the Risen Christ and the Labours of Hercules in the Royal Collection, and the artist's preliminary sketch for the Sistine Chapel's fresco of the Creation of Man, in the British Museum.

But if three eminent German scholars are to be believed, the methods by which Michelangelo prepared for the epic struggle of painting the 300 figures on the chapel ceiling remains a mystery, and the drawings that are said to explain it merely mystify it. In a beautiful and weighty new book, Michelangelo: Complete Works, they insist that only a small minority of the drawings currently attributed to the master are definitely by him.

British critics have given the thesis a hostile if not derisory reception – Brian Sewell, commenting in the London Evening Standard, declared: "I fervently dispute the dismissal as copies of many of Michelangelo's drawings, concluding from the author's conclusions that they have no knowledge of the practice of drawing in the Renaissance."

But even those to whom the idea of the world being awash in phoney Michelangelo drawings is anathema concede the objective reality of the uncertainty. "From his own day to the present there has been a remarkable degree of consensus concerning the corpus of Michelangelo's painting, sculpture and architecture," David Ekserdjian writes in The Sunday Times. "By contrast, his figural drawings remain the victims of extraordinary connoisseurial mood swings... Around 1900, Bernard Berenson and others took a minimalist view, numbering the total of autograph sheets around 200... this figure has been slowly but surely climbing since the 1950s, especially in what might be described as the Anglo-American and Italian axis, towards a figure of around 800."

The German scholars take the figure back down to around 200 again, so that, for Ekserdjian, "turning the pages of reproductions is a surreal experience, as some of the most beautiful drawings ever made are summarily dismissed." The iconoclasm of Frank Zöllner, Thomas Pöpper and Christof Thoenes knows no bounds: not only are vastly valuable treasures in the collection of the Queen brought into question, but also the "preliminary sketches" of the Creation for the Sistine Chapel ceiling. Famous drawings of Adam, one of the British Museum's greatest treasures, are cruelly and casually dismissed as fakes.

"They prove upon closer inspection chiefly to be early copies after the finished fresco... occasionally deliberately trying to pass themselves off as original sketches." A second Blitzkrieg is under way.

The scorn of Sewell and Ekserdjian is less persuasive, however, than the gentle scepticism of the Germans, who caution that their views – "each attribution", they emphasise, "has been weighed up again and again in a lengthy process of review" – should only be taken "as a starting point for future discussion".

The vested interests of the great museums in favour of granting authenticity to works of such vast popularity and financial worth should not be underestimated – nor their influence, however subliminal, on the art critics. When the British Museum unveiled its gorgeous show of Michelangelo drawings in March 2006, only one critic, Richard Dorment, insisted that the Emperor was wearing very few clothes.

There is, he insisted on pointing out in the Telegraph, "remarkably little consensus... as to what a Michelangelo drawing looks like and how many of them there are" – and the museum's failure to take account of that fact he deemed "a crushing disappointment". The curator, he said, had simply accepted

attributions published 50 years before. "The ordinary visitor would never guess that only three of the 80 or so drawings attributed to Michelangelo on display are universally accepted by all scholars as being by the hand of the master."

This is one of those scholarly rows, like the unending debates over the real authorship of Shakespeare's plays, that is an entirely harmless spectator sport. Somebody, somehow did write King Lear, and the endless theories about who exactly the author might have been throw weird, oblique beams of light on that and all his other masterpieces.

Michelangelo certainly painted the Sistine Chapel ceiling, spattered with drips, belly sagging, beard sticking straight up – and if the question of how he prepared for that Schumacher-like feat remains a mystery, then so much the more interesting.

It was in any event an impossible commission, from the artist's most demanding, impossible patron. Raphael's painting of Pope Julius II as a hollow-eyed, white-bearded figure clutching a money bag in one hand and the arm of his throne in the other, fails to do justice to one of the most bellicose megalomaniacs ever to occupy St Peter's chair, which is saying a bit.

Julius was, writes the papal historian Eamon Duffy, "a very dubious Father of all the Faithful, for he had fathered three daughters... while a cardinal, and he was a ferocious and enthusiastic warrior, dressing in silver papal armour and leading his own troops through the breaches blown in the city walls of towns who resisted his authority."

He was, however, the greatest papal patron of the Renaissance, giving inspired commissions to Raphael, Bramante and Leonardo as well as to Michelangelo.

Michelangelo's relationship with the pope was tormented. The artist from Arezzo, who turned 33 in 1508, was already famous as the sculptor of David, completed in 1504, and recognised as the genius of the age. Julius summoned him to Rome and commanded him to create a preposterous thing – a vast sepulchre worthy of a Pharaoh more than a pope, which was to contain 40 life-size figures and would become the eighth wonder of the world.

Perhaps fortunately, this monstrous monument was never finished, but what the artist called "the tragedy of the Tomb" pursued him long after Julius's death and interment in 1513, with rows over lousy assistants, inadequate budgets and revisions of the contract. In 1506, after one nasty spat, Michelangelo bolted from Rome on horseback.

But Julius, for all his megalomania, had a clear view of Michelangelo's worth, and after the artist had been prevailed on to apologise, got him to execute a bronze statue of him – subsequently melted down into a cannon.

Then, even while the agonies of the tragic tomb continued to pile up, Julius threw another amazing job at Michelangelo. The walls of the Sistine Chapel, the private chapel of the papal household, were already adorned with works by 15th-century masters including Botticelli and Perugino. The ceiling was painted blue, dotted with gold stars. The chapel had long been in disuse because of a large crack in the ceiling. Now Julius wanted it to be drastically renovated, and commanded him to paint 12 large figures of the Apostles on the ceiling.

At first, Michelangelo was reluctant because, as he told the pope, painting "is not my profession". The discussions continued through March and April. Finally, in May the artist grudgingly agreed, writing stiffly on the receipt for the initial payment of 500 ducats, that he, a sculptor, had received 500 ducats for the painting in the Sistine Chapel.

In the event, the commission multiplied, from a mere 12 figures, albeit giants, to more than 300, and the first phase of work continued to 1512. Twenty-four years later Michelangelo returned to complete the work and in May 1536 he was at work on The Last Judgement, the "Day of Wrath" which occupies the whole of the wall behind the altar, with its awesome vision of the dreadful fate of sinners, among whom Michelangelo was bitterly fearful that he himself would be counted – even though he included a portrait of himself as St Bartholomew, displaying his flayed skin.

This, his final work in the chapel, was revealed to universal praise in 1541. Thousands of people still gaze up at it in wonder every day.

The source of Michelangelo's inspiration was the belief, as he put it in a poem, that, "Whatever beauty here on earth is seen,/ To meet the longing and perceptive eye,/ Is semblance of that source divine, / From

whence we all come./ In this alone we catch a glimpse of Heaven." Art had religious value because it was the only way to glimpse the divine intention.

To come close to that high ideal, the work must be as finely realised as possible – hence, it seems, his refusal to let out of his studio anything that was not perfect; and hence the impossibility of understanding exactly how he pulled off his great achievements: a mystery that somehow makes them all the greater.

Six great artists – and their helpers

By Rob Sharp

Damien Hirst

Damien Hirst's famous spot paintings were first bought by Charles Saatchi at the artist's degree show in the early 1990s, but they nowadays fetch hundreds of thousands of pounds, as is befitting of the world's most commercially marketable artists (one "spot" sold recently for almost £500,000). However, few people realise that Hirst officially "authors" very few of these works; most are thrown together by a gamut of his assistants. If you are lucky enough to get your hands on one authored specifically by him you pay for the privilege.

Rembrandt

Rembrandt had a slew of assistants – including Samuel van Hoogstraten, Govert Flinck and Gerard Dou – many of whom would pay top guilders to work with the artist in 17th-century Amsterdam. Many of them were almost as talented as the great man himself; he was not in the habit of taking on sub-standard talents. Indeed, if one of them did a painting which he thought was particularly good, he was often in the habit of signing it as one of his own.

Leonardo da Vinci

There are varying "degrees of Leonardo authorship", varying from those solely produced by the "Renaissance Man" to those in which his involvement is unknown. It is generally accepted that he depicted The Last Supper, but Bacchus, which currently resides in the Louvre, is thought to be a workshop copy of a drawing. Da Vinci was known to assign sections of his paintings for his raft of assistants to fill in with paint.

Andy Warhol

At The Factory, his 1960s Manhattan studio, Andy Warhol produced thousands of screen-prints – most famously the Campbell's soup can. He described them as his take on the public's obsession with consumerism. Surrounded by helpers, Warhol even described his working methods as being like a "machine", a full acknowledgement that he was never the only pair of hands involved in the artistic process.

Caravaggio

The authorship of Caravaggio's paintings have long been the source of some dispute; many are said to have been painted by his "followers" – contemporaries who worked closely with the Baroque artist or lived in his wake. Art historians and experts have conducted much research into his oeuvre and some attest that with each publication of significant research, the resulting number of paintings attributed to the artist decreases.

Jeff Koons

New-York-based sculptor Jeff Koons' work is often finished by his assistants; indeed, his "hands-off" approach has sometimes landed him in trouble. In 1992 Koons landed in hot water after he found a picture of a man and woman with their arms full of puppies and instructed his assistants to model it in sculpture form. He made three and each sold for nearly half a million dollars. A court later ruled that the sculpture was a "copy" and ruled against the artist.

http://www.independent.co.uk/arts-entertainment/art-and-architecture/features/the-sistine-chapel-was-created-500-years-ago-by-michelangeloor-was-it-773079.html

Cigarettes Leave Deadly Path By Purging Protective Genes

ScienceDaily (Jan. 24, 2008) — A University of Rochester scientist discovered that the toxins in cigarette smoke wipe out a gene that plays a vital role in protecting the body from the effects of premature aging. Without this gene we not only lose a bit of youthfulness -- but the lungs are left open to destructive inflammation and diseases such as chronic obstructive pulmonary disease (COPD) and lung cancer.

By identifying the Sirtuin (SIRT1) gene's role in pulmonary disease, scientists also hope to find ways to restore it and jump-start lung healing. They've begun testing the powerful antioxidant resveratrol, which is extracted from red grape skins, to develop a treatment to target SIRT1 and reverse lung damage, or at least enhance the way standard COPD therapies work.

"This novel protein will allow us to program our body's immune-inflammatory system against lung damage and premature aging. The hallmark of this discovery is that we may be able to provide remedies to millions of smokers who would like to quit but cannot kick their addiction, and millions of former smokers who, despite quitting, remain at risk for illness as they age," said Irfan Rahman, Ph.D., associate professor of Environmental Medicine and an investigator in the University of Rochester's Lung Biology and Disease Program.

Approximately 23 million Americans have COPD, which is induced by inflammation and results in progressive breathlessness. By the year 2020, it is expected to be the third leading cause of death worldwide; today at least 9 percent of the elderly population is estimated to suffer from debilitating lung conditions.Rahman has spent years studying how the 4,700 toxic chemical compounds in cigarettes assault lung tissue. He also focuses on why some people seem genetically predisposed to develop lung diseases while others are more fortunate, despite being smokers.

SIRT1 plays a pivotal role in the puzzle. It belongs to a class of genes that regulate chronic inflammation, cancer and aging. When SIRT1 is highly active, or over-expressed in mice, worms and fruit flies, their life spans are greatly increased. Recent studies also show that SIRT1 plays a positive role in stress resistance, metabolism, apoptosis and other processes involved in premature aging. However, environmental stress such as cigarette smoke or pollution can decrease production of SIRT1 in the lungs.

In collaboration with Vuokko L. Kinnula, M.D., at Helsinki University Hospital in Finland, Rahman's team studied the levels of SIRT1 in the lungs of nonsmokers and smokers with and without COPD. Thirty-seven patients from Helsinki who were undergoing either a lung resection for suspected cancer or a lung transplant, volunteered to provide tissue samples for the study. Researchers confirmed that SIRT1 was significantly lower in smokers who had COPD and in smokers who did not have disease, compared to nonsmokers.The next step was to investigate what pathways lead to the depletion of SIRT1. Researchers found that Sirtuin also plays a role in regulating the entire chemical signaling system that protects the lungs from smoke and pollution. They investigated how SIRT1 relates to another key protective molecule, Nrf2, a transcription factor. Just as in the case of SIRT1, an airway deficient in Nrf2 is weak and inflamed and more prone to conditions such as COPD, researchers found.

Nrf2 was also important because it directly regulates several antioxidant genes such as gluthathione (GSH), the most abundant cellular antioxidant responsible for detoxifying the airways. Therefore, the pathway from SIRT1 to Nrf2 ultimately leads to the depletion of GSH, exacerbating the organ's aging process.

"You can be 45 years old and look great on the outside, but if you are a smoker or former smoker, your lungs can easily be 60 years old because of the chemical assault," Rahman said.

Other University of Rochester research teams are investigating the Nrf2 pathway and various ways to boost fundamental genetic changes in the body that would arm it with amplified natural antioxidants. The result could be the development of a target for new drugs that would protect us from age-related diseases such as cancer and emphysema.Although he was not involved in the study, James D. Crapo, M.D., a leading expert in the field of lung disease and a professor of Medicine at the National Jewish Medical and Research Center, University of Colorado Health Sciences Center in Denver, said Rahman's novel finding opens new doors. "This is certainly an important breakthrough in understanding the persistent lung damage and inflammation that occur in patients with COPD, and therapies can now be directed towards this protein."

The research was published in two separate studies, in the American Journal of Respiratory Critical Care Medicine, appearing online Jan. 3, 2008, and in the American Journal of Physiology, appearing Dec. 27, 2007.The Environmental Health Sciences Center of the University of Rochester, which is partially funded by the National Institute of Environmental Health Sciences (NIEHS), supported the research. In addition, the University of Rochester has filed a patent to protect the identification of a novel molecular target to treat the progression of COPD and emphysema by inducing the Sirtuin1 gene.

Adapted from materials provided by University of Rochester Medical Center.

http://www.sciencedaily.com:80/releases/2008/01/080123150522.htm

Large Study Links Folic Acid Supplementation With Reduced Risk Of Preeclampsia During Pregnancy

ScienceDaily (Jan. 24, 2008) — Folic acid supplementation during pregnancy has long been known to reduce the risk of birth defects in newborns, but a new study now suggests that the vitamin may also reduce the risk of preeclampsia, a leading cause of maternal and infant illness and death worldwide.

As described in the January 2008 issue of the American Journal of Obstetrics and Gynecology, researchers closely followed approximately 3,000 pregnant women at The Ottawa Hospital and the Kingston General Hospital and found that preeclampsia occurred in 2.2 per cent of women who took multivitamins containing folic acid compared to 5.1 per cent of women who did not. The study was purely observational and women were not asked to make any changes to their daily lifestyle or health care. Known preeclampsia risk factors such as maternal age, education level and previous preeclampsia were controlled for and the difference was found to be significant by conventional standards.

Because of the known association of folic acid and reduced risk of birth defects, Health Canada currently recommends that all pregnant women take 0.4 mg folic acid per day while the Society of Obstetricians and Gynaecologists of Canada recommends a dose of 1 mg per day. In the current study, 92 per cent of women were taking folic acid, mostly at the higher dose.

Preeclampsia is characterized by high maternal blood pressure and urine protein – conditions that increase the risk of stroke, kidney problems, premature birth and other complications. There are currently no established treatments to prevent preeclampsia or lessen its effects.

“Previous smaller observational studies had suggested a link between folic acid and reduced risk of preeclampsia, but our study is the largest yet to test this association, and it was very carefully designed,” said lead author Dr. Shi Wu Wen, a Senior Scientist at the Ottawa Health Research Institute and Professor at the University of Ottawa. “The data also makes sense from a biological standpoint, because we know that folic acid has an important role in the development and function of blood vessels, and increasing evidence suggests that this process is disrupted in women with preeclampsia.”

The researchers have applied for funding to conduct a randomized controlled trial to determine if there is a cause-and-effect relationship between folic acid dose and risk of preeclampsia. Because the current study was observational in nature, it could only reveal associations.

“Eventually, this research could help us significantly reduce pregnancy complications, but for now, women should continue to follow the current folic acid guidelines,” said Dr. Mark Walker, coauthor of the study and a high-risk obstetrician at The Ottawa Hospital.

This study was funded by the Canadian Institutes for Health Research.

Adapted from materials provided by University of Ottawa.

http://www.sciencedaily.com:80/releases/2008/01/080123113752.htm

Farming Has Significantly Changed The Hydrology And Chemistry Of The Mississippi River

ScienceDaily (Jan. 24, 2008) — According to researchers at LSU and Yale University, farming has significantly changed the hydrology and chemistry of the Mississippi River, injecting more carbon dioxide into the river and raising river discharge during the past 50 years.

LSU Professor R. Eugene Turner and graduate student Whitney Broussard, along with their colleagues at Yale, tracked changes in the discharge of water and the concentration of bicarbonate, which forms when carbon dioxide in soil water dissolves rock minerals. Bicarbonate in rivers plays an important, long-term role in absorbing atmospheric carbon dioxide, a greenhouse gas. Oceans then absorb this carbon dioxide, but become more acidic in the process, making it more difficult for organisms to form hard shells -- a necessary function in coral reefs, for example.

Researchers concluded that liming and farming practices, such as changes in tile drainage, tillage practices and crop type, are most likely responsible for the majority of the increase in water and carbon in the Mississippi River, North America's largest river.

"It's like the discovery of a new large river being piped out of the corn belt," said Pete Raymond, lead author of the study and associate professor of ecosystem ecology at the Yale School of Forestry & Environmental Studies.

The research team analyzed 100-year-old data on the Mississippi River warehoused at two New Orleans water treatment plants, and combined it with data on precipitation and water export.

"The water quality information we used has been sitting idle for over 50 years in an attic in New Orleans, waiting to be discovered," said Broussard, who is pursuing a doctoral degree in coastal ecology at LSU. "I felt like a treasure-hunter when we opened those boxes in that 100-plus degree attic to find those data logs. You never know where your research will take you if you're open to suggestion and serendipity." Turner, distinguished professor of coastal ecology, added, "and [where it will take

you] if you have the benefits of long-term collaborations of trusting and high-quality academic research groups."

The research team used the data to demonstrate the effects of this excess water on the carbon content of the river, and argue that the additional water in the river is altering the chemistry of the Gulf of Mexico as by increasing the amount of nutrients and pollution the river transports to the Gulf.

"We're learning more and more about the far-reaching effects of American agriculture on rivers and lakes. This also means that the agricultural community has an incredible opportunity to influence the natural environment in a positive way, more than any other contemporary enterprise," said Broussard. "If we want to clean the water, we have to steward the land with right agriculture."

The study, "Anthropogenically Enhanced Fluxes of Water and Carbon from the Mississippi River," is authored by Peter Raymond and Neung-Hwan Oh of the Yale School of Forestry & Environmental Studies, R. Eugene Turner of the Coastal Ecology Institute at LSU and Whitney Broussard of the Department of Oceanography and Coastal Sciences at LSU. It is published in the journal Nature.

Adapted from materials provided by Louisiana State University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080123131737.htm

Low-income US Children Less Likely To Have Access To Qualified Math Teachers

ScienceDaily (Jan. 24, 2008) — Children from low-income families in the United States do not have the same access to qualified teachers as do wealthier students, according to a University of Missouri study. Compared to 46 countries, the United States had the fourth largest opportunity gap, the difference between students of high and low socioeconomic status in their access to qualified teachers.

Comparing eighth grade math teachers from around the world, the study defined highly qualified teachers as ones who have full certification, a degree in math or math education and at least three years of teaching experience. The study found that high-achieving countries have a larger percentage of students taught by highly qualified teachers than low-achieving countries.

"When students are not taught by highly qualified teachers, their opportunity to learn is considerably lower," said Motoko Akiba, assistant professor of educational leadership and policy analysis in the College of Education at MU. "Previous studies have shown that students with similar backgrounds achieve significantly higher when taught by highly-qualified teachers."

Other findings included:

- 29.7 percent of U.S. eighth grade math teachers did not major in mathematics or mathematics education; the international average is 13.2 percent.
- 60.3 percent of U.S. eighth graders are taught mathematics by teachers with full certification, who were mathematics or mathematics education majors and had at least three years of teaching experience; nearly 40 percent of U.S. eighth graders do not have access to highly qualified teachers.
- In the United States, 67.6 percent of high-socioeconomic status students are taught by highly qualified teachers, compared with 53.2 percent of low-socioeconomic status students. This opportunity gap of 14.4 percent is significantly larger than the international average of 2.5 percent.

The study supports No Child Left Behind's (NCLB) requirement of full certification and subject-specific preparation. However, Akiba said NCLB's requirements will not be enough to close the opportunity gap without providing equal and continuous learning opportunities and resources for instructional improvement.

"The intention of teacher quality requirements in NCLB is good, but it is not enough." Akiba said. "There is a gap in learning opportunities for teachers. In order to close the opportunity gap in the United States, teachers should have equal opportunities to learn and to expand their knowledge in their field."

Many countries in this study ensure equal student access to highly qualified teachers through equal distribution of educational resources. In the United States, however, there is a major funding gap between low-income and high-income districts. In high-poverty areas, districts may not have resources or the capacity to recruit highly qualified teachers.

The study "Teacher Quality, Opportunity Gap and National Achievement in 46 Countries," was published in the Educational Researcher. The study was conducted by Akiba; Gerald K. LeTendre, professor-in-charge of educational theory and policy at Penn State; and Jay P. Scribner, associate professor of educational leadership and policy analysis at MU.

Adapted from materials provided by University of Missouri-Columbia.

http://www.sciencedaily.com:80/releases/2008/01/080123131519.htm

From And For The Heart, My Dear Valentine: Broccoli

Eating broccoli may help fight heart disease, according to a new study. (Credit: Courtesy of ACS)

ScienceDaily (Jan. 24, 2008) — Wishing your Valentine good heart health on February 14 -- and throughout 2008?

Then consider the food some people love to hate, and hand over a gift bag of broccoli along with that heart-shaped box of chocolates. Researchers in Connecticut are reporting impressive new evidence that eating broccoli may protect against heart disease.

Researchers have known for years that broccoli is a rich source of antioxidants, vitamins, and fiber that may protect against cancer, Dipak K. Das and colleagues note. Other studies also suggest that broccoli may benefit the heart, although scientists do not know how it works.

Das and colleagues now report evidence on that topic from animal studies. They gave broccoli extract to lab rats for one month and measured its effects on the rats' heart muscle. Compared to a control group that ate a regular diet, the broccoli-fed animals had improved heart function and less heart muscle damage when deprived of oxygen. Broccoli's heart-healthy effects are likely due to its high concentrations of certain substances that seem to boost levels of a heart-protective protein called thioredoxin, the researchers note.

The article "Broccoli: A Unique Vegetable That Protects Mammalian Hearts through the Redox Cycling of the Thioredoxin Superfamily"is scheduled for the Jan. 23 issue of ACS' Journal of Agricultural and Food Chemistry.

Adapted from materials provided by American Chemical Society.

http://www.sciencedaily.com:80/releases/2008/01/080121091349.htm

Disparities Among Patients With Extremity Soft-tissue Sarcomas

ScienceDaily (Jan. 24, 2008) — A new study reveals significant racial and ethnic differences in the treatment and survival of patients with soft-tissue sarcomas, a rare but dangerous cancer that begins in muscle, fat, blood vessels or other supporting tissue of the body.

While racial and ethnic disparities in treatment and disease outcomes have been reported for various cancers, this is the first study to address disparities in extremity soft-tissue sarcomas. Extremity soft-tissue sarcomas affect approximately 9,220 patients in the United States, more than half of which are estimated to involve an upper or lower extremity.

Preserving limbs with surgery is the accepted standard treatment for adult extremity soft tissue sarcomas. Amputation is seldom necessary because radiation therapy, given either before or after surgery, can effectively preserve limbs in up to 91 percent of cases. However, the research showed that this doesn't always happen for all patients.

Utilizing a database of the National Cancer Institute, Dr. Steve R. Martinez, a surgical oncologist with UC Davis Cancer Center and lead author of the study, and Dr. Anthony S. Robbins of the California Cancer Registry, mined the Surveillance, Epidemiology and End Results (SEER)-Medicare database and identified adult patients in the United States with extremity soft-tissue sarcomas who were diagnosed and treated between 1988 and 2003. Eligible patients included 4,636 whites, 663 blacks, 696 Hispanics and 411 Asians. Comparisons of treatments and survival were then made for each population.

The authors found that blacks had significantly lower rates of surgeries that would have saved their arm or leg, they had the highest rates of amputations, and they were the least likely to receive additional treatments that would lead to improved survival. The study found when compared with whites, blacks had a 39 percent higher death rate related to their disease, even when taking into account various factors known to influence sarcoma-specific survival.

In their analysis, the researchers also found that Hispanics tended to be diagnosed with extremity soft-tissue sarcomas at a younger age than whites, blacks, and Asians; blacks, Hispanics, and Asians tended to have larger tumors than whites; Asians were most likely to undergo limb-sparing procedures, and had the lowest rates of amputation; and Hispanics had lower rates of limb preservation and higher rates of amputation when compared with whites.

Martinez said that the study does not address the reasons for the different outcomes for patients with the same disease, but added that his study should be a wake-up call for physicians treating soft-tissue sarcomas.

"We need to take a close look at the factors that lead to worse results for one population when compared to others," he said. "And we need to focus our efforts toward improving extremity soft-tissue sarcoma treatment and outcomes for all patients, especially for those most at risk."

Journal article: "Racial and Ethnic Differences in Treatment and Survival Among Adults With Primary Extremity Soft-Tissue Sarcoma" Steve R. Martinez, Anthony S. Robbins, Frederick J. Meyers, Richard J. Bold, Vijay P. Khatri and James E. Goodnight. Cancer; Published Online: January 22, 2008 (DOI: 10.1002/cncr.23261); Print Issue Date: March 1, 2008.

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080122101937.htm

New Advanced Method For Measuring Protein Synthesis Developed

ScienceDaily (Jan. 24, 2008) — In a major breakthrough for future research and drug development, a team of Los Angeles Biomedical Research Institute (LA BioMed) investigators developed a new, more reliable method for measuring protein synthesis and turnover, processes that are critical to understanding cellular functions.

Their findings were reported in the online edition of the Journal of Applied Physiology, a peer-reviewed journal. The researchers used deuterated or "heavy" water -- water to which the normal hydrogen is partly replaced by added deuterium -- and mass spectrometry to determine specific protein synthesis. Previous methods for measuring protein synthesis required purification of proteins and weren't as accurate or reliable.

This new method makes it possible for scientists to study the dynamics of every protein in the human body.

"This is really the definitive method for measuring protein synthesis because it enables scientists to measure this critical process accurately for the first time," said Wai-Nang Paul Lee, M.D. and a LA BioMed investigator. "The proteins are the structure, the skeleton and the enzymes that allow the cell to function. Protein synthesis is a very sensitive indicator of the integrity of the cell and the function it performs."

Dr. Lee was the leader of a team of LA BioMed researchers that included Drs. Gary Guishan Xiao, Meena Garg, Shu Lim and Derek Wong. Dr. Vay Liant Go, Department of Medicine, Division of Gastroenterology, David Geffen School of Medicine, Los Angeles, California, also participated in the research.

In the past, scientists used labeled amino acids to help determine protein synthesis. But this process had the potential of introducing errors and required protein purification. The use of deuterated water eliminated these errors and made the proteins easier to measure. The scientists determined this method would be especially useful in studies of protein turnover and protein expression in proteomics to address important clinical questions such as the age and dynamics of amyloid plaques in Alzheimers disease.

The study, entitled "Determination of Protein Synthesis in vivo Using Labeling from Deuterated Water and Analysis of MALDI-TOF Spectrum," appears in the online edition of the Journal of Applied Physiology.

Adapted from materials provided by Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center.

http://www.sciencedaily.com:80/releases/2008/01/080122110050.htm

UK Doctors 'Failing' Children Trapped In Gender Limbo, According To Experts

ScienceDaily (Jan. 24, 2008) — Gender disordered children as young as ten are being denied desperately needed hormonal drugs leading to bullying, violence and even suicide according to new research.

Dr Simona Giordano from The University of Manchester says British doctors are depriving children relief from "extreme suffering" caused by their condition - forcing their families into seeking help outside the UK.

Homophobic bullying in schools is experienced by 89.2% of lesbian, gay, bisexual and transgender youths in the UK. 17.6% of pupils are physically assaulted for reasons related to their gender and sexual orientation. Children have been killed by their peers because of their gender ambiguity.

The ethicist based at the School of Law contacted US medics who report treating children turned down at UK clinics. Poorer families, however, are unable to afford US medical care she says.

She also suspects that significant numbers of children are suffering alone and without support, though detailed research is needed to reveal the true extent of the problem.

The effect of so called hormone 'blockers' - which suspend puberty- are easily reversible. However other therapies used at later stages - including masculinising and feminising hormones and surgery - are more are more difficult to reverse.

Dr Giordano also discovered controversial guidelines - published in 2005 by the British Society for Paediatric Endocrinology and Diabetes.

The guidelines – which are now withdrawn - laid down that treatment should not start until puberty is complete. But according to the researcher they are still being used.

She said: "Current evidence on risks and benefits of blockers in children and adolescents does not justify the strong resistance of UK specialists, especially considering the risks of refusal of treatment.

"Children are being exposed to the anguish and terror of growing in a body that is experienced as alien.

"It means they will suffer the ill effects of having to begin less reversible treatment on a body which is already fully formed.

"That in turn may lead to more invasive surgery, should he or she decide to transition.

"It' s an intolerable state of affairs: some individuals attempt to buy the hormones from non-medical sources and inject them at unregulated dosages and without medical supervision.

“Some will turn to prostitution to pay for these hormones which exposes them to risks of hepatitis, HIV, and stunted development.

“Many of these people, if they are refused medical help, will do whatever it takes to get hormonal treatment, because they can' t cope with what' s happening to them.

"Lives are certainly at risk and the public is widely uninformed about the matter; even general practitioners often lack competence to identify problems of gender identity and refer children to specialist clinics.

"There's no data on the extent of this problem at present, though the likelihood is that many young people will be suffering alone and without support. Clinical specialists do seem to be seeing more of these children."

Dr Giordano also argues that children as well as adults are in some cases competent to give consent to hormonal therapy.

She explained: "There is no legal or ethical ground for presuming that a child or adolescent with gender identity disorder cannot be competent to make an informed judgment about this issue - this disorder is certainly not a mental illness as some medics claim.

"Even if it was, UK law says that a person with a mental illness is not necessarily incompetent to make decisions about treatment for his or her condition.

"We have to presume that these people are competent, unless there is evidence of the contrary.

"If it was impossible to give valid consent to treatment whose side-effects are unclear, it would follow that no-one - including adults - could consent to medical research.

"Each case must be evaluated on an individual basis, without assumption that their consent cannot be valid or that treatment cannot be ethical."

Summary of Guidelines Outlined In Report

- Children' s requests for treatment should be fulfilled, provided that the children are competent and that treatment is in their best interests.
- Age-related criteria of access to treatment should be eliminated.
- Focus should be on competence and on best interests of the child/adolescent.
- If family participation is made essential to treatment of minors, it should be explained why this is so.
- Guidelines should emphasize ethical principles, such as respect for the autonomy of the child.
- Guidelines should incorporate respect for consistency and equality.
- Guidelines should stress that in law and ethics it is accepted that healthcare professionals are, at least to some extent, responsible for omissions, as well as for actions.
- Healthcare professionals should be made aware that, both legally and ethically, refusal to administer treatment is not always a safe option and may be open to ethico-legal challenge.

Two reports

- Gender Atypical Organisation in Children and Adolescents: Ethico-legal Issues and a Proposal for New Guidelines
- Lives in a chiaroscuro. Should we suspend the puberty of children with Gender Identity Disorder?

GID is a severe medical condition, associated with strong disgust for the body and profound uncertainty over the sense of the self. Invariably, growing in a chiaroscuro causes great distress. Once they start puberty, trans-boys may develop female secondary sex characteristics, such as breasts, and may even start to menstruate, whereas trans-girls may grow beards and prominent Adam' s apples, experience erections and became taller than average.

Adapted from materials provided by University of Manchester.

http://www.sciencedaily.com:80/releases/2008/01/080123174355.htm

Unique Fungal Collection Could Hold Key To Future Antibiotics

ScienceDaily (Jan. 23, 2008) — Scientists at Royal Holloway, University of London have joined forces with CABI to establish a facility to screen for potential new antibiotics. The aim of the project is to build a highly focused natural products drug discovery operation that will address the urgent need for bringing new antibiotic compounds to market.

Since their discovery, antibiotics and other antimicrobial agents have saved millions of lives and significantly eased patients' suffering. However, over time, micro-organisms have developed resistance to existing antibiotics making infections difficult, if not impossible, to treat. The recent appearance of multiple-resistant bacterial infections has radically increased the necessity for new antibiotic discovery.

As part of a three-year programme, the joint research facility will utilise CABI's unique collection of fungi gathered from all parts of the world, to screen for potential new antibiotics. Although the first natural product antibiotic to be used clinically, penicillin, was isolated from a fungus, these organisms have not been as extensively evaluated as bacteria as sources of new drugs for treating infections and so there is great potential for discovery in CABI's 28,000 organism collection.

Furthermore, over the past 25 years companies have concentrated on using chemistry-based approaches to modify recognised antibiotic structures. However, the use of natural products, from fungi, which have evolved from millions of years of competition against bacteria is likely to lead to products with new modes of antibiotic action that disease-causing bacteria cannot counter. This new joint facility aims to harness these natural chemical compounds from fungi to offer potential new antibiotics. Similarly, compounds that have proven health benefits when taken in the diet (so-called nutraceuticals) are also likely to be found in fungi and the new joint research facility will also screen the collection for new nutraceuticals.

Professor Peter Bramley and Dr Paul Fraser in the School of Biological Sciences at Royal Holloway and Dr Trevor Nicholls, CEO and Dr Joan Kelley Executive Director of CABI are managing the project. Professor Bramley and Dr Fraser's extensive experience in molecular biology and analytical methodologies will be applied to state-of-the-art screening techniques for the discovery of new compounds and the manipulation, recombination and expression of their biosynthetic pathways to bioengineer new, related compounds. Dr Nicholls' experience in the biotechnology industry and Dr Kelley's expertise and knowledge of mycology and biodiversity will direct the research to identify strains which are likely to be more biochemically diverse and commercially valuable for screening.

Professor Bramley commented, "This joint initiative lays the foundations for a long term collaboration with potential strategic benefits, both research and commercial. A major focus will be the search for new antibiotics and nutraceuticals, for which there is now increasing commercial, nutritional and medical demand."

Dr Trevor Nicholls, CEO CABI added, "This is a really exciting partnership and we are looking forward to working with the expertise of the scientists at Royal Holloway. We are hopeful that our collaboration will prove the winning formula for discovering new drugs to fight cancers, diseases and resistant strains of infections such as MRSA."

The joint facility is located in the Royal Holloway's School of Biosciences and houses a new state-of-the-art mass spectrometer. As part of this collaboration, two technicians will be employed and a PhD studentship funded.

Royal Holloway has also obtained early stage seed fund investment from the London Development Agency backed WestFocus PARK Fund, to commercialise any potential new discoveries emerging from this project. The project team will work closely with the Research & Enterprise department at Royal Holloway to protect, manage and exploit any new intellectual property.

About CABI

CABI is a not-for-profit organisation that provides information and applying scientific expertise to solve problems in agriculture and the environment. Its mission and direction is influenced by its 45 member countries who help guide the activities undertaken as a business. These include scientific publishing, projects and consultancy, information for development and mycological services.

Adapted from materials provided by CABI.

http://www.sciencedaily.com:80/releases/2008/01/080122154659.htm

Equal Level Of Commitment And Relationship Satisfaction Found Among Gay And Heterosexual Couples

ScienceDaily (Jan. 23, 2008) — Same-sex couples are just as committed in their romantic relationships as heterosexual couples, say researchers who have studied the quality of adult relationships and healthy development. Their finding disputes the stereotype that couples in same-sex relationships are not as committed as their heterosexual counterparts and are therefore not as psychologically healthy.

These results are from two studies featured in the January issue of Developmental Psychology.* Both studies compared same-sex couples with opposite-sex couples on a number of developmental and relationship factors. The first study examined whether committed same-sex couples differ from engaged and married opposite-sex couples in how well they interacted and how satisfied they were with their partners. Evidence has shown that positive interactions improve the quality of relationships in ways that foster healthy adult development.

Researchers from the University of Illinois at Urbana-Champaign compared 30 committed gay male and 30 committed lesbian couples with 50 engaged heterosexual couples and 40 older married heterosexual couples, as well as with dating heterosexual couples. All the partners responded to a questionnaire that documented how positively they interacted with one another on a day to day basis. The couples were also observed during a laboratory task and were monitored for distress by skin conductance and heart rate.

Results showed that same-sex relationships were similar to those of opposite-sex couples in many ways. All had positive views of their relationships but those in the more committed relationships (gay and straight) resolved conflict better than the heterosexual dating couples. And lesbian couples worked together especially harmoniously during the laboratory tasks.

The notion that committed same-sex relationships are "atypical, psychologically immature, or malevolent contexts of development was not supported by our findings," said lead author Glenn I. Roisman, PhD. "Compared with married individuals, committed gay males and lesbians were not less satisfied with their relationships."

Furthermore, said Roisman, "Gay males and lesbians in this study were generally not different from their committed heterosexual counterparts on how well they interacted with one another, although some evidence emerged the lesbian couples were especially effective at resolving conflict."

In the second study, researchers from the University of Washington, San Diego State University and the University of Vermont wanted to examine how sexual orientation and legal status affected relationship quality. To do so, they followed 65 male and 138 female same-sex couples with civil unions, 23 male and 61 female same-sex couples not in civil unions and 55 heterosexual married couples over a three-year period. One member of each heterosexual couple was a sibling to a member of a civil union couple.

Both partners in all of the couples answered questions regarding their demographics, status of their relationship, number of children, sexual behavior, frequency of contact with their parents with and without their partners and perceived social support. Partners in same-sex relationships also answered questions regarding disclosure of their sexual orientation to their family, peers and work associates.

The researchers found that same-sex couples were similar to heterosexual couples on most relationships variables, and that the legalized status of a relationship did not seem to be the overriding factor affecting same-sex relationships.

Despite the legal status of their relationships, the civil union couples showed no differences on any of the relationship measures from the same-sex couples who were in committed relationships but not in civil unions. "This may be because those couples in Vermont who sought out the legal protection of a

civil union might have legalized their relationship more for symbolic value than for commitment reasons, which did not affect their day-to-day interactions," said lead author Kimberly F. Balsam, PhD.

However, the same sex-couples who were not in civil unions were more likely to have ended their relationships compared to those couples in same-sex civil unions or heterosexual marriages. This suggests that the protections afforded by a legalized relationship may impact same-sex relationships, something the study's authors plan to follow up on in future research, said Balsam.

The findings also showed that same-sex couples, regardless of civil union status, were more satisfied with their relationships compared to married heterosexual couples. Same-sex couples reported more positive feelings toward their partners and less conflict than heterosexual married couples, said the authors. They theorized that there may be societal pressures and norms, as well as the presence of legal status as a couple, which may contribute to heterosexual couples staying together even when they are not happy. Alternatively, most long-term same-sex couples have to stay together by their own will and hard work since they don't have society's forces on their side, Balsam added.

This was the first study to follow same-sex couples in legalized unions over a period of time. This type of design allows the researchers to monitor changes in the relationships and compare them with changes experienced by both same-sex couples not in civil unions and heterosexual couples. All the couples were comparable with respect to race/ethnicity and age at the time of the study.

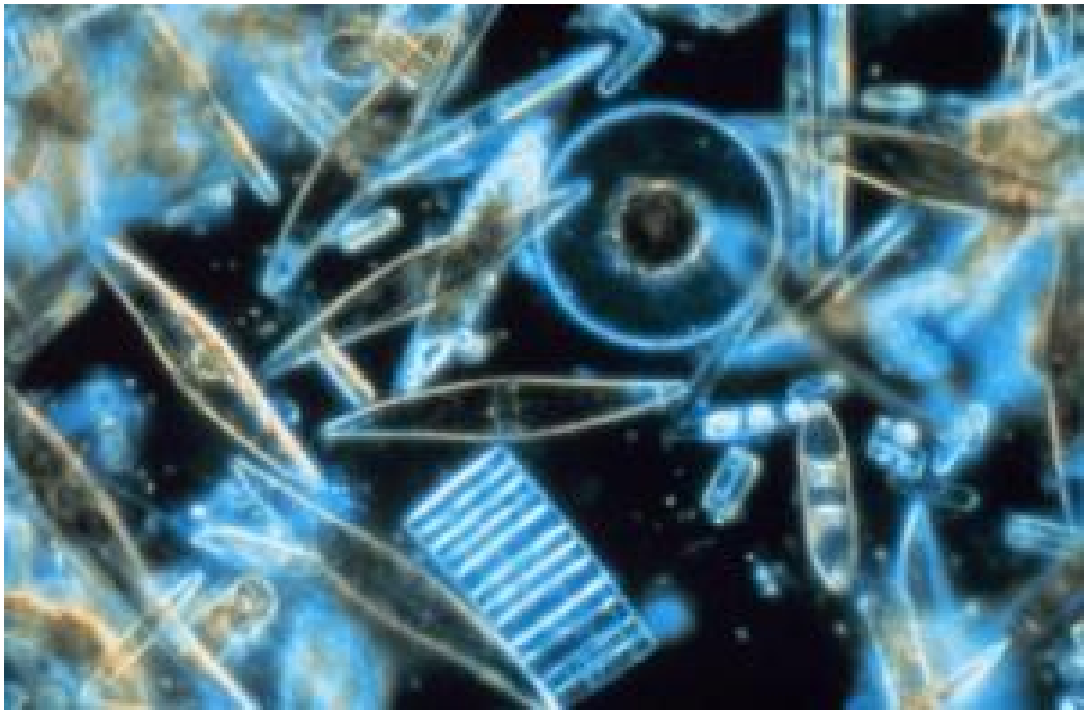
*Journal reference:Adult Romantic Relationships as Contexts of Human Development: A Multimethod Comparison of Same-Sex Couples with Opposite-Sex Dating, Engaged, and Married Dyads," Glenn I. Roisman, PhD, Eric Clausell, MA, Ashley Holland, MA, Keren Fortuna, MA, and Chryle Elieff, PhD, University of Illinois at Urbana-Champaign; Developmental Psychology, Vol. 44, No. 1.

*Journal reference: "Three-Year Follow-Up of Same-Sex Couples Who Had Civil Unions in Vermont, Same-Sex Couples Not in Civil Unions, and Heterosexual Married Couples," Kimberly F. Balsam, PhD and Theodore P. Beauchaine, PhD, University of Washington; Esther D. Rothblum, PhD, San Diego State University; Sondra E. Solomon, PhD, University of Vermont; Developmental Psychology, Vol. 44, No. 1.

Adapted from materials provided by American Psychological Association.

http://www.sciencedaily.com:80/releases/2008/01/080122101929.htm

In Diatom, Scientists Find Genes That May Level Engineering Hurdle



By manipulating the genes responsible for silica production in diatoms -- unicellular algae that encase themselves in intricately patterned, glass-like shells -- scientists hope to produce faster computer chips. (Credit: Dr. Neil Sullivan, University of Southern Calif; courtesy of NOAA Photo Library)

ScienceDaily (Jan. 23, 2008) — Denizens of oceans, lakes and even wet soil, diatoms are unicellular algae that encase themselves in intricately patterned, glass-like shells. Curiously, these tiny phytoplankton could be harboring the next big breakthrough in computer chips.

Diatoms build their hard cell walls by laying down submicron-sized lines of silica, a compound related to the key material of the semiconductor industry--silicon. "If we can genetically control that process, we would have a whole new way of performing the nanofabrication used to make computer chips," says Michael Sussman, a University of Wisconsin-Madison biochemistry professor and director of the UW-Madison's Biotechnology Center.

To that end, a team led by Sussman and diatom expert Virginia Armbrust of the University of Washington has reported finding a set of 75 genes specifically involved in silica bioprocessing in the diatom Thalassiosira pseudonana, as published January 21 in the online Early Edition of the Proceedings of the National Academy of Sciences. Armbrust, an oceanography professor who studies the ecological role of diatoms, headed up the effort to sequence the genome of T. pseudonana, which was completed in 2004.

The new data will enable Sussman to start manipulating the genes responsible for silica production and potentially harness them to produce lines on computer chips. This could vastly increase chip speed, Sussman says, because diatoms are capable of producing lines much smaller than current technology allows.

"The semiconductor industry has been able to double the density of transistors on computer chips every few years. They've been doing that using photolithographic techniques for the past 30 years," explains Sussman. "But they are actually hitting a wall now because they're getting down to the resolution of visible light."

Before diatoms were appreciated for their engineering prowess, they interested ecologists for their role in the planet's carbon cycle. These photosynthetic cells soak up carbon dioxide and then fall to the ocean floor. They account for upwards of 20 percent of the carbon dioxide that is removed from the atmosphere each year, an amount comparable to that removed by all of the planet's rainforests combined.

"We want to see which genes express under different environmental conditions because these organisms are so important in global carbon cycling," explains Thomas Mock, a postdoctoral researcher in Armbrust's lab and the paper's first author.

But research on these algae has uncovered other enticing possibilities. As he learned about diatoms, Sussman became intrigued by the fact that each species of diatom--there may be around 100,000 of them--is believed to sport a uniquely designed cell wall.

To determine which genes are involved in creating those distinctive patterns, the research team used a DNA chip developed by Sussman, UW-Madison electrical engineer Franco Cerrina and UW-Madison geneticist Fred Blattner, the three founders of the biotechnology company NimbleGen. Put simply, the chip allows scientists to see which genes are involved in a given cellular process. In this case, the chip identified genes that responded when diatoms were grown in low levels of silicic acid, the raw material they use to make silica.

Of the 30 genes that increased their expression the most during silicic acid starvation, 25 are completely new, displaying no similarities to known genes.

"Now we know which of the organism's 13,000 genes are most likely to be involved in silica bioprocessing. Now we can zero in on those top 30 genes and start genetically manipulating them and see what happens," says Sussman.

For his part, Sussman is optimistic that in the long run these findings will help him improve the DNA chip he helped develop -- the very one used to gather data for this research project. "It's like the Lion King song," he says. "You know, 'the circle of life.'"

Contributions to this paper were also made by Vaughn Iverson, Chris Berthiaume, Karie Holtermann and Colleen Durkin of the University of Washington; Manoj Pratim Samanta of Systemix Institute; Matthew Robison, Sandra Splinter BonDurant, Kathryn Richmond, Matthew Rodesch, Toivo Kallas, Edward L. Huttlin and Francesco Cerrina of the University of Wisconsin-Madison.

Funding came from the Gordon and Betty Moore Foundation, the National Science Foundation, the UW National Institutes of Health Genomic Sciences Training Grant and the postdoctoral program of the German Academic Exchange Service.

Adapted from materials provided by University of Wisconsin-Madison.

http://www.sciencedaily.com:80/releases/2008/01/080121181404.htm

Cranberries Might Help Prevent Urinary Infections In Women

ScienceDaily (Jan. 23, 2008) — Evidence supports drinking cranberry juice -- a familiar home remedy -- to treat urinary tract infection (UTI), according to a new review from Scotland.

"UTIs can be distressing, and people often take a self-care approach rather than seeking professional advice," said Ruth Jepson, a senior research fellow at the University of Stirling, who led the review. "It is a common problem that a great deal of health care time and resources are spent on."

A diagnosis of a urinary tract infection refers to a presence of a large amount of bacteria in the urine that can cause pain during urination and can lead to more severe infections of the bladder and kidneys.

The aim of the systematic review was to determine whether taking cranberries is an effective way to prevent urinary tract infections.

The review appears in The Cochrane Library an international organization that evaluates research in all aspects of health care. Systematic reviews draw evidence-based conclusions about medical practice after considering both the content and quality of existing trials on a topic.

According to the American Urological Association, UTIs are among the most common medical conditions and are responsible for more than 7 million doctor office visits each year. The association reports that about 40 percent of women and 12 percent of men will experience at least one urinary tract infection during their lifetime.

People have used cranberries, especially cranberry juice, for decades to prevent and treat UTIs. The fruit contains organic substances, such as quinic acid and citric acid, which act as antibacterial agents to help eliminate bacteria from the bladder.

The Cochrane reviewers analyzed 10 studies including 1,049 participants of all ages who received either cranberry products (juice or cranberry capsules), placebo juice or water for at least one month.

Of the studies evaluated, there was no consistent dosage or concentration of cranberries given to the participants, but according to Jepson, there was a "typical amount" given daily.

"The most common amount recommended is one glass twice a day," Jepson said. "Trouble is, there is no general rule as to how long you have to drink that much in order for you to prevent one UTI."

Jepson and her colleague found that cranberry products significantly reduced UTIs over 12 months compared to the placebo/control groups. The cranberry treatment was more effective for women who suffered from recurrent UTIs. For example, in one study, after six months, eight women in the cranberry group had a least one recurring UTI, compared with 19 women in the lactobacillus group and 18 in the control group.

The Cochrane reviewers pointed to a high number of participant withdrawals within some of the studies, and suggested it was due to the taste of cranberry juice or the juice's high cost. Jepson, however, could not recommend that a woman with recurrent UTI use cranberry capsules as an alternative treatment if taste or cost became prohibitive.

"The trouble with capsules is that there is no standardized preparation," said Jepson. "What we don't know is if the active ingredient is as effective when taken in the capsule or tablet form."

Roger Dmochowski, a professor of urology at Vanderbilt University Medical and the American Urological Association's expert on this topic, and said the association has no official policy toward cranberry juice or products.

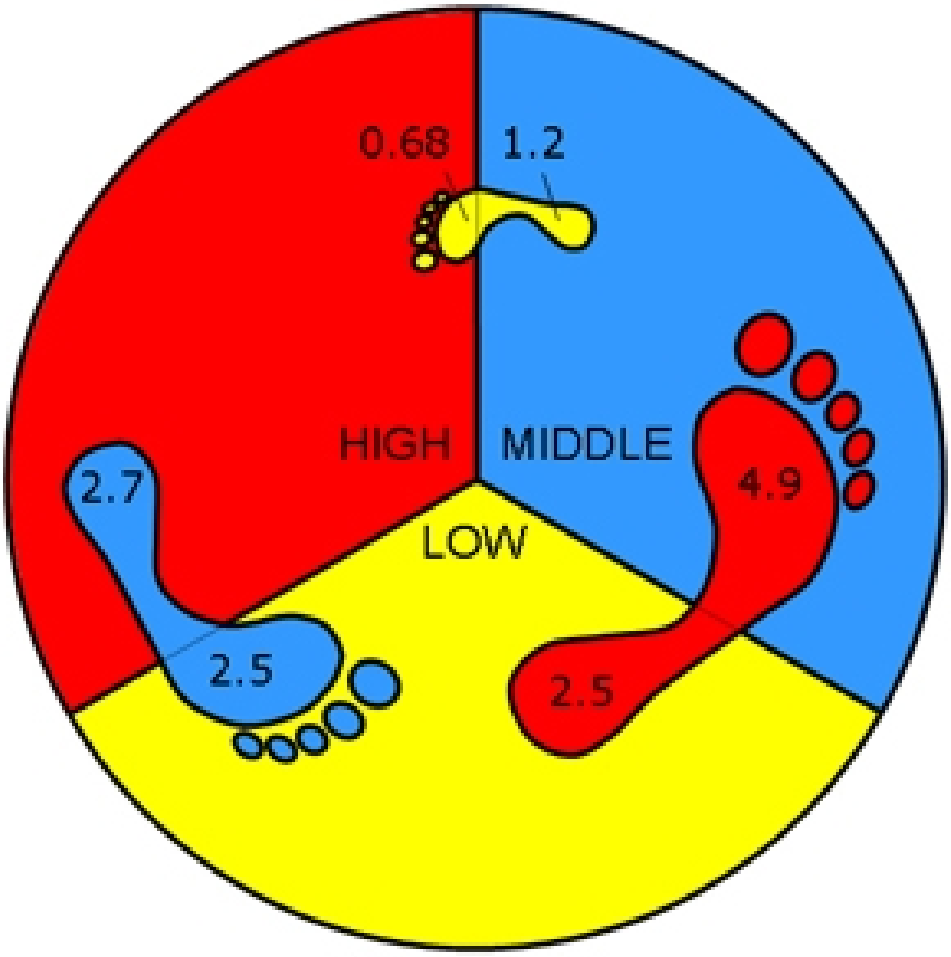
"Most urologists recommend urine acidification for certain types of infections of the urine," he said. "However not all UTIs are due to non-acid urine. Therefore, it is reasonable to use cranberry extract, but certainly this does not pertain to all UTI indications. This strategy [cranberries] remains an option for women bothered by recurrent infections but only one of many strategies, which include hydration and judicious use of antibiotics."

Jepson RG, Craig JC. Cranberries for preventing urinary tract infections (Review). Cochrane Database of Systematic Reviews 2008, Issue 1.

Adapted from materials provided by Center for the Advancement of Health.

http://www.sciencedaily.com:80/releases/2008/01/080122203326.htm

Rich Nations' Environmental Footprints Tread Heavily On Poor Countries



Where ecological footprints fall. The environmental impacts of high- (red), middle- (blue) and low- (yellow) income nations fall on other income tiers, as indicated by the footprints. The numbers are in trillions of 2005 international dollars. (Credit: Thara Srinivasan/UC Berkeley)

ScienceDaily (Jan. 23, 2008) — The environmental damage caused by rich nations disproportionately impacts poor nations and costs them more than their combined foreign debt, according to a first-ever global accounting of the dollar costs of countries' ecological footprints.

The study, led by former University of California, Berkeley, research fellow Thara Srinivasan, assessed the impacts of agricultural intensification and expansion, deforestation, overfishing, loss of mangrove swamps and forests, ozone depletion and climate change during a 40-year period, from 1961 to 2000. In the case of climate change and ozone depletion, the researchers also estimated the impacts that may be felt through the end of this century.

"At least to some extent, the rich nations have developed at the expense of the poor and, in effect, there is a debt to the poor," said coauthor Richard B. Norgaard, an ecological economist and UC Berkeley professor of energy and resources. "That, perhaps, is one reason that they are poor. You don't see it until you do the kind of accounting that we do here."

The calculation of the ecological footprints of the world's low-, middle- and high-income nations drew upon more than a decade of assessments by environmental economists who have tried to attach monetary figures to environmental damage, plus data from the recent United Nations Millennium Ecosystem Assessment and World Bank reports.

Because of the monumental nature of such an accounting, the UC Berkeley researchers limited their study to six areas of human activity. Impacts of activities that are difficult to assess, such as loss of habitat and biodiversity and the effects of industrial pollution, were ignored. Because of this, the researchers said that the estimated financial costs in the report are a minimum.

"We think the measured impact is conservative. And given that it's conservative, the numbers are very striking," said Srinivasan, who is now at the Pacific Ecoinformatics and Computational Ecology (PEaCE) Lab in Berkeley. "To our knowledge, our study is the first to really examine where nations' ecological footprints are falling, and it is an interesting contrast to the wealth of nations."

Srinivasan, Norgaard and their colleagues reported their results this week in the early online edition of the journal Proceedings of the National Academy of Sciences.

"In the past half century, humanity has transformed our natural environment at an unprecedented speed and scale," Srinivasan said, noting that the Earth's population doubled in the past 50 years to 6.5 billion as the average per-capita gross world product also doubled. "What we don't know is which nations around the world are really driving the ecological damages and which are paying the price."

Norgaard said that the largest environmental impact by far is from climate change, which has been assessed in previous studies. The current study broadens the assessment to include other significant human activities with environmental costs and thus provides a context for the earlier studies.

The study makes clear, for example, that while deforestation and agricultural intensification primarily impact the host country, the impacts from climate change and ozone depletion are spread widely over all nations.

"Low-income countries will bear significant burdens from climate change and ozone depletion. But these environmental problems have been overwhelmingly driven by emission of greenhouse gases and ozone-depleting chemicals by the rest of the world," Srinivasan said.

Climate change is expected to increase the severity of storms and extreme weather, including prolonged droughts and flooding, with an increase in infectious diseases. Ozone depletion mostly impacts health, with increases expected in cancer rates, cataracts and blindness All of these will affect vulnerable low-income countries disproportionately.

In addition to climate change and ozone depletion, overfishing and conversion of mangrove swamps to shrimp farming are areas in which rich nations burden poor countries.

"Seafood derived from depleted fish stocks in low-income country waters ultimately ends up on the plates of consumers in middle-income and rich countries," Srinivasan said. "The situation is similar for farmed shrimp. For such a small, rare habitat, mangroves, when cut down, exact a surprisingly large cost borne primarily by the poor- and middle-income countries."

The primary cost is loss of storm protection, which some say was a major factor in the huge loss of life from 2005's tsunami in Southeast Asia.

Deforestation, on the other hand, can exacerbate flooding and soil erosion, affect the water cycle and offshore fisheries and lead to the loss of recreation and of non-timber products such as latex and food sources. Agricultural intensification can lead to drinking water contamination by pesticides and fertilizers, pollution of streams, salinization of croplands and biodiversity loss, among other impacts.

When all these impacts are added up, the portion of the footprint of high-income nations that is falling on the low-income countries is greater than the financial debt recognized for low income countries, which has a net present value of 1.8 trillion in 2005 international dollars, Srinivasan said. (International dollars are U.S. dollars adjusted to account for the different purchasing power of different currencies.) "The ecological debt could more than offset the financial debt of low-income nations," she said.

Interestingly, middle-income nations may have an impact on poor nations that is equivalent to the impact of rich nations, the study shows. While poor nations impact other income tiers also, their effect on rich nations is less than a third of the impact that the rich have on the poor.

Norgaard admits that "there will be a lot of controversy about whether you can even do this kind of study and whether we did it right. A lot of that will just be trying to blindside the study, to not think about it. What we really want to do is challenge people to think about it. And if anything, if you don't believe it, do it yourself and do it better."

Srinivasan led the three-year study in collaboration with Norgaard, who provided economic expertise; John Harte, professor of energy and resources at UC Berkeley, who initiated the idea and the basic framework for the study; post-doctoral fellow Susan Carey of the UC Berkeley Department of Environmental Science, Policy and Management; Reg Watson, a senior research fellow at the Fisheries Centre at the University of British Columbia; UC Berkeley Energy and Resources Group graduate students Adam B Smith, Amber C. Kerr, Laura E. Koteen and Eric Hallstein; and former UC Berkeley post-doctoral fellow Paul A. T. Higgins, who is now at the American Meteorological Society in Washington, D.C.

Adapted from materials provided by University of California - Berkeley.

http://www.sciencedaily.com:80/releases/2008/01/080121181408.htm

Gastric Banding Reverses Impact Of Type 2 Diabetes

ScienceDaily (Jan. 23, 2008) — Preliminary research indicates that obese patients with type 2 diabetes who had gastric banding surgery lost more weight and had a higher likelihood of diabetes remission compared to patients who used conventional methods for weight loss and diabetes control.

"Obesity and type 2 diabetes are likely to be the 2 greatest public health problems of the coming decades. The conditions are strongly linked, with the increased prevalence of diabetes correlating with the increased prevalence of obesity," the authors write. Weight control is perhaps the most important aspect of type 2 diabetes management. Recent evidence indicates that improvement in blood glucose control is related to the degree of weight loss.

Currently available lifestyle and pharmacological strategies provide only small to modest levels of weight loss, a problem compounded by patients with diabetes experiencing greater difficulty in losing weight than those without diabetes. Significant sustained weight loss as a result of bariatric surgery has never been formally studied as a treatment for type 2 diabetes in obese participants, according to background information in the article.

John B. Dixon, M.B.B.S., Ph.D., of Monash University, Melbourne, Australia, and colleagues conducted a 2-year trial involving 60 obese participants (body mass index [BMI] greater than 30, less than 40) to compare surgically induced weight loss with conventional therapy for the management of type 2 diabetes. Patients were randomized to receive either conventional diabetes therapy with a focus on weight loss by lifestyle change or laparoscopic adjustable gastric banding with conventional diabetes care. Of the 60 patients enrolled, 55 (92 percent) completed the 2-year follow-up.

The researchers found that remission of type 2 diabetes was achieved by 26 study participants (43 percent) at two years, with 22/30 (73 percent) from the surgical program and 4/30 (13 percent) from the conventional-therapy program. This represented 76 percent and 15 percent remission rates for those in the surgery and conventional-therapy groups, respectively. Greater percentage of weight loss at two years and lower baseline HbA1c values (hemoglobin used primarily to identify the average plasma glucose concentration) were independently associated with remission, but percentage of weight loss alone explained most of the variance.

"After 2 years, the surgical group displayed a 5 times higher remission rate and 4 times greater reduction in HbA1C values than the conventional-therapy group," the authors write.

The surgical group achieved an average 20.7 percent body weight loss at two years, compared with 1.7 percent among the conventional-therapy group, representing a loss of 62.5 percent of excess weight (using BMI of 25 as ideal weight) in the surgical group compared with 4.3 percent in the conventional-therapy group. There were no serious complications in either group.

"An important finding of this study is that degree of weight loss, not the method, appears to be the major driver of glycemic improvement and diabetes remission in obese participants. This has important implications, as it suggests that intensive weight-loss therapy may be a more effective first step in the management of diabetes than simple lifestyle change. This study shows that few participants achieved remission with a body weight loss of less than 10 percent, a level expected to produce important health benefits," the researchers add.

"While caution is required in interpreting the longer-term benefits of surgery and weight loss, this study presents strong evidence to support the early consideration of surgically induced loss of weight in the treatment of obese patients with type 2 diabetes," they conclude.

Journal reference: JAMA. 2008;299[3]:316-323.

Editorial: Gastrointestinal Surgery as a Treatment for Diabetes

In an accompanying editorial, David E. Cummings, M.D., and David R. Flum, M.D., M.P.H., of the University of Washington, Seattle, comment on the findings of Dixon and colleagues.

"... there is much to learn about surgical treatments for diabetes. Researchers are striving to elucidate surgical mechanisms of diabetes improvement, hoping ultimately to harness the effects of 'surgery in a pill'--i.e., a formulation providing the desired effects without operative risks. Policy and health care leaders are grappling with the costs and risks of surgical interventions, which must be balanced against the costs and risks of not taking advantage of surgically induced diabetes remission, in the face of an expanding pandemic. Addressing these issues requires time and resources, but in this era of advanced diabetes research, the insights already beginning to be gained by studying surgical interventions for diabetes may be the most profound since the discovery of insulin. As a result, the future looks brighter for patients."

Editorial reference: JAMA. 2008;299[3]:341-343.

Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com:80/releases/2008/01/080122165647.htm

Palpable Computing: A Taste Of Things To Come

ScienceDaily (Jan. 23, 2008) — Virtually everyone stands to benefit from the more pervasive use of computer technology. But while adding microchips to more everyday objects can make lives easier – and even save them – the approach creates some unique problems of its own. "Palpable" rather than "ubiquitous" computing promises a solution.

"Palpable computing", a term coined by Morten Kyng, a researcher at the University of Aarhus in Denmark, refers to pervasive computer technology that is also tangible and comprehensible to its users.

Ubiquitous computing, in the traditional sense, is based on the vision of making the computers invisible, Kyng suggests. "The problem is that when the technology is invisible you can't see what it is doing, how it functions or comprehend it."

Anyone who has tried to connect their mobile phone to their laptop can attest to that. But while the invisibility of ubiquitous computing technology may be a mere inconvenience for many, in some cases it can be a serious, even life-threatening problem. A breakdown in communications that cannot be quickly fixed during a natural disaster can cost lives, as too can interoperability failures in hospital equipment.

By making the technology visible when it needs to be and comprehensible all the time, palpable computing reduces the complications of using the technology, while opening the door to developers creating new applications more easily.

Putting the user in control

The vision of ubiquitous computing has focused on tools honed through use over time and well suited to what they are designed to do, comments Kyng. "The problems arise when you want or need to do something new or different from what the designers intended: the user is not really in control," he adds.

Over the last four years, Kyng has led a team of more than a hundred researchers from across Europe working on making palpable computing a reality. They have developed software architecture for palpable computing systems as well as a toolbox for developers to create applications that has recently been made available under an open source licence. The researchers, who received EU funding in the PalCom project, also developed several test platforms that have served to highlight the benefits of their approach.

One of them was used when the Tall Ships' Races – the world's biggest competition for sailing ships – visited Aarhus in July 2007. The platform enabled police and fire fighters to interact with a three-dimensional (3D) workspace of the Aarhus harbour and its surroundings, displaying the location of key personnel, cars, ships and equipment to give a general overview of what was going on.

"Large-scale events, such as the Tall Ships' Races, can be very hard to gain an overview of. With a million visitors and a huge area, it is challenging to monitor every critical spot. In my opinion, PalCom's technology has enormous potential – not only for events [like this] but also for monitoring major accident scenes," notes Aarhus fire chief Jakob Andersen.

A second test platform was created to enhance therapy for disabled children, while a third was designed to help landscape architects visualise the location and assess the visual impact of large development projects (wind farms, industrial buildings, etc.).

The system involves a camera, placed on the roof of a car, connected with a laptop running an advanced 3D-visualisation programme which provides landscape architects with a much more precise

indication of where a new building will be located and its impact on the surrounding landscape as they drive around.

Key markets: emergency response and healthcare

"The potential uses for palpable computing are diverse, although initially I think the key markets will be in areas, such as emergency response and healthcare, where there is an urgent need for increasingly more efficient and effective technology," Kyng says.

The University of Aarhus and several other project partners are concentrating on the development of applications using PalCom's architecture in those fields. Kyng's team, for example, is applying the technology to help women through pregnancies and to improve the treatment of hip-replacement patients. One palpable computing system being developed to enhance post-surgery monitoring will allow hip patients to leave the hospital 24 hours after surgery, he estimates, rather than the current three or four days.

The PalCom coordinator notes that the trial systems have elicited considerable interest and expects the open source release of the toolbox to lead to new applications.

"Ultimately, success in the marketplace will drive the technology forward," he says.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com:80/releases/2008/01/080121124809.htm

One Out Of Four Children Involved In A Divorce Undergoes Parental Alienation Syndrome

ScienceDaily (Jan. 23, 2008) — One out of four children involved in a divorce and custody litigation undergoes the so-called Parental Alienation Syndrome (PAS), consisting of the manipulation of children by the custodial parent, who incessantly tries to turn them against the other parent by arousing in them feelings of hatred and contempt for the target parent, as explained in the book Marital Conflicts, Divorce, and Children's Developmentby professors José Cantón Duarte, Mª Rosario Cortés Arboleda, and Mª Dolores Justicia Díaz, from the Department of Evolutionary and Educational Psychology of the University of Granada.

In the 1980's, PAS was defined by scientist Richard Gardner of Columbia University. Men are usually the target parent, since in most cases the mother has custody of the child.

According to Mª Rosario Cortés, "the so-called alienating parent is the one who has custody and uses it to brainwash the child, turning him or her against the alienated parent". In most cases, the process is very subtle the custodial parent stating such things as "if I just told you some more things about your father/mother…", or by making the child feel sorry for "abandoning" every time he or she visits the alienated parent.

As pointed out by the group of researchers of the University of Granada, there are many other factors which influence PAS apart from the unacceptable attitude of the custodial parent, such as children's psychological vulnerability, the character and behaviour of parents, dynamics among brothers, or the existing conflicts between the two divorced parents. Very often children not only reject their father, but also his family and close friends. Grandparents, uncles and aunts, cousins, and the new partner of the non-custodial parent are also affected by this syndrome, and children undergoing PAS can even "expel them from their life."

Symptoms

Among other symptoms, Professor Cortés points out that children tend to find continual justifications for the alienating parent's attitude. They denigrate the target parent, relate negative feelings unambivalently towards that parent, deny being influenced by anyone (pleading responsibility for their attitude), feel no guilt for denigrating the alienated parent, or recount events which were not experienced but rather came from listening to others.

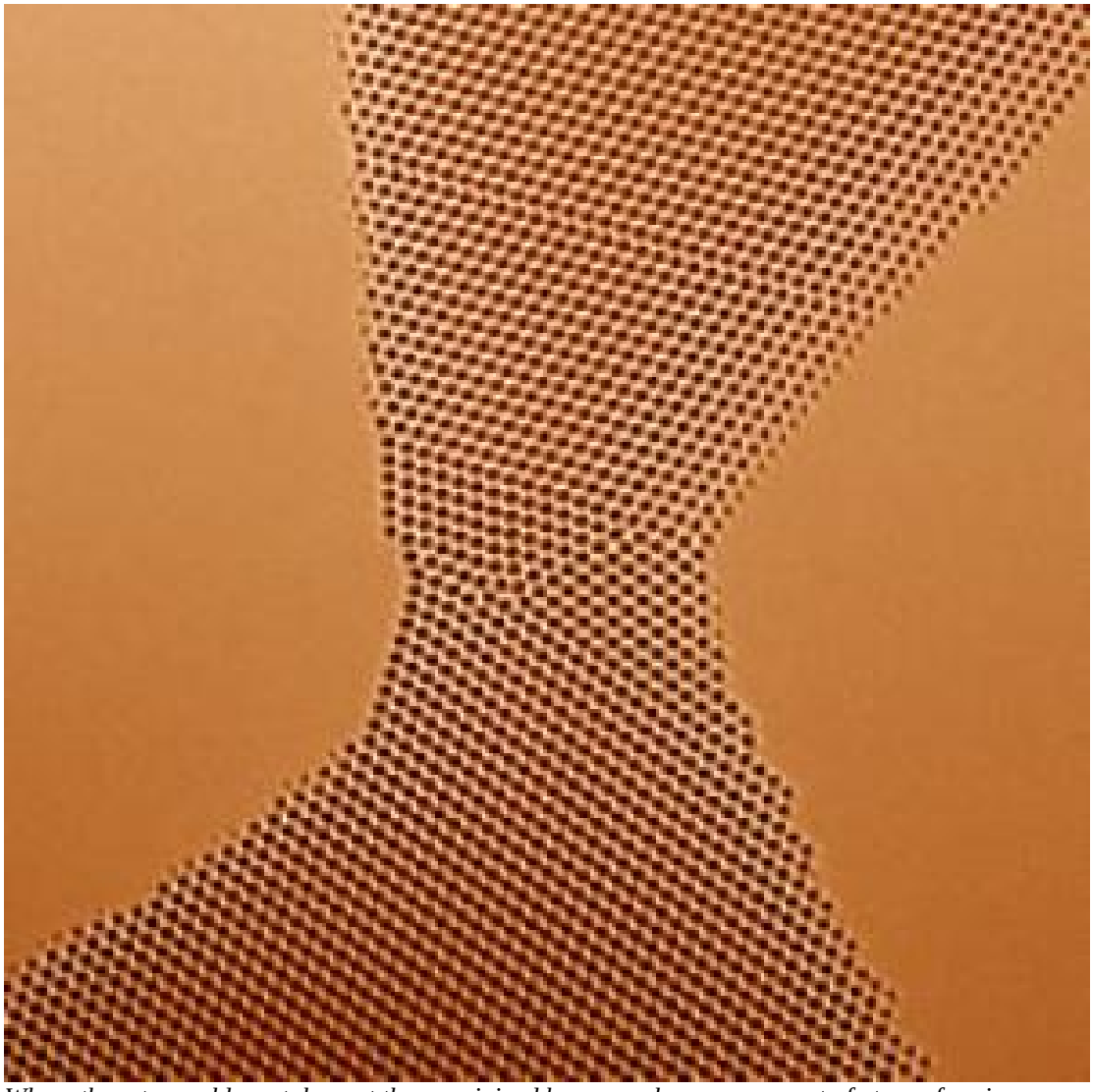
The authors of Marital Conflicts, Divorce, and Children's Development, which was first published in Spanish in 2000 and is coming soon in a new updated edition, state that PAS is more frequent among children aged 9 to 12 than among teenagers, and that there are no relevant gender differences in PAS.

According to Mª Rosario Cortés, the Parental Alienation Syndrome occurs most frequently in cases where parents are involved in divorce litigation, while it is not usual when the decision to seek divorce is mutual. The professor of the UGR underlines that in every case of SAP, "the family must be provided with a family-mediation programme for equal treatment of all members affected by this problem, which is increasingly more frequent."

Adapted from materials provided by Universidad de Granada.

http://www.sciencedaily.com:80/releases/2008/01/080122110040.htm

World's Best Microscope Can Produce Images Less Than Diameter Of Single Hydrogen Atom



Where these two gold crystals meet they are joined by a complex arrangement of atoms, forming a nanobridge that accommodates their different orientations. The gold atoms are 2.3 angstroms apart. TEAM 0.5's unprecedented signal-to-noise ratio makes it possible to distinguish individual atoms and, at the edges of the two crystals, deduce their position in three dimensions. (Credit: Image courtesy of DOE/Lawrence Berkeley National Laboratory)

ScienceDaily (Jan. 23, 2008) — TEAM 0.5, the world's most powerful transmission electron microscope — capable of producing images with half-angstrom resolution (half a ten-billionth of a meter), less than the diameter of a single hydrogen atom — has been installed at the Department of Energy's National Center for Electron Microscopy (NCEM) at Lawrence Berkeley National Laboratory.

The TEAM Project (TEAM stands for Transmission Electron Aberration-corrected Microscope) is led by Berkeley Lab in a collaboration with DOE's Argonne and Oak Ridge National Laboratories, the Frederick Seitz Materials Laboratory of the University of Illinois, and two private companies specializing in electron microscopy, the FEI Company headquartered in Portland, Oregon, and CEOS of Heidelberg, Germany.

Now that TEAM 0.5's basic systems are operational, additional components and facilities are being completed and tuned, including a state-of-the-art control room display that shows the sample under the microscope on a flat panel resembling a wide-screen, high-definition TV. After a long series of rigorous tests and adjustments, TEAM 0.5 will become available to outside users by October, 2008.

Atom by atom in 3-D

In preliminary tests at the FEI Company, before the TEAM 0.5 was shipped, NCEM's Christian Kisielowski tested the microscope's ability to resolve individual atoms and precisely locate their positions in three dimensions. He made a series of images of two gold crystals connected by a "nanobridge" only a few dozen atoms wide. From each exposure to the next, individual gold atoms could be seen changing positions.

To achieve this extraordinary resolution, TEAM 0.5 embodies technical advances that have only recently become possible, including ultra-stable electronics, improved aberration correctors, and an extremely bright electron source.

Spherical aberration degrades images, making points of light look like disks, and correcting it can make dramatic improvements to image resolution. (This was famously demonstrated in 1993, when spherical aberration in the Hubble Space Telescope's optical lenses was corrected in a special space mission.) In the case of electron microscopes, a series of multipole magnetic lenses of varying geometries shapes the electron beam.

"Correcting spherical aberration in an electron microscope has long been possible in theory," says Dahmen. "But only recently has it become practical, because today's stable electronics reduce drift and fast computers allow continuous adjustments in real time." Corrector technology has even become available commercially, says Dahmen, "but no off-the-shelf corrector can match TEAM 0.5's ability to compensate even higher-order aberrations."

Correcting spherical aberration makes it possible to use the TEAM 0.5 not only for broad-beam, "wide-angle" images but also for scanning transmission electron microscopy (STEM), in which the tightly focused electron beam is moved across the sample as a probe, capable of performing spectroscopy on one atom at a time — an ideal way to precisely locate impurities in an otherwise homogeneous sample, such as individual dopant atoms in a semiconductor material.

Aberration correction is also essential for another advanced feature of TEAM 0.5: its ability to maintain high resolution with lower electron beam energies.

"Low energy electrons have longer wavelengths, so they are harder to focus," Dahmen explains. "Aberration correction allows better than one-angstrom resolution with excellent contrast even at 80 kilovolts. This is important when you don't want to damage the sample with a high-energy beam — in biological studies, for example."

It's not just high resolution that makes TEAM 0.5 the world's best microscope, Dahmen says. When all the electrons in the beam focus at the same plane, image contrast and signal-to-noise ratio improve tremendously.

"It's because the signal-to-noise ratio is so good that you can adjust focus atom by atom, with enough sensitivity to obtain information about the three-dimensional atomic structure of a single nanoparticle." Dahmen adds, "This brings us within reach of meeting the great challenge posed by the famous physicist Richard Feynman in 1959: the ability to analyze any chemical substance simply by looking to see where the atoms are."

The position of individual atoms in a structure can be determined by taking images at different angles, from which the computer reconstructs a 3-D tomograph of the sample, as in a CAT scan. To make this

possible an innovative system capable of tilting and rotating the sample, and moving it up, down, or sideways under the electron beam, is also being developed at NCEM.

Much smaller than sample stages now in use, the new TEAM stage will be housed entirely inside the microscope column. Manipulating the sample by such methods as minute piezoelectric "crawlers" that change shape when electricity is applied, the new stage will be able to control and reproduce the sample's position and attitude with an accuracy of less than a billionth of a meter.

Installation of the new stage must await the next phase of the TEAM Project: the TEAM I microscope, due to be set up at NCEM early in 2009.

While TEAM 0.5 corrects spherical aberration in both the "probe" beam (the electron beam before it strikes the sample) and the image beam (after it exits the sample, but before it reaches the detector), TEAM I will also correct chromatic aberration in the image beam, which has never beeen accomplished before. Spherical aberration is caused by the shape of a lens; chromatic aberration results when a lens refracts light or electrons of different wavelengths (different colors or energies) at different angles.

"Correcting chromatic aberration is harder and takes more space," says Dahmen. "The chromatic aberration corrector will add two feet to the height of the TEAM I column. But the new configuration will also allow us to enlarge the gap between the pole pieces, into which the sample fits. In TEAM 0.5 this gap is only about two millimeters, so we have to use traditional outside-mounted sample stages, with limited space to manipulate the sample. In TEAM I the gap will be five millimeters; the sample stage will have much greater freedom of movement."

New vistas in the realm of the small

TEAM 0.5 and TEAM I will be housed side by side at NCEM for some time, occupying the two multistory "silos" that until recently were the homes of the historic High-Voltage Electron Microscope and the Atomic Resolution Microscope, the most powerful microscopes in the world when NCEM was established in the early 1980s.

Ambitious as those microscopes were in their day, says TEAM's Project Manager, Peter Denes of the Engineering Division, "when the TEAM Project was launched in 2004, it was not quite clear if the goals could even be achieved. The electron microscopy community had never done a collaborative project like TEAM before, and certainly not with full DOE project-management rigor."

Says Denes, "Perhaps the biggest contributor to success was a series of scientific workshops that contributed to forming a converging opinion on what the next steps would be, and what would constitute success. That helped in getting everyone — if not quite on the same page — at least in the same book."

Dahmen agrees. "This is a big jump for the microscopy community. TEAM's success will open the door to other ambitious developments around the world."

Dahmen suggests at least two broad categories of researchers who will benefit from the powerful new electron microscopes: experts with sophisticated microscopy problems to solve, and scientists less familiar with electron microscopy but with a particular problem for which microscopy can provide the answer.

"For example, Jim Zuo at the University of Illinois is doing studies of electron diffraction from the surface of single nanoparticles," Dahmen says. "He sees evidence of surface contraction. But when we at NCEM do imaging of similar nanoparticles, we find that the surface is expanding. Jim looks forward to using the TEAM microscope because it can do diffraction and imaging of the same particle at the same time — a grand experiment, and the only way to solve the apparent contradiction."

An example of a problem-solving nonspecialist, says Dahmen, might be a materials scientist who has created a new kind of nanostructure, such as a tetrapod semiconductor, and needs to know exactly where in this complex, three-dimensional shape the impurity atoms reside. "TEAM's ability to image the structure in 3-D through tomography and its ability to do spectroscopy with single-atom sensitivity can identify each kind of atom at each position in the structure. That has never been possible before."

The basic TEAM components of aberration correction, enhanced signal-to-noise ratio, single-atom sensitivity, and an ultrabright beam that can be used in both TEM and STEM modes — all the while manipulating the sample in the beam — are goals that until recently seemed at the very edge of technological daring. All are on track, and some have been solved ahead of schedule. The TEAM Project's continuing success, signaled by the installation of TEAM 0.5 at NCEM, has opened the possibility of numerous future advances in electron microscopy that were barely conceivable when TEAM was launched.

Adapted from materials provided by DOE/Lawrence Berkeley National Laboratory.

http://www.sciencedaily.com:80/releases/2008/01/080122154357.htm

Drugs To Bulk Up Muscles May Make Injuries More Likely

ScienceDaily (Jan. 23, 2008) — Block the action of a protein that normally regulates muscle mass, and watch your muscles grow. That may sound like a good idea to people with muscle-wasting diseases such as muscular dystrophy, and to older people, whose muscles naturally get smaller and weaker with age. Drugs that restrict the protein myostatin, which normally prevents muscles from being overly bulky, are currently under study, but not on the market, for some medical conditions.

Such drugs, called myostatin inhibitors, also are stirring interest among body builders and athletes. There are already signs of a nascent black market for what might become another illegal performance-enhancing drug in organized sports.

Now, a new University of Michigan study in mice suggests that while myostatin inhibitors may indeed bulk up muscles, they may also bring a troubling side effect -- small, brittle tendons that could make muscle injuries more likely.

"Those interested in myostatin inhibitors need to be aware of the fact that by doing these things to muscles, they may be having negative effects on tendons," says John A. Faulkner, Ph.D., the study's senior author and professor in the Department of Molecular and Integrative Physiology at the U-M Medical School. He is also a research professor at the U-M Institute of Gerontology and professor of biomedical engineering at the U-M College of Engineering.

When you lift weights at the gym, muscle tissue gets damaged. That sets off the release of myostatin, starting a process that clears away damaged proteins and sets the stage for muscle rebuilding, says the study's first author, Christopher L. Mendias, Ph.D. The study suggests we need normal myostatin action for other reasons, too.

"It also appears to make tendons bigger and more flexible," says Mendias, a U-M post-doctoral research fellow in the Regenerative Sciences Training Program in the Department of Surgery at the U-M Medical School.

It is known that blocking myostatin's activity increases muscle mass and strength, but also makes muscle fibers more vulnerable to injury. The U-M team broke new ground by asking if myostatin also affected the make-up and performance of tendons, the fibrous, tough tissues that connect muscle to bone.

Tendons are stiffer than muscles to begin with, and get stiffer with age. If tendons are brittle and short, as they were in myostatin-lacking mice in the study, they can't adequately do their important job of buffering against muscle injuries.

"The tendon acts like a spring," Faulkner says, to reduce some of the force on the muscle in a lengthening contraction. Contraction-induced injury is the most common way we injure our muscles. This type of injury already occurs frequently in people with muscular dystrophy -- so short, brittle tendons could aggravate the problem if myostatin inhibitors turn out to cause the effect in people.

The research team conducted a series of studies using a strain of laboratory mice that lacked the ability to produce myostatin. They tested the mechanical properties of tendons, compared to tendons in a strain of normal laboratory mice. They isolated and treated tendon cells with myostatin and examined what genes control tendon activity. They were able to identify tendon genes that respond to myostatin, which is produced in muscles, showing that myostatin acts as a hormone to promote strong, flexible tendons.

The findings in mice that lack myostatin are very preliminary and will need to be tested in other mouse strains before seeing if they hold true in people, the researchers say. It's also necessary to explore whether tendon brittleness is a problem if myostatin is merely reduced.

In the meantime, the results are intriguing and cautionary for the variety of people interested in the potential of myostatin inhibitors to increase muscle mass.

For people with the most common forms of muscular dystrophy as well as muscle-wasting diseases, myostatin inhibitors represent one potentially effective type of treatment that is being explored. These inhibitors may be able to reverse the loss of muscle mass and also lessen fibrosis, a build-up of connective tissue in muscle that afflicts people with muscular dystrophy and can be a problem in aging and inactivity. One myostatin inhibitor is currently being tested in people as a possible treatment for Duchenne muscular dystrophy, a debilitating disease that affects one in 3,500 boys worldwide.

For certain types of competitive athletes, the possibility that tendons become stiffer with myostatin inhibitors may not seem a disadvantage, says Mendias, who is also an athletic trainer. The prospect of widespread interest in myostatin inhibitors for enhancing performance, which like steroid use is illegal, is very real, he says, adding that the study results point to a greater need for a system to detect their use.

In addition to Faulkner and Mendias, U-M biology student Konstantin I. Bakhurin also authored the study.

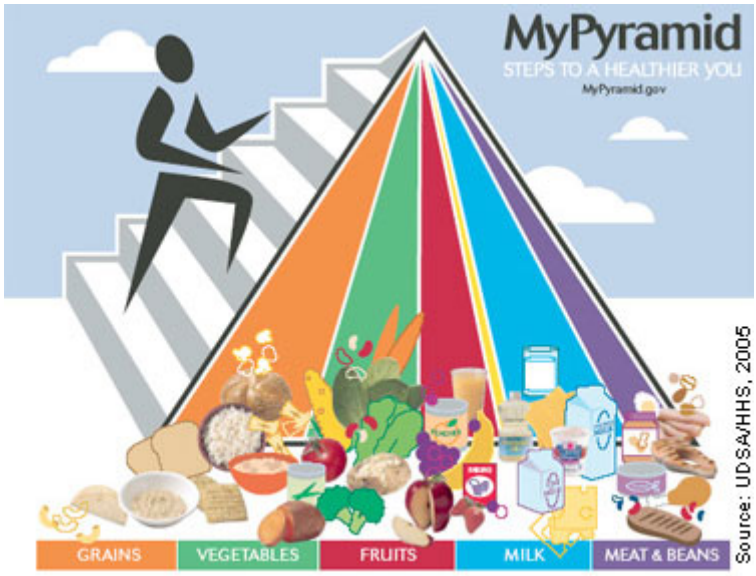
Citation: Proceedings of the National Academy of Sciences, Jan. 8 (pp. 388-393, Issue 1, Volume 105)

Funding: The National Institute on Aging and the National institute of Diabetes and Digestive and Kidney Disorders funded the research.

Adapted from materials provided by University of Michigan Health System, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080122165601.htm

Do National Dietary Guidelines Do More Harm Than Good?



ScienceDaily (Jan. 23, 2008) — For nearly three decades, Americans have become accustomed to hearing about the latest dietary guidelines, which are required by federal regulation to be revised and reissued at five-year intervals. Mid-way to the drafting of the 2010 guidelines, researchers at Albert Einstein College of Medicine of Yeshiva University raise questions about the benefits of federal dietary guidelines, and urge that guideline writers be guided by explicit standards of evidence to ensure the public good. The researchers, led by Paul Marantz, M.D., MPH, associate dean for clinical research education at Einstein, outline their argument in the January 22 online edition of the American Journal of Preventive Medicine.

"When dietary guidelines were initially introduced in the late 1970s, their population-based approach was especially attractive since it was presumed to carry little risk," says Dr. Marantz, who also is professor of epidemiology and population health, and of medicine at Einstein. "However, the message delivered by these guidelines might actually have had a negative impact on health, including our current obesity epidemic. The possibility that these dietary guidelines might actually be endangering health is at the core of our concern about the way guidelines are currently developed and issued."

Dr. Marantz and colleagues argue that if guidelines can alter behavior, such alteration could have positive or negative effects. They cite how, in 2000, the Dietary Guideline Advisory Committee suggested that the recommendation to lower fat, advised in the 1995 guidelines, had perhaps been ill-advised and might actually have some potential harm. The committee noted concern that "the previous priority given to a 'low-fat intake' may lead people to believe that, as long as fat intake is low, the diet will be entirely healthful. This belief could engender an overconsumption of total calories in the form of carbohydrates, resulting in the adverse metabolic consequences of high-carbohydrate diets," the committee wrote, while also noting that "an increasing prevalence of obesity in the United States has corresponded roughly with an absolute increase in carbohydrate consumption."

Dr. Marantz and colleagues present data that support these trends; however, they are careful to note that this temporal association does not prove causation. Instead, says Dr. Marantz, "it raises the possibility of a net harmful effect of seemingly innocuous dietary advice. These dietary recommendations did not necessarily cause harm, but there is a realistic possibility that they may have."

"As doctors, our first call is to do no harm," he adds. "That's why we recommend that guidelines be generous in providing information, but more cautious in giving direction. Any directions should be

based on the very highest standards of scientific evidence. After all, we expect that much from pharmaceutical companies before they bring a new drug to market."

Other Einstein researchers contributing to the paper are Michael Alderman, M.D., professor of epidemiology and population health and of medicine, and Elizabeth Bird.

Adapted from materials provided by Albert Einstein College of Medicine.

http://www.sciencedaily.com:80/releases/2008/01/080122154703.htm

Evolutionary Phenomenon In Mice May Explain Human Infertility

Field mice have traded the production of an immunologically important protein in favor of a faster fertilization process in order to compete with other mice more successfully, new research shows. (Credit: iStockphoto/Silvia Letizia Gandolla)

ScienceDaily (Jan. 23, 2008) — Scientists at the University of Liverpool have found that field mice have evolved a unique way of ensuring faster fertilisation, a phenomenon which could explain some cases of infertility in humans.

The team, in collaboration with Charles University, Prague, found that field mice sacrifice some of their immunity protection in favour of a more rapid fertilisation process. This occurs due to the absence of a protein, called CD46. Present in both animals and humans, it helps protect the body's cells from attack by its immune system. Over time, field mice have lost the ability to produce this protein, resulting in instability of a cap-like structure, called the acrosome, present over the head of the sperm.

This instability allows the acrosome to be shed from the sperm head to create a new surface essential for sperm to be capable of fusing with an egg. This is a natural process that can take days to occur in humans, but field mice have developed a way in which this can occur rapidly.

Immunologist, Professor Peter Johnson, explains: "Field mice have traded the production of an immunologically important protein in favour of this faster fertilization process in order to compete with other mice more successfully. Female mice produce multiple eggs and if there are a lot of male mice competing for her, then it is an advantage to an individual mouse for its sperm to react quickly in order to beat other male competitors to fertilisation."

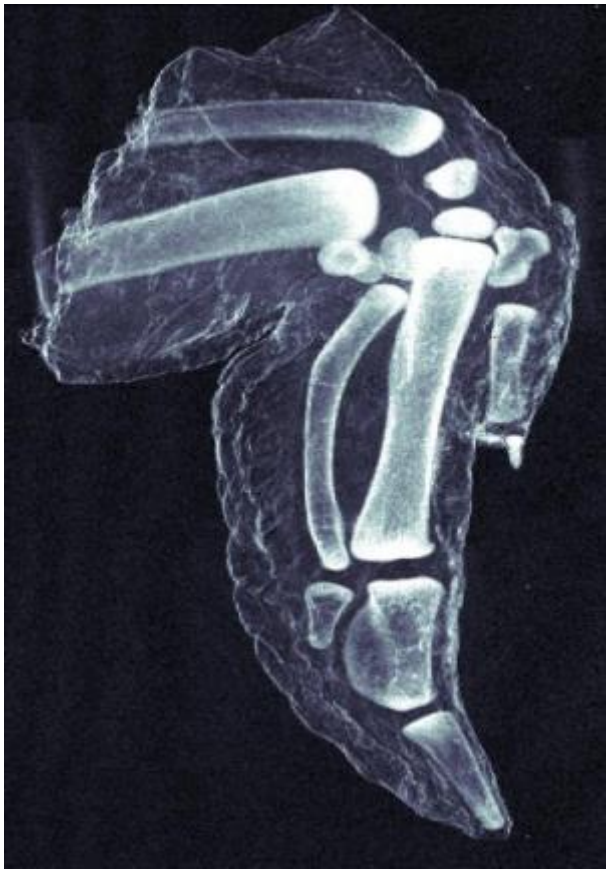
"By improving our understanding of defects in CD46 we may improve treatments for infertility in men. Humans normally produce a single egg each month and there is no evolutionary necessity to develop rapid sperm reaction to egg fertilisation. The process is therefore much slower and so any defect in CD46 could result in sperm being destabilised too early.

"Interestingly the rapid reaction caused in mice is similar to that in IVF treatment in humans where the acronome is artificially expelled from the sperm head before it is introduced to the egg to speed up the fertilisation process. Field mice appear to do this naturally." The research is published in Reproduction.

Adapted from materials provided by University of Liverpool.

http://www.sciencedaily.com:80/releases/2008/01/080123085257.htm

New Technology Sharpens X-ray Vision



Dark-field image of chicken wing. (Credit: Franz Pfeiffer, EPFL/PSI)

ScienceDaily (Jan. 23, 2008) — Researchers at the Paul Scherrer Institute (PSI) and the EPFL in Switzerland have developed a novel method for producing dark-field x-ray images at wavelengths used in typical medical and industrial imaging equipment.

Dark-field images provide more detail than ordinary x-ray radiographs and could be used to diagnose the onset of osteoporosis, breast cancer or Alzheimer's disease, to identify explosives in hand luggage, or to pinpoint hairline cracks or corrosion in functional structures.

Up until this point, dark-field x-ray imaging required sophisticated optics and could only be produced at facilities like the PSI's 300m-diameter, $200 million synchrotron. With the new nanostructured gratings described in this research dark-field images could soon be produced using ordinary x-ray equipment already in place in hospitals and airports around the world.

Unlike traditional x-ray images, which show a simple absorption contrast, dark-field images capture the scattering of the radiation within the material itself, exposing subtle inner changes in bone, soft tissue, or alloys. The overall clarity of the images is striking.

The improved sensitivity in measuring bone density and hairline fractures could help diagnose the onset of osteoporosis. Because cancer or plaque cells scatter radiation slightly differently than normal cells, dark-field x-ray images can also be used to explore soft tissue, providing safer early diagnosis of breast cancer or the plaques associated with Alzheimer's disease.

Security screening equipment equipped with dark-field image capability could better identify explosives, whose micro-crystalline structures strongly scatter x-ray radiation. And because x-rays

penetrate a material without damaging it, dark-field images could help reveal scattering-producing micro-cracks and corrosion in structures such as airplane wings or the hulls of boats.

"Researchers have been working on dark-field x-ray images for many years," explains Franz Pfeiffer, a professor at EPFL and researcher at the PSI. "Up until now these images have only been possible using sophisticated crystal optical elements." Crystal optics, however, only work for a single x-ray wavelength and thus are highly inefficient.

"Our new technique uses novel x-ray optical components, in the form of nanostructured gratings, that permit the use of a broad energy spectrum, including the standard range of energies in traditional x-ray equipment used in hospitals or airports," adds Christian David, Pfeiffer's colleague at PSI. "This opens up the possibility for adapting current imaging equipment to include dark-field imaging."

Pfeiffer plans to collaborate with the Center for Biomedical Imaging (CIBM), a joint center with the Universities of Lausanne and Geneva and their associated hospitals, to develop an adaptation for existing medical equipment. "When combined with the phase contrast imaging technique that we developed in 2006, we now have the possibility of providing the same range of imaging techniques in broad-spectrum x-ray imaging that we do with visible light."

Journal reference: Hard-x-ray dark-field imaging using a grating interferometer, by F. Pfeiffer et al, Nature Materials, online January 20, 2008.

Earlier work: Phase retrieval and differential phase-contrast imaging with low-brilliance X-ray source, F. Pfeiffer et al., Nature Physics 2, 258-261 (2006).

Adapted from materials provided by Ecole Polytechnique Fédérale de Lausanne, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080120160718.htm

Celery Makes 'Grandma's Penicillin' Tastier In Cold & Flu Season

ScienceDaily (Jan. 23, 2008) — Batches of homemade chicken soup -- fondly known as "Grandma's Penicillin" -- will be more appealing to stuffy-nosed cold and flu victims this winter if prepared with plenty of celery. That's the take-home message from a study which reports identification of the flavor-boosting components in celery.

In the new study, Kikue Kubota and colleagues note that cooks have long recognized celery's "remarkable" ability to enchance the complex flavors of soups and broths. Almost magically, celery takes on a sweet-spicy flavor after boiling, helping to give food a thick, full-bodied, satisfying taste. Until now, however, scientists have been unable to track down the roots of celery's effects.

The scientists prepared batches of chicken broth with and without a volatile extract from celery. Panels of tasters confirmed that the flavor of soup made with celery extract was more intense. In particular, celery's extract enhanced the sweetness and umami (meaty or savory) taste of the broth, even though the extract had virtually no flavor of its own.

From the extract, researchers identified three compounds responsible for celery's flavor-enhancement. The compounds were phthalides, and they had the ability to enhance flavors despite being tasteless themselves.

The article "Flavor Enhancement of Chicken Broth from Boiled Celery Constituents" is scheduled for the Jan. 23 issue of ACS' Journal of Agricultural and Food Chemistry.

Adapted from materials provided by American Chemical Society.

http://www.sciencedaily.com:80/releases/2008/01/080121100811.htm

Music Therapy May Offer Hope For People With Depression

ScienceDaily (Jan. 23, 2008) — A therapist may be able to use music to help some patients fight depression and improve, restore and maintain their health, states a Systematic Review from The Cochrane Library.

About 121 million people world-wide are believed to suffer from depression. This can be seen in disturbed appetite, sleep patterns and overall functioning as well as leading to low self-esteem and feelings of worthlessness and guilt. It can lead to suicide and is associated with 1 million deaths a year.

Drugs and psychotherapy are common treatments, but a group of Cochrane Researchers set out to see whether there was evidence that music therapy could deliver benefits.

After searching the international literature, they identified five studies that met their criteria. Four of these reported greater reduction in symptoms of depression among people who had been given music therapy than those who had been randomly assigned to a therapy group that did not involve music. The fifth study, however, did not find this effect.

"While the evidence came from a few small studies, it suggests that this is an area that is well worth further investigation and, if the use of music therapy is supported by future trials, we need to find out which forms have greatest effect," says lead author Anna Maratos, an Arts Therapist who works in the Central and Northwest London Foundation NHS Trust, London, UK.

"The current studies indicate that music therapy may be able to improve mood and has low drop-out rates," says Maratos.

"It is important to note that at the moment there are only a small number of relatively low quality studies in this area, and we will only be able to be confident about the effectiveness of music therapy once some high quality trials have been conducted," says Maratos.

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080122203158.htm

Daily Exercise Dramatically Lowers Men's Death Rates

ScienceDaily (Jan. 23, 2008) — Increased exercise capacity reduces the risk of death in African-American and Caucasian men, researchers reported in Circulation: Journal of the American Heart Association.

The government-supported Veterans Affairs study included 15,660 participants and is the largest known to assess the link between fitness and mortality.

"It is important to emphasize that it takes relatively moderate levels of physical activity -- like brisk walking -- to attain the associated health benefits. Certainly, one does not need to be a marathon runner. This is the message that we need to convey to the public," said Peter Kokkinos, Ph.D., lead author of the study and director of the Exercise Testing and Research Lab in the cardiology department at the Veterans Affairs Medical Center in Washington, D.C.

Professor Kokkinos and colleagues investigated exercise capacity as an independent predictor of overall mortality for African-American men (6,749) and Caucasian men (8,911) and also examined whether racial differences in exercise capacity influence the risk of death. Veterans were tested by a standardized treadmill test to assess exercise capacity between May 1983 and December 2006 at Veterans Affairs medical centers in Washington, D.C., and Palo Alto, Calif. The men were encouraged to exercise until fatigued unless they developed symptoms or other indicators of ischemia. These individuals were then followed for an average of 7.5 years and death rates were recorded.

Researchers classified the subjects into fitness categories based on their treadmill performance, expressed as peak metabolic equivalents (METs) achieved. Technically, a MET is equivalent to oxygen consumption of 3.5 milliliters per kilograms of body weight per minute. One MET represents the amount of oxygen the person uses at rest. Anything above one MET represents work. The higher the MET level achieved, the more fit the individual.

Based on this concept, the researchers divided the participants into four categories:

1. 3,170 men were "low fit," achieving less than 5 METs;
2. 5,153 men were "moderately fit," achieving 5 to 7 METs;
3. 5,075 were "highly fit," achieving 7.1 to 10 METs; and
4. 2,261 were "very highly fit," achieving more than 10 METs.

The study found that "highly fit" men had half the risk of death compared to "low fit" men. Men who achieved "very highly fit" levels had a 70 percent lower risk of death compared to those in the "low fit" category. For every 1-MET increase in exercise capacity (fitness), the risk for death from all causes was 13 percent for both African Americans and Caucasians.

Kokkinos said, "These findings are important for several reasons: First, we were able to quantify the health benefits per unit increase in exercise capacity. Second, this is the first study to provide information on physical activity and mortality in African Americans, information lacking until now. Keep in mind that death rates in African Americans are much higher when compared with Caucasians, in part because race and income negatively influence access to healthcare."

"The Veterans Affairs' health system is unique in that it ensures equal access to care regardless of a patient's financial status," he added. "Thus, it provides us with a unique opportunity to assess the impact of exercise or physical activity on death without the influence of healthcare differences."

According to Kokkinos, most middle-age and older individuals can attain fitness levels with a brisk walk, 30 minutes per day, five to six days each week. "I do not advocate that everyone can start with 30 minutes of physical activity. In fact, 30 minutes may be too much for some people. If this is the case, split the routine into 10-15 minutes in the morning and another 10-15 minutes in the evening. The benefits will be similar if the exercise volume accumulated is similar," he said.

"Our findings show that the risk of death is cut in half with an exercise capacity that can easily be achieved by a brisk walk of about 30 minutes per session 5-6 days per week," he added. "Physicians should encourage individuals to initiate and maintain a physically active lifestyle, which is likely to improve fitness and lower the risk of death. Individuals should also discuss exercise with their physician before embarking on an exercise program."

Co-authors are: Jonathan Myers, Ph.D.; John Peter Kokkinos; Andreas Pittaras, M.D.; Puneet Narayan, M.D.; Athanasios Manolis, M.D.; Pamela Karasik, M.D.; Michael Greenberg, M.D.; Vasilios Papademetriou, M.D.; and Steven Singh, M.D.

Adapted from materials provided by American Heart Association.

http://www.sciencedaily.com:80/releases/2008/01/080122165618.htm

Early Promising Results In Malaria Vaccine Trial

ScienceDaily (Jan. 23, 2008) — A small clinical trial conducted by an international team of researchers in Mali has found that a candidate malaria vaccine was safe and elicited strong immune responses in the 40 Malian adults who received it. The trial was the first to test this vaccine candidate, which is designed to block the malaria parasite from entering human blood cells, in a malaria-endemic country. Based on these promising results, the research team is now conducting trials of this vaccine in 400 Malian children aged 1 to 6 years. Malaria is a leading killer in Africa and other developing countries, claiming more than 1 million lives each year, most of them children.

The trial enrolled volunteers living in Bandiagara, a rural town in northeast Mali with a heavy burden of malaria. In this relatively dry region, almost no new infections occur during the driest month of the year, March, but people typically get up to 60 malaria-transmitting mosquito bites per month in August and September, when the rainy season peaks.

A total of 60 participants were assigned at random to receive either a full or half-dose of the candidate malaria vaccine or a licensed rabies vaccine, which served as a control. Each volunteer received three injections, spaced one month apart. Injections began in late December 2004, at the end of the malaria transmission season. As expected, all volunteers had significant levels of antibodies against malaria parasites detectable in their blood at the beginning of the trial, signaling that they had prior exposure to malaria parasites.

Those who received the candidate vaccine tolerated it very well and experienced a significant boost (up to a sixfold rise) in levels of vaccine-specific antibodies, while those who received the rabies vaccine had declining levels of antibodies as the rainy season receded.

Lead investigator Mahamadou A. Thera M.D., MPH, and 16 other co-authors of the newly published study are based at the Malaria Research and Training Center at the University of Bamako, Mali. The National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, supported the trial and helps fund the Center. University of Maryland School of Medicine researcher Christopher Plowe, M.D., MPH, was the co-leader of the study.

Other collaborators included scientists from Walter Reed Army Institute of Research, Silver Spring, Maryland; the U.S. Agency for International Development, Washington, DC; and GlaxoSmithKline Biologicals, in Rixensart, Belgium.

Journal reference: MA Thera et al. Safety and immunogenicity of an AMA-1 malaria vaccine in Malian adults: Results of a Phase 1 randomized controlled trial. PLoS One DOI: 10.1371/journal.pone.0001456 (2008).

Adapted from materials provided by NIH/National Institute of Allergy and Infectious Diseases, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080122203034.htm

Optical Fiber: Secure In All The Chaos

ScienceDaily (Jan. 23, 2008) — Secure messages hidden in chaotic waveforms, transmitted at up to 10 gigabits per second, is the vision behind a group of dedicated European researchers. Now they are prototyping the equipment that could make the vision a reality.

Hiding a message within a chaotic transmission offers a way of securing information exchange – provided the message can be distinguished from the chaos by the receiver.

Two years ago, members of OCCULT, a European research project, showed that messages could be sent at gigabit per second rates over 100km of the standard fibre-optic network of the city of Athens, using a chaotic mix of light frequencies with massive variation in amplitudes.

And the message was received with low bit error rates. Yet, anyone tapping into the fibre-optic cable, attempting to intercept the message without highly specialised knowledge and equipment, would have been unable to distinguish it from the chaotic light 'noise' that surrounded it.

Now researchers in a follow-on project (Photonic Integrated Components Applied to Secure chaoS encoded Optical communications systems – PICASSO) that is also funded by the European Commission are designing and testing two integrated and stable chaotic sources. In effect, these are the first prototypes for a kit that will allow chaotic transmissions to be used as a standard security measure by organisations, such as banks and governments.

They are also researching techniques that will enable chaotic transmissions to be made and received at tens of gigabits per second.

Synchronisation delivers communication

The key to sending signals using chaotic light sources is synchronisation. Chaotic systems are unpredictable because they are affected by many – often millions – of tiny events. The potential effect on the weather of the beat of a butterfly's wing is the most famous example of this.

But the fact that they are not predictable does not mean that they are random. In fact, the little events are interdependent and generate discernible patterns in the chaos. A couple of decades ago it was discovered that if, under the right conditions, two chaotic systems start to affect each other, they will synchronise their chaotic motions.

Laboratory experiments soon confirmed that lasers transmitting light in patterns that were chaotic in time and space would synchronise when they received light from one another through space or optical fibre.

The next step was to 'fold' a message into the chaotic waveform. The receiver is able to discern the message by subtracting the (synchronised) chaotic waveform he is generating from the chaotic waveform, plus message, that he is receiving.

The OCCULT team (Optical chaos Communications Using Laser-Diodes Transmitters) took the principles of synchronised chaotic transmissions out into the real world. While the signal transmitted over the Athens network was less than one second long, it proved that the technique worked.

Stable chaotic sources

PICASSO's first challenge was to build integrated devices incorporating laser diodes that were capable of acting as stable chaotic sources. They have come up with two devices. The first is a single chip about 1cm in length which is being prototyped in a Berlin laboratory. The second is a hybrid device about 15cm long consisting of a laser and a small piece of fibre, using an oil coating to maintain temperature and feedback strength.

"We expect both to work well quite soon," says Claudio Mirasso, project coordinator on the OCCULT project and a member of the PICASSO team.

Consistency is a key goal for the mechanical parts. Sending longer signals is dependent on maintaining synchronisation between the two chaotic light sources for long periods, enabling data transmission at 10 gigabits per second.

"One of the main problems could be temperature," says Mirasso. "Changes in temperature lead to deviations in wavelength and you can lose synchronisation easily. We are working on mechanisms that could offer better stabilisation, but at this stage we don't know how much our new devices will drift with temperature."

During a second phase of PICASSO, the research team will investigate increasing the rate of transmission using wavelength division multiplexing, where a number of signals are transmitted together at clearly separated wavelengths.

"You have to define the width of the channels very well," comments Mirasso. "But in many ways it is not very different from normal wavelength division multiplexing. Perhaps ten or more channels would be possible."

The security offered by chaotic waveforms does not match the complete security of quantum cryptography. But the rate of transmission is far higher – a security protection in itself. And attempts to break into the optical fibre and interpret the signal would be extremely difficult – if not impossible at the moment.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com:80/releases/2008/01/080121130022.htm

By Jove, We've Got It: EEG Correlates Of Insightful Problem Solving

ScienceDaily (Jan. 23, 2008) — The history of our development over the last three millennia chronicles many remarkable and fundamental discoveries, such as Archimedes' law of buoyancy, Newton's law of gravity, Poincaré's conjecture, which are considered as classical cases of cognitive insight (also popularly known as a Eureka moment), a phenomenon where the problem solver working on a complex problem suddenly makes a breakthrough after a period of frustration and finally experiences the much reported Aha!. But despite the widespread evidence and importance of cognitive insight, very little is known about its constituent cognitive components and their underlying neural mechanism.

Researchers at Goldsmiths College, London investigated brain rhythms and their dynamics while human volunteers solved verbal problems. Often, the participants reached a state of mental block and could not progress further: excessive amount of gamma brain rhythm (the same rhythm gets enhanced with selective attention) might cause this mental road block. It clearly indicates that focusing or attending too much on a topic might have a detrimental effect.

Afterwards, clues were provided yet they were not always successfully utilized, and the researchers found that it was possible to predict the success or failure based on the brain state prior to the clue presentation.

They also found that when the volunteers were consciously aware that they were having a strong breakthrough in their mental strategies, they were less likely to feel the suddenness of Aha!. Bhattacharya and colleagues show that a strong Aha! sensation involves minimal metacognitive (monitoring of one's own thoughts) processes and unconscious restructuring or, better, an automatic, subconscious recombination of information which stands in contrast to conscious mental restructuring which is an attention-demanding process involving executive control. The study shows that it is possible to identify these processes before they reach the level of verbal awareness.

Arguably, insight lies at the core of human intelligence, so its proper understanding in terms of a set of underlying neural mechanisms will not only influence the immediate fields of psychology and cognitive neuroscience but also exert sold impact on a range of scientific and educational disciplines. The pedagogical importance is also noteworthy.

For example, a better understanding of complex problem solving behaviour of human subjects will facilitate a better strategy of teaching and enhancing the performance of pupils, formulation of efficient solution strategies which, in turn, enhances the creativity.

Citation: Sandkühler S, Bhattacharya J (2008) Deconstructing Insight: EEG Correlates of Insightful Problem Solving. PLoS One 3(1): e1459.
doi:10.1371/journal.pone.0001459 http://www.plosone.org/doi/pone.0001459

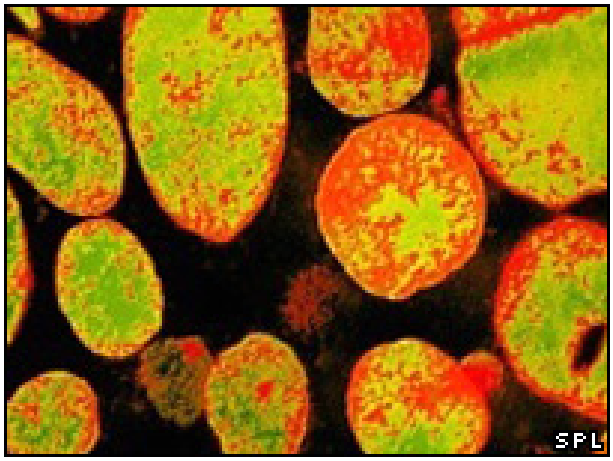
Adapted from materials provided by Public Library of Science, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080122203120.htm

Synthetic life 'advance' reported

By Helen Briggs
Science reporter, BBC News

An important step has been taken in the quest to create a synthetic lifeform.



A US team reports in Science magazine how it built the entire DNA code of a common bacterium in the laboratory using blocks of genetic material.

The group hopes eventually to use engineered genomes to make organisms that can produce clean fuels and take carbon dioxide out of the atmosphere.

Publication of the research gives others the chance to scrutinise it. Some have ethical concerns.

It sets the stage for what we hope is going to be a new approach to engineering organisms
Dr Hamilton Smith, Nobel Prize winner

These critics have been calling for several years now for a debate on the risks of creating "artificial life" in a test tube.

But Dr Hamilton Smith, who was part of the Science study, said the team regarded its lab-made genome - a laboratory copy of the DNA used by the bacterium *Mycoplasma genitalium* - as a step towards synthetic, rather than artificial, life.

He told BBC News: "We like to distinguish synthetic life from artificial life.

"With synthetic life, we're re-designing the cell chromosomes; we're not creating a whole new artificial life system."

Gene cassettes

The team of 17 scientists constructed the bacterial genome by chemically synthesising small blocks of DNA.

These were grown up in a bacterium, and knitted together into bigger pieces, so-called "cassettes" of genes.

The researchers ended up with several large chunks of DNA that were joined to make the circular genome of a synthetic version of *Mycoplasma genitalium* .

They have named it *Mycoplasma JCVI-1.0* , after their research centre, the J Craig Venter Institute in Rockville, MD, US.

Dr Craig Venter, who was involved in the race to decode the human genome, believes tailor-made micro-organisms can become efficient producers of non-polluting fuels such as hydrogen. Other synthetic bacteria could be made to take up greenhouse gases, he believes.

"It sets the stage for what we hope is going to be a new approach to engineering organisms," said co-researcher Dr Smith.

Operating systems

To achieve this goal, the researchers must overcome a crucial, and tricky, obstacle.

They must transplant the synthetic genome into another cell so that it can use the existing machinery to "boot up" and start growing and reproducing.

STEPS TO SYNTHETIC LIFE
2002 : synthetic virus created - a lab version of polio
2007 : a genome from one cell is placed in another
2008 : publication of synthetic genome study

"It's installing the software - basically we have to boot up the genome, get it operating," said Dr Smith, who shared a Nobel Prize in 1978 for furthering knowledge on how to cut up segments of DNA.

"We're simply re-writing the operating software for cells - we're not designing a genome from the bottom up - you can't drop a genome into a test tube and expect it to come to life," he added.

This is the stage which raises the most concern among critics, and where a new lifeform could be said to be truly created. How precisely will it behave? What will its impact be on other organisms and the environment? Some say it is a step too far, but others argue that the new field of synthetic biology is an important science.

Even bigger

The UK's Royal Society is seeking views from the public on the issue.

Adviser on synthetic biology, Dr Jason Chin, said the increasing ability to design and construct DNA sequences would, in principle, allow the construction of organisms for particular purposes, such as biofuels production.

He added: "Understanding how you construct organisms artificially is an important first step. But scientists still need to understand what effect altering the DNA sequence of an organism - such as bacteria - will have upon their behaviour."

Dr Drew Endy of the Department of Biological Engineering at Massachusetts Institute of Technology, US, said that re-constructing a natural bacterial genome from scratch was a great technical feat.

HAVE YOUR SAY Such advances in science is the way ahead for humanity! Brian Hunter

He said genomes 10 times larger than *Mycoplasma JCVI-1.0* had already been assembled from existing DNA fragments by a Japanese group.

Dr Endy added: "Given the work already done in Japan, building genomes almost 10 million base-pairs long - I would be surprised if by 2012 it were not technically possible to routinely design and construct the genomes of any bacteria or single celled eukaryote, which also means that it will be possible to construct some mammalian chromosomes."

Dr Simon Woods, a bio-ethicist at the Policy, Ethics and Life Sciences Research Centre at the University of Newcastle, UK, said scientists were acting in a regulatory vacuum.

"On the one hand it's an amazing piece of science but the real concern is that it's another example of science delving into matters that have potentially dangerous consequences," he said.

"It's not necessarily going to stay in the hands of well-intentioned scientists."

VOTE Do you think that scientists should develop artificial life? **Yes No Not sure**
Results are indicative and may not reflect public opinion

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7203186.stm

Published: 2008/01/24 21:13:45 GMT

Climate 'clearly out of balance'
The world's climate is "clearly out of balance and is warming", the world's largest society of Earth and space scientists has said in a statement.

The American Geophysical Union (AGU) warned that changes to the Earth's climate system were "not natural".

Changes in temperature, sea level and rainfall were best explained by the increased concentration of greenhouse gases from human activities, it added.

The union called for carbon emissions to be cut by more than 50% by 2100.

It is the first time the AGU has updated its policy position on climate change since 2003, when it called for a concerted worldwide study to understand how the Earth would change as a result of climate change.

'Tough challenge'

The revised statement has gone further, stating that the changes to the planet's climate system were "best explained by the increased atmospheric abundances of greenhouse gases and aerosols generated by human activities in the 20th Century".

There are fewer caveats that might have appeared in previous statements
Professor Tim Killeen,
AGU president

The AGU Council, which adopted the updated position, said that a sustained research effort involving many of its members had strengthened the scientific understanding of the impacts of climate change.

It warned that the world faced a tough challenge over the coming 50 years: "Even the lower limit of impending climate change - an additional global mean warming of 1.0C (1.8F) above the last decade - is far beyond the range of climate variability experienced during the past 1,000 years.

"Warming greater than 2.0C (3.6F) above 19th Century levels is projected to be disruptive, reducing global agricultural productivity, causing widespread loss of biodiversity, and - if sustained over centuries - melting of much of the Greenland ice sheet."

If the 2C rise was to be avoided, the AGU said, net annual emissions of carbon dioxide had to be cut by at least 50% by the end of the century.

It acknowledged that, as with most projections, there was a degree of uncertainty but that it was highly unlikely that the impacts would be "inconsequential".

IPCC ASSESSMENT
The IPCC says more heat waves are very likely in the future

"This is a fast-moving field of science and the AGU felt it was time to update the statement," AGU president, Tim Killeen, told BBC News.

"We took seven months to do it; we brought together a panel of experts, who created drafts which underwent extensive critical review, and it was formally approved by the elected Council in December."

Although the statement is consistent with previous positions adopted by the AGU, Professor Killeen said it differed in a number of ways.

"There are fewer caveats that might have appeared in previous statements," he explained.

"It is more of a declarative statement that the climate is changing and those changes are best explained by human effects due to greenhouse gases and aerosols."

"Secondly, rather than the AGU saying that this is important and should be looked at, I think this is a call that we need to do something about it."

In 2007, the Intergovernmental Panel on Climate Change (IPCC) published its Fourth Assessment Report, which said changes to the climate were "very likely" the result of human activity.

The IPCC also warned that the cost of acting now to reduce emissions would be far less than having to adapt to the future consequences of climate change.

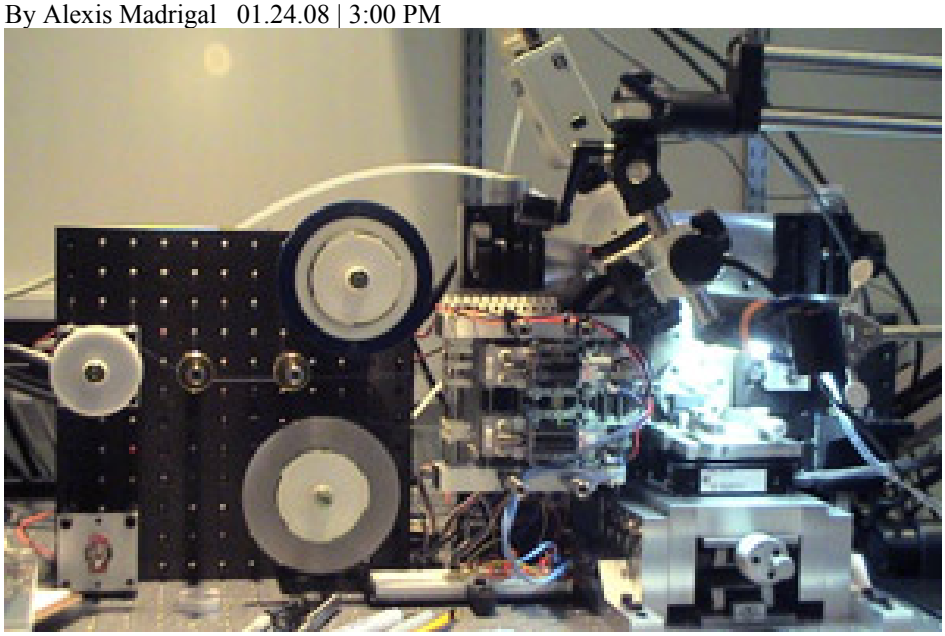
The AGU, which has 50,000 members in 137 countries, said delivering solutions would require the co-operation of all sectors; from science and technology, to industry and government.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7207335.stm

Published: 2008/01/24 21:18:16 GMT

Mapping the Most Complex Structure in the Universe: Your Brain

By Alexis Madrigal 01.24.08 | 3:00 PM



The ATLUM machine cuts ultrathin slices of mouse brain to prepare them for mapping the connections that link millions of neurons.
Photo: Lichtman Lab

Harvard scientists have embarked upon an ambitious program to create a circuit diagram of the human brain, with the help of new machines that automatically turn brain tissue into high-resolution neural maps.

By mapping every synapse in the brain, researchers hope to create a "connectome" -- a diagram that would elucidate the brain's activity at a level of detail far outstripping today's most advanced brain-monitoring tools like fMRI.

"You're going to see things you didn't expect," said Jeff Lichtman, a Harvard professor of molecular and cellular biology. "It gives us an opportunity to witness this vast complicated universe that has been largely inaccessible until now."

The effort is part of a new field of scientific research called connectomics. The field is so new that the first course ever taught on it recently ended at MIT. It is to neuroscience what genomics is to genetics. Where genetics looks at individual genes or groups of genes, genomics looks at the entire genetic complement of an organism. Connectomics makes a similar jump in scale and ambition, from studying individual cells to studying swaths of the brain containing millions of cells. A full set of images of the human brain at synapse-level resolution would contain hundreds of petabytes of information, or about the total amount of storage in Google's data centers, Lichtman estimates.

Machine Peels Brain, So Scientists Can Map Synapses

It slices, it dices and it heralds the arrival of a new era of neuroscience that focuses on industrializing the process of mapping the brain.

It's a neuroscience gadget called the automatic tape-collecting lathe ultramicrotome (ATLUM), and the name says it all. An ultramicrotome is a piece of laboratory equipment that cuts samples of flesh into very thin slices. The lathe allows the machine to cut continuously, which makes the process faster. Already, the prototype has collected more than a hundred half-centimeter-long sections of mouse brain.

Once the slices have been stuck onto a piece of transparent tape, the scientists use a scanning electron microscope to actually image the cells. Harvard molecular biology professor Jeff Lichtman's lab partnered with optical equipment company JEOL to automate the process of imaging and ordering those images.

"We will go to each section of tissue that the ATLUM has deposited and identify the region of that section that contains the important information, like the wiring of the neurons," said Charles Nielsen, a product manager and vice president at JEOL. "Then we'll do a series of montage maps on each section."

Continued on page 2

A map of the mind's circuitry would allow researchers to see the wiring problems that might underpin disorders like autism and schizophrenia.

"The 'wiring diagram' of the brain could help us understand how the brain computes, how it wires itself up during development and rewires itself in adulthood," said Sebastian Seung, a computational-neuroscience professor at MIT.

But with 100 billion neurons in the human brain, mapping them is an impossibly complex task for humans alone. An early "by hand" connectomics effort by Sydney Brenner of the Salk Institute studied the roundworm and its meager 300 nervous-system cells: It took a decade to complete.

Michael Huerta, associate director of the National Institute of Mental Health for scientific technology research, said that connectomics will fill a key gap in our understanding of the brain.

"You could conceivably know every chemical and every molecule of every cell in the brain, but unless you understand how those cells are connected to each other, you have no idea how information is being processed," Huerta said. "The connectome, in my opinion, is really what it's all about."

Lichtman's lab is creating what could be the equivalent of the genome sequencing machine, which dramatically sped up the race to map the human genome. It's an automated brain peeler and imager they call ATLUM (sidebar, left).

ATLUM uses a lathe and specialized knife to create long, thin strips of brain cells that can be imaged by an electron microscope. Software will eventually montage the images, creating an ultrahigh-resolution 3-D reconstruction of the mouse brain, allowing scientists to see features only 50 nanometers across.

"It works like an apple peeler," Lichtman said. "Our machine takes a brain, peels off a surface layer, and puts it all on tape. These technologies will allow us to get to the finest resolution, where every single synapse is accounted for."

Connectomics differs from other efforts to map the brain not just because of its methods, but also the type of information it seeks. While the Brain Atlas, funded by Paul Allen, maps the genes of a mouse brain, Lichtman's lab is gathering anatomical detail. He's looking at the physical features of cells, like the size of their synaptic vesicles, which store neurotransmitters essential for cell communication.

"My background is in neuroanatomy, and to see (connectomics) data is stunning," Huerta said. "Like the Human Genome Project, this work is giving us a whole new level of information. The neuroscience community in general is very excited about it."

Machine Peels Brain, So Scientists Can Map Synapses

Continued from page 1

The technological hurdles of stitching together thousands of images (each 5,000 x 4,000 pixels) into a 3-D reconstruction of the brain is daunting. The team wants to complete the mouse-brain reconstruction in

four years, but to hit that goal, Nielsen said the team would need up to 10 more electron microscopes to speed image taking.

"In the old days, we'd make an injection and see a few cells light up, and that was that," said Michael Huerta, associate director for scientific technology research at the National Institute of Mental Health. "But as areas in science mature, they get to the point where they are generating huge amounts of data: in this case, data about connectivity in tissues."

Better image-recognition technology, which turns photographic images into information that computers can use, could also increase the speed at which pictures of the brain are transformed into wiring diagrams.

"If our computers could automatically identify the synapses in the images, and trace axons and dendrites to their parent neurons, then they would be able to generate brain-wiring diagrams," said Sebastian Seung, a computational neuroscience professor at MIT. "Although we have made progress, we are still far from making computers 'smart' enough to do this reliably. This is a challenge at the frontier of computer science and artificial intelligence."

Though he's working on a massive scale, Lichtman's inspiration comes from the desire to understand individual neurons. Specifically, he wants to understand how neurons go from having dozens of connections at birth to having just a few. Each cell pares down many weak connections, keeping just a few strong ones.

"Each baby nerve cell connects to 20 times the amount of nerve cells that it will have as an adult," said Lichtman. "We try to understand what the rules of pruning are. If a nerve cell has 100 connections and needs to prune that down to five, the question is, which five?"

The neurons fight to stay connected, and each competition affects the outcome for the rest of the cells, Lichtman said.

"So to understand the competition's impact on one cell, you have to understand all of the competitions," he said. The net effect of all that neural "hand-to-hand combat" is what we call brain development, and it's what transforms a baby who can't walk, talk or operate a Blackberry into a modern, adult human being.

While connectomics researchers are very excited, they're still just getting a handle on mouse-sized brains. It could be a decade before data-crunching technology will be available to map the complexity of the human brain. "Some say that the brain is the most complex structure in the universe," said Seung. "Right now it would be an incredible achievement just to find the connectome for a tiny animal like a fly."

But the ATLUM could turn out to be as useful for connectomics researchers as technologies like sequencers turned out to be for genomics researchers. Then Lichtman and his colleagues would be able to answer some of the most fundamental questions about what happens when you take unprogrammed human beings and release them into the world.

It's the wiring, after all, that provides us with the flexibility that Lichtman calls "the magic of being human."

"When a dragonfly is born, it has to know how to catch a mosquito," Lichtman said. "But for us, none of this is built in. Our brains have to go through this profound education period that lasts until our second decade. What is changing in our brains?"

http://www.wired.com/science/discoveries/news/2008/01/connectomics

College Endowments: Rich Get Richer

JUSTIN POPE | January 24, 2008 09:51 AM EST |

New figures on university endowments confirm it's not just the "haves" and "have nots" in academe these days. Beyond the great majority of colleges, there's a growing group of the newly rich schools, and _ at the top of the heap _ a tiny cadre of ultra-wealthy institutions.

The latest endowment figures from NACUBO, a college business officers' group, highlight the growing prosperity but also the stratification among elite universities. That development is creating tension.

There are now 76 colleges and universities with endowments that have passed $1 billion _ including 16 new members of that club like Georgetown and the Universities of Oklahoma and Missouri.

But five at the top each have nearly $6 billion more than any school outside that group: Harvard ($34.6 billion), Yale ($22.5 billion), Stanford ($17.2 billion), Princeton ($15.8 billion) and the University of Texas system ($15.6 billion). The survey marks the end of the most recent fiscal year, which at most schools ended last June 30, so the numbers don't reflect the recent downturn in the stock market.

Among them, Harvard's endowment _ the largest overall _ expanded by an amount last year that's more than Ivy League rival Cornell has altogether. Princeton now has over $2 million in the bank for every student. Stanford raised nearly $1 billion during its last reported fiscal year alone.

There is a "tremendous dispersion in wealth from the people right at the top to the lesser ones," said Ronald Ehrenberg, an expert on higher education economics at Cornell. "It falls off very, very quickly."

The figures come at a time when the advantages of that small group of superrich schools have been a contentious topic.

There's been growing criticism from the public and some in Congress that the wealthiest schools should be dipping deep into their savings to hold down prices. But when Harvard and Yale recently announced they would do so by boosting aid for families earning well into six figures, they were sharply criticized.

Other schools complained they would be forced to keep up by spending more on aid for wealthier students and less to help students who need it most.

Harvard President Drew Gilpin Faust added to the tension by getting into an exchange with Big Ten provosts over whether ambitious science research should be left to the most elite universities. Some objected to her suggestion that it would be better for some institutions to focus on social sciences and humanities.

There's also rising resentment in higher education over faculty raiding, with wealthier colleges offering salaries that poorer schools can't possibly match.

It's not just the very richest schools _ prosperous public universities raid poorer peers, too. Some argue there's a public benefit when talented scholars gather in one place and collaborate. But there's also a cost when the schools that educate the most people lose their stars. Harvard now pays full professors on average about $177,000, compared to about $106,000 at the average public research university.

"The publics lag woefully behind the prestigious privates not only in terms of faculty salaries, but in terms of their ability to attract the best graduates students and pay them competitive stipends," said Mark Yudof, chancellor of the University of Texas.

Yudof says he doesn't mind competition, and his system is better off than most _ its $15.6 billion endowment is the largest by far of any public university. Texas leads a group of public institutions like the universities of Michigan ($7 billion) and Virginia ($4.3 billion) that have achieved real financial clout.

But for a big university, the money doesn't go as far. Texas' funds support 300,000 students, more than 10 times the number at schools such as Harvard and Yale.

The NACUBO survey reports colleges earned on average 17.2 percent on their investments last year, with schools with $1 billion or more returning 21.3 percent, compared to 14.1 percent for schools under $25 million. Those figures are comparable to a similar survey released earlier this month by the Commonfund Institute.

Overall, institutions spent on average 4.6 percent of their endowments to support their operations, about the same as last year.

Sen. Charles Grassley, the Iowa Republican who has pressured wealthy colleges to spend more, called on them to do just that in a statement responding to the survey.

"Based on the new numbers, a 5 percent payout requirement wouldn't break the bank," he said. "It seems a lot of these schools could go beyond 5 percent and consider a payout commensurate with their rate of endowment growth over time. That would offer real relief for low- and middle-income families."

David Ward, outgoing president of the American Council on Education, an umbrella group that lobbies for colleges in Washington, said he worries the focus on the wealthiest schools distracts the public. In fact, most colleges are much more hand-to-mouth, and state funding will likely take a hit this year with the economic slowdown.

"I agree the anxiety is there," he said. "I think the magnitude (of wealth at the richest colleges), the scale is sometimes exaggerated because of the visibility of the schools. That doesn't mean it doesn't have a perceptual impact that's very powerful. That's what we're dealing with."

http://www.huffingtonpost.com/2008/01/24/college-endowments-rich-_n_83005.html

That Mushroom Cloud? They're Just Svejking Around
By MICHAEL KIMMELMAN

PRAGUE — One Sunday, several months ago, early risers gazing at Czech Television's CT2 channel saw picturesque panoramas of the Czech countryside, broadcast to the wordless accompaniment of elevator music. It was the usual narcoleptic morning weather show.

Then came the nuclear blast.

Across the Krkonose Mountains, or so it appeared, a white flash was followed by the spectacle of a rising mushroom cloud. A Web address at the bottom of the screen said Ztohoven.com.

Ztohoven, to no one's great surprise, turned out to be a collective of young artists and friends who had previously tinkered with a giant neon sculpture of a heart high atop Prague Castle, and managed (during a single night, no less) to insert announcements for an art opening inside all 750 lighted advertising boxes in the city's subway system.

Now half a dozen members of the group face up to three years in jail or a fine or both, charged with scaremongering and attempted scaremongering. The trial is set for March. Some Czechs expressed outrage over Ztohoven's action, naturally, but in general it drew a mild, tolerant, even amused public response, in contrast to how terrorism-related pranks, or what might seem like them, have been widely greeted elsewhere. The incident instead has highlighted an old Czech tradition of tomfoolery that is a particular matter of national cultural pride.

Not long ago a film that became a local hit, "Czech Dream," documented a boondoggle by two young Czech filmmakers, who enlisted advertisers and publicists to devise a marketing scheme for a nonexistent supermarket. The movie's goal, like Ztohoven's, was to wag the dog: lampoon media manipulation and public gullibility. In the trailer hundreds of shoppers swarm a weedy field, rushing toward what they believe to be the store, which turns out to be a painted backdrop. The mushroom cloud, in a sense, upped the ante on the supermarket.

To hack into the CT2 broadcast, Ztohoven simply switched cables on an unmanned, remote camera at a limestone quarry in the mountains, which the artists had scouted three years earlier. Then they piped in their video. The name Ztohoven makes a pun in Czech that means both "out of it" and an obscenity. Rightly, the group presumed this would tip off viewers that the explosion was fake, in case they hadn't already guessed it from the cheesy special effects.

Contrary to what the British press reported, no "War of the Worlds" panic ensued. So far as anyone can tell, not a single sleepy-eyed Czech viewer was frightened by the stunt, their lack of fear, the state

attorney said, not being the explanation for the curious charge of "attempted" scaremongering. (The charge is a Czech legal fine point.)

As for exactly who the group's members are, that remains something of a mystery, which Ztohoven theatrically guards. Even the state prosecutor said over the phone the other day it was private information until the trial. Nevertheless three members of the group — two amiable ringleaders and a quiet, sweet-faced 26-year-old who looked as if he were 12 — agreed to meet at an empty cafe over coffee and Coke. They declined to give their names.

But they brought a film crew.

Turns out, Ztohoven includes no women. "That's the problem of radicalism," sighed the threesome's 33-year-old elder statesman, who called himself Roman Tyc. (The pun works in English.) "To get together for pranks is also more difficult now that we're getting into our 30s."

His associate, in a pastel crewneck sweater, who gave his name as Zdenek Dostal, and whom the highly voluble Roman had a tendency to talk over, said the action on Czech Television, which Ztohoven titled "Media Reality," was "not meant to be threatening but to land softly on the public consciousness so that people won't let themselves be brainwashed."

The artists just wanted to startle viewers "from their lethargy," piped in the quietest member of the trio, Mira Slava (punningly, "peace and fame"). All three Ztohovenites recoiled at a description of an art project some years back entailing fake bombs left in a New York subway station, which briefly shut part of the city down.

Nothing really happened at all here, initially, anyway. Ladislav Sticha, the tall spokesman for Czech Television, told me that the show's audience was "miniature" — presumably he meant small in number. Only a few people, among them perplexed hikers checking the weather before setting out for a Sunday stroll, called or sent e-mail messages to inquire.

But then Czech Television broadcast Ztohoven's handiwork hour after hour on its numerous news programs, and the video soon landed on YouTube. By the next day all Europe knew about it.

"It's not that we would not have supported this kind of art, if they had come to us," Mr. Sticha added, somewhat abashed that, because Czech Television filed a complaint for breach of property, the affair ended up in court.

Hardly anyone here seems to want Ztohoven to receive more than a legal slap on the wrist, if that. Neither have fellow artists protested the trial in the streets, nor made a freedom of speech issue out of it. A literary weekly even mildly took Ztohoven to task for being a little too hungry for media attention.

On the other hand, the National Gallery in Prague last month awarded the group a prize. Milan Knizak, the National Gallery's white-haired, pony-tailed director, himself an artist and one-time Czech Actionist, explained that the award was not a statement about the court case but given for the "directness" of "Media Reality."

Back in the 1960s, Mr. Knizak added, he contrived to send hundreds of packages to a randomly chosen apartment building in Prague: "clothes, furniture, live fish, tickets to the movie theater."

"No art was present" in that action, he went on. "It meant a change in the everyday life of everyday people. It didn't take place in a gallery or museum, it just happened. Like love. You don't reason why. It just is."

Ztohoven's work has a larger context, in other words. It belongs to a history of Czech literary and artistic mystification and sly, deadpan humor that is the expression of a small, underdog nation dominated for

generations by outsiders, one after another. “The Good Soldier Svejk,” by Jaroslav Hasek, the famous Czech novel that is the masterpiece of this genre, tells of an idiot Candide, a hopeless orderly whose humanity throws into contrast a decaying empire.

“The Czech hero was no longer the nobleman but the poor, simple creature,” Mr. Knizak said about “Svejk,” “not Don Quixote but Sancho Panza.”

The book, it seems, even gave rise to a droll verb: “Because of the past, Austria, communism, fascism, someone always stepping on our necks, we have had no choice except to Svejk around,” Roman Tyc said about the general Czech psyche.

From Svejk’s example derived the fictional Jara da Cimrman, a kind of kitsch anti-Svejk, concocted by a group of writers and actors partly as a protest against authority during the communist era. In a country that claims no towering inventors or explorers, Cimrman became the quintessential Czech hero, a Zelig who trekked to the North Pole but missed it by several yards, who advised Chekhov, but failed to get credit. (“Two sisters?” he asked the Russian. “Isn’t that too few?”)

“It’s the difference between us and the Soviets,” Ladislav Smoljak, one of Cimrman’s creators, said one recent morning in his apartment, where an imitation Vermeer hung on the wall. “The oppression under which we lived was mostly mild so our reaction has been mild too. Mystification is a part of it.”

“Mystification is too strong a word,” Mr. Knizak, the gallery director, responded. “It’s more nebulous: important and unimportant at once, not aggressive, light, distant, not black humored. Czechs don’t start revolutions in the streets. We settle things over beer in pubs.”

Which, as it happened, was where Jiri Rak held forth the other night. A specialist in Czech smallness and a historian of culture, he summed up Ztohoven’s larger meaning in a neighborhood bar. “When people make fun of something, they are making themselves free of it,” he said. “That’s the condition of the small nation. It’s a defense for everyone today in the globalized world.

“I think the goal of Czech mystification is to show us that we live in a world continually mystifying us — the politicians, the advertisers.” He paused over his Pilsner, then raised the glass. “Thank God for Ztohoven.”

http://www.nytimes.com/2008/01/24/arts/design/24abroad.html?_r=2&ref=arts&oref=slogin&oref=slogin

Could finger lengths predict musical and athletic ability?
By Rita Rubin, USA TODAY
Palm readers may not be the only ones who can tell a lot about people by examining their hands.

Recently, scientists in North America and Europe have looked to the relative lengths of index and ring fingers for clues about a variety of characteristics, including musical ability, athletic prowess and, in a study just released, osteoarthritis risk.

The researchers believe that the difference between the two fingers' lengths signifies the level of testosterone exposure in the womb. The longer the ring finger compared to the index finger, the thinking goes, the higher the exposure.

Scientists express the fingers' relative lengths as a ratio, computed by dividing index finger length by ring finger length. Men tend to have longer ring fingers than index fingers, or ratios less than 1, and women tend to have index and ring fingers of equal length, or ratios of 1.

Don't worry if your finger ratio looks to be more like that of the opposite sex, says Marc Breedlove, professor of neuroscience at Michigan State University. There's less of a sex difference in finger ratios than there is in height, he says.

"I wish it was a better marker … of prenatal testosterone," he says. "It's not a very good correlation. It's easy to find women who have more masculine ratios than some men."

Still, Breedlove says, short of a time machine, he doesn't know of a better tool with which to assess prenatal testosterone exposure.

Just made the connection

Giacomo Casanova, the famous womanizer who died in 1798, observed in his memoirs that the ring finger is longer than the index finger.

But it wasn't until 1998 that British psychologist John Manning first linked the index-ring finger ratio to prenatal hormone levels.

"It's been known for about a hundred years that there's this tiny sex difference in the ratio, but it's so small that one wouldn't think it's particularly important," says Manning, who recently retired from the University of Central Lancashire and is now associated with Southampton University.

Manning had been studying whether body asymmetry — in which, say, a finger on one hand is longer than the same finger on the other hand — is linked to such traits as fertility. He noticed that in young boys, but not young girls, ring fingers tended to be longer than index fingers. He speculated that prenatal hormone exposure played a role.

"The sex difference almost certainly arises before birth," Manning says, adding that it can be seen in fetuses at nine weeks' gestation, "and it doesn't change at puberty."

Since 1998, Manning has published studies suggesting that male symphony orchestra musicians have lower finger ratios than less-musical men, that heterosexual men have lower ratios than homosexual men and that people with lower ratios tend to do better on certain tests of spatial ability.

But "the links with sports are the strongest I've found," Manning says. "They're particularly strong with endurance running." He theorizes that prenatal testosterone benefits the cardiovascular system.

"I think the goal is to see whether you can find any evidence that prenatal testosterone makes any difference at all," Breedlove says. "If you do see a relationship between the digit ratios and whatever symptom you're looking at, then you have to wonder."

For example, he says, "how might prenatal testosterone influence how your joints feel when you're 55 years old? Ten years ago, no one would have even asked the question."

The link to osteoarthritis

British rheumatologist Michael Doherty and his collaborators at the University of Nottingham did just that in a study in the January issue of *Arthritis & Rheumatism*.

Osteoarthritis is more common in men, Doherty says, and, he and his co-authors write, increased activity and physically demanding sports could contribute to the condition through repetitive joint trauma. So it makes sense that a lower finger ratio, thought to be more common in men and in athletic individuals, would be linked to a higher osteoarthritis risk.

By comparing about 2,000 osteoarthritis patients with about 1,000 people without osteoarthritis, Doherty's team found that is indeed the case. The strongest link: osteoarthritis of the knee in women whose ring fingers were longer than their index fingers.

Even after accounting for such osteoarthritis risk factors as physical activity and higher current testosterone levels, Doherty and his co-authors found that a relatively long ring finger was itself a risk factor. If they had studied elite athletes, though, perhaps they would have seen a link between physical activity and osteoarthritis risk, Doherty says, noting, "we're just one study."

Although finger ratio is easily measured, says Michael Peters, a psychology professor at Ontario's University of Guelph, "I don't see it becoming a powerful diagnostic predictor anytime soon."

But, Manning says, one country hopes the tool will help identify future athletes. He is working with Qatar's Aspire Sports Academy, whose vision, according to its website, "is to discover the best young sporting talent … and transform them into world-renowned champions."

Manning's goal: to prove that finger ratio at age 10 predicts athletic ability at age 18.

http://www.usatoday.com/news/health/2008-01-23-finger-ratios_N.htm

Clive Thompson on Why Sci-Fi Is the Last Bastion of Philosophical Writing

By Clive Thompson 01.18.08 | 6:00 PM

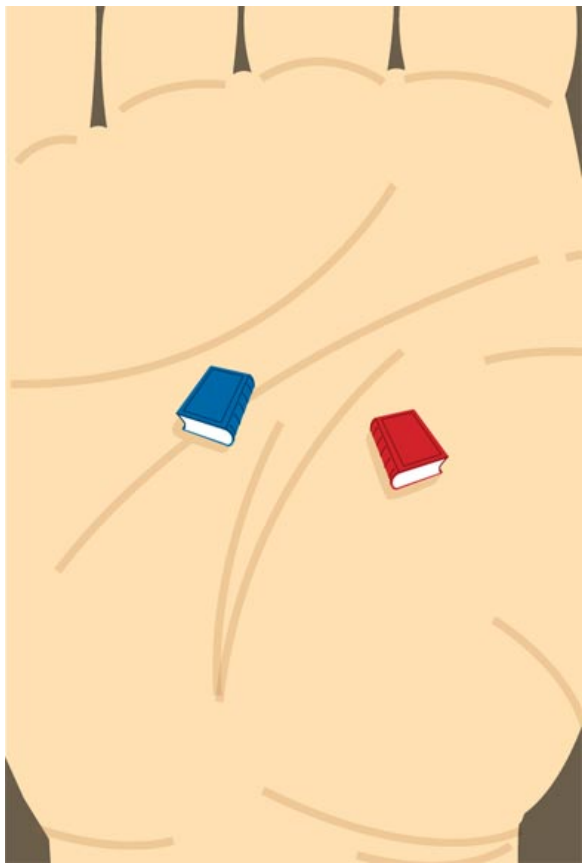


Illustration: Rodrigo Corral

Recently I read a novella that posed a really deep question: What would happen if physical property could be duplicated like an MP3 file? What if a poor society could prosper simply by making pirated copies of cars, clothes, or drugs that cure fatal illnesses?

The answer Cory Doctorow offers in his novella *After the Siege* is that you'd get a brutal war. The wealthy countries that invented the original objects would freak out, demand royalties from the developing ones, and, when they didn't get them, invade. Told from the perspective of a young girl trying to survive in a poor country being bombed by well-off adversaries, *After the Siege* is an absolute delight, by turns horrifying, witty, and touching.

Technically, *After the Siege* is a work of science fiction. But as with so many sci-fi stories, it works on two levels, exploring real-world issues like the plight of African countries that can't afford AIDS drugs. The upshot is that Doctorow's fiction got me thinking — on a Lockean level — about the nature of international law, justice, and property.

Which brings me to my point. If you want to read books that tackle profound philosophical questions, then the best — and perhaps only — place to turn these days is sci-fi. Science fiction is the last great literature of ideas.

From where I sit, traditional "literary fiction" has dropped the ball. I studied literature in college, and throughout my twenties I voraciously read contemporary fiction. Then, eight or nine years ago, I found myself getting — well — bored.

Why? I think it's because I was reading novel after novel about the real world. And there are, at the risk of sounding superweird, *only so many ways to describe reality*. After I'd read my 189th novel about someone living in a city, working in a basically realistic job and having a realistic relationship and a realistically fraught family, I was like, "OK. Cool. I see how today's world works." I also started to feel like I'd been reading the same book over and over again.

Here's my overly reductive, incredibly nerdy way of thinking about the novel: Consider it a simulation, kind of like *The Sims*. If you run a realistic simulation enough times — writing tens of thousands of novels about contemporary life — eventually you're going to explore almost every outcome. So what do you do then?

You change the physics in the sim. Alter reality — and see what new results you get. Which is precisely what sci-fi does. Its authors rewrite one or two basic rules about society and then examine how humanity responds — so we can learn more about ourselves. How would love change if we lived to be 500? If you could travel back in time and revise decisions, would you? What if you could confront, talk to, or kill God?

Teenagers love to ponder such massive, brain-shaking concepts, which is precisely why they devour novels like Philip Pullman's *His Dark Materials*, the *Narnia* series, the Harry Potter books, and *Ender's Game*. They know that big-idea novels are more likely to have an embossed foil dragon on the cover than a Booker Prize badge.

Adults and serious intellectuals used to love ruminating over this stuff, too. Thought experiments formed the foundation of Western philosophy — from Socrates to Thomas Hobbes to Simone de Beauvoir.

So, then, why does sci-fi, the inheritor of this intellectual tradition, get short shrift among serious adult readers? Probably because the genre tolerates execrable prose stylists. Plus, many of sci-fi's most famous authors — like Robert Heinlein and Philip K. Dick — have positively *deranged* notions about the inner lives of women.

But the worm is turning. For whatever reasons — maybe the reality fatigue I've felt — a lot of literary writers are trying their hand at speculative fiction. Philip Roth used a "counterfactual" history — what if Nazi sympathizers in the US won the 1940 election? — to explore anti-Semitism in *The Plot Against America*. Cormac McCarthy muses on the nature of morality in the Hobbesian anarchy of his novel *The Road*. Then there's the genre-bending likes of Michael Chabon, Jonathan Lethem, Susanna Clarke, and Margaret Atwood (whom I like to think of as a sci-fi novelist trapped *inside* a literary author).

Those aren't writers whose books are adorned with embossed dragons. But that doesn't mean they don't owe that dragon a large debt.

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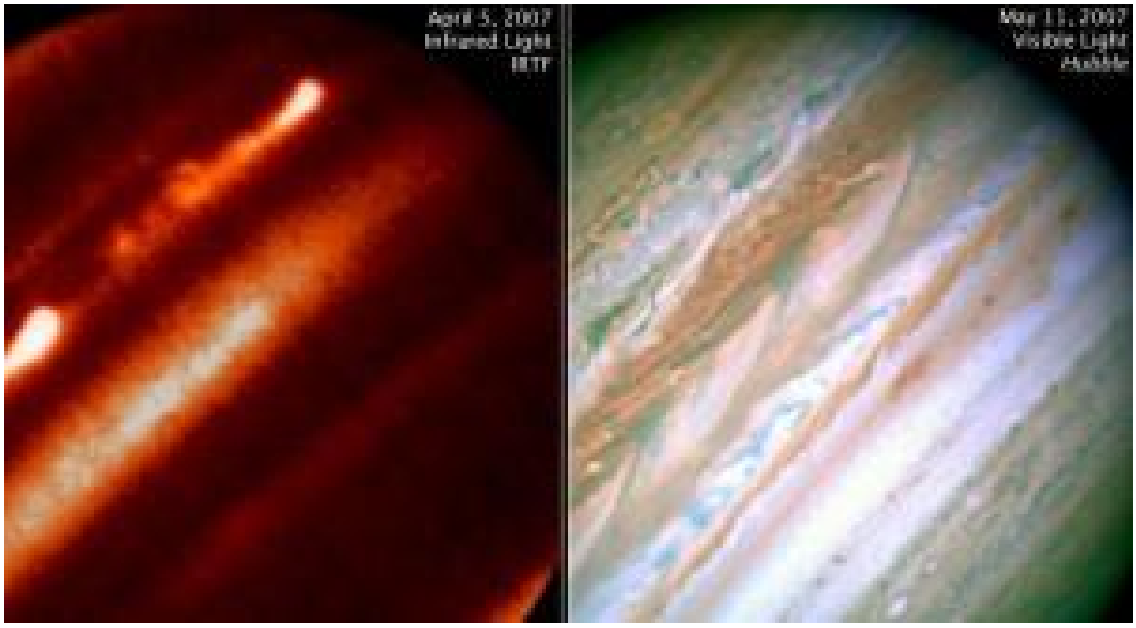
http://www.wired.com/techbiz/people/magazine/16-02/st_thompson

Mystery Of Jupiter's Jets Uncovered



Left: Jupiter's infra-red picture, taken by NASA's IRTF telescope; right: Jupiter's visible-light picture taken by Hubble Espace Telescope. (Credit: ESA-NASA/ GCP-UPV/EHU)

ScienceDaily (Jan. 25, 2008) — At the end of March 2007, scientists all over the world observed with surprise and awe a rare change in the atmosphere of Jupiter. A giant perturbation occurred amongst its clouds and two extremely bright storms erupted in the middle latitudes of the northern hemisphere, where its most intense jet stream - reaching speeds of 600 kilometers per hour – resides. Research into these unusual storms (previous ones had been seen in 1975 and 1990) and the reaction of the jet to them, undertaken by an international team coordinated by Agustín Sánchez-Lavega, from the Higher Technical School of Engineering of the University of the Basque Country (UPV/EHU), gives a more precise idea about the origin of these current flows and likewise can help to gain a better understanding of terrestrial meteorology.

The team, made up of scientists from the UPV/EHU, researchers from the Fundación Observatorio Esteve Durán in Barcelona and from several North American centres: NASA, the Jet Propulsion Laboratory, the Universities of Berkeley and Arizona, as well as the University of Oxford in the United Kingdom, amongst others, monitored the event with a spatial and temporal resolution without precedent. On the one hand, they used the Hubble Space Telescope (HST) and, on the other, the NASA telescope at the mountain tops of Hawaii and the telescopes in the Canary Islands, due to the infra-red light of which, the highest clouds and temperature changes can be observed.

Moreover, also decisive was the help of a whole battery of smaller telescopes located around the Earth's southern hemisphere, from where planet Jupiter can currently be seen in better conditions. Fortunately, the beginning of the storm was observed by the HST as a backup of the observations that the New Horizons spaceship undertook in its overflight on its way to far off Pluto. They observed how the storm grew quickly from 400 km to 2,000 km in less than 24 hours, explained Mr Sánchez-Lavega.

According to the study, the very bright storms are formed amongst the deepest clouds of water on the planet, rising vigorously and injecting a mixture of ice ammonia and water up to 30 km above the visible clouds. The storms move with the maximum velocity of the jet, - more than 600 kilometers per hour, creating disturbances and generating a stele of turbulence of reddish clouds that circle the whole planet. The infrared images show the brilliant festoons that make up the storms abandoning the jet stream to leeward.

Surprisingly, and despite the enormous amount of energy deposited by the storms and the mixture and whirlwinds generated thereby, the jet stream stayed practically still during all this perturbation and, when it was over, this stayed robust, despite the event suffered. The computer models simulating the progress of the phenomenon suggested that the jet stream goes deep into Jupiter's atmosphere, to more than 100 km below the visible cloud level and where solar energy cannot reach.

This confirms the results previously obtained by the Galileo probe when it penetrated Jupiter's atmosphere in December 1995. Although the regions studied are meteorologically different, everything points to Jupiter's jet streams going very deep and suggests that the internal energy source plays an important role in its generation, states Mr Sánchez-Lavega.

The comparison of the currently observed phenomenon with the previous cases of 1975 and 1990 show surprising similarities and coincidence, although without an explanation for the time being. The three eruptions have had a periodicity of between 15 to 17 years, strange for Jupiter as they do not bear any obvious relationship with the known natural periods of this planet. The storms arose at the peak of the jet, where the velocity is maximum, not to the North or to the South and there have always been two storms (not one or more or one less) and, finally, in all cases they move at the same speed. If, at some time in the future, we are able to crack this riddle, we will know the mysteries that lie beneath Jupiter's clouds, comments Mr Sánchez-Lavega.

The atmosphere of the giant gaseous planet of Jupiter, ten times the size of the Earth and where the day lasts only 10 hours, is in a permanent state of agitation. Atmospheric circulation is dominated by a system of jet streams, alternating in latitude and that distribute their clouds in bright and dark rings parallel to its equator – all these phenomena being unexplained. The changes in the cloud rings are sometimes violent ones circling the planet. Their origin and that of the energy source generating them as well as the jet streams are all matter for controversy amongst meteorologists and planet scientists. They might be generated by the deposition of solar radiation as on Earth or by the intense internal energy source emanating from Jupiter's interior or perhaps by a combination of both.

Knowing the mechanisms that operate in these phenomena is important for terrestrial meteorology – which is home to many storms and where jet streams also dominate atmospheric circulation. In this manner Jupiter represents a natural laboratory where scientists can study the nature of and the interrelation between jet streams, storms and violent atmospheric phenomena

The work, entitled "Depth of a strong Jovian jet from a planetary-scale disturbance driven by storms', is the cover of the 24 of January issue of the journal Nature.

Adapted from materials provided by Basque Research.

http://www.sciencedaily.com:80/releases/2008/01/080124114410.htm

Marijuana Withdrawal As Bad As Withdrawal From Cigarettes

ScienceDaily (Jan. 25, 2008) — Research by a group of scientists studying the effects of heavy marijuana use suggests that withdrawal from the use of marijuana is similar to what is experienced by people when they quit smoking cigarettes. Abstinence from each of these drugs appears to cause several common symptoms, such as irritability, anger and trouble sleeping - based on self reporting in a recent study of 12 heavy users of both marijuana and cigarettes.

"These results indicate that some marijuana users experience withdrawal effects when they try to quit, and that these effects should be considered by clinicians treating people with problems related to heavy marijuana use," says lead investigator in the study, Ryan Vandrey, Ph.D., of the Department of Psychiatry at the Johns Hopkins University School of Medicine.

Marijuana is the most widely used illicit drug in the United States. Admissions in substance abuse treatment facilities in which marijuana was the primary problem substance have more than doubled since the early 1990s and now rank similar to cocaine and heroin with respect to total number of yearly treatment episodes in the United States, says Vandrey.

He points out that a lack of data, until recently, has led to cannabis withdrawal symptoms not being characterized or included in medical reference literature such as the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, (DSM-IV) or the International Classification of Diseases, 10th edition (ICD-10).

Since the drafting of the DSM-IV in 1994, an increasing number of studies have surfaced suggesting that cannabis has significant withdrawal symptoms. What makes Vandrey's recent study unique is that it is the first study that compares marijuana withdrawal symptoms to withdrawal symptoms that are clinically recognized by the medical community - specifically the tobacco withdrawal syndrome.

"Since tobacco withdrawal symptoms are well documented and included in the DSM-IV and the IDC-10, we can infer from the results of this comparison that marijuana withdrawal is also clinically significant and should be included in these reference materials and considered as a target for improving treatment outcomes," says Vandrey.

Vandrey added that this is the first "controlled" comparison of the two withdrawal syndromes in that data was obtained using rigorous scientific methods - abstinence from drugs was confirmed objectively, procedures were identical during each abstinence period, and abstinence periods occurred in a random order. That tobacco and marijuana withdrawal symptoms were reported by the same participants, thus eliminating the likelihood that results reflect physiological differences between subjects, is also a strength of the study.

Interestingly, the study also revealed that half of the participants found it easier to abstain from both substances than it was to stop marijuana or tobacco individually, whereas the remaining half had the opposite response.

"Given the general consensus among clinicians that it is harder to quit more than one substance at the same time, these results suggest the need for more research on treatment planning for people who concurrently use more than one drug on a regular basis," says Vandrey.

Vandrey's study, which appears in the January issue of the journal Drug and Alcohol Dependence, followed six men and six women at the University of Vermont in Burlington and Wake Forest University School of Medicine in Winston-Salem, N.C., for a total of six weeks. All were over 18 (median age 28.2 years), used marijuana at least 25 days a month and smoked at least 10 cigarettes a day. None of the subjects intended to quit using either substance, did not use any other illicit drugs in the prior month, were not on any psychotropic medication, did not have a psychiatric disorder, and if female, were not pregnant.

For the first week, participants maintained their normal use of cigarettes and marijuana. For the remaining five weeks, they were randomly chosen to refrain from using either cigarettes, marijuana or both substances for five-day periods separated by nine-day periods of normal use. In order to confirm abstinence, patients were given daily quantitative urine toxicology tests of tobacco and marijuana metabolites.

Withdrawal symptoms were self reported on a daily basis Monday through Friday using a withdrawal symptom checklist that listed scores for aggression, anger, appetite change, depressed mood, irritability, anxiety/nervousness, restlessness, sleep difficulty, strange dreams and other, less common withdrawal symptoms. Patients also provided an overall score for discomfort they experienced during each abstinence period.

Results showed that overall withdrawal severity associated with marijuana alone and tobacco alone was of similar frequency and intensity. Sleep disturbance seemed to be more pronounced during marijuana abstinence, while some of the general mood effects (anxiety, anger) seemed to be greater during tobacco abstinence. In addition, six of the participants reported that quitting both marijuana and tobacco at the same time was more difficult than quitting either drug alone, whereas the remaining six found that it was easier to quit marijuana or cigarettes individually than it was to abstain from the two substances simultaneously.

Vandrey recognizes that the small sample size is a limitation in this study, but the results are consistent with other studies indicating that marijuana withdrawal effects are clinically important.

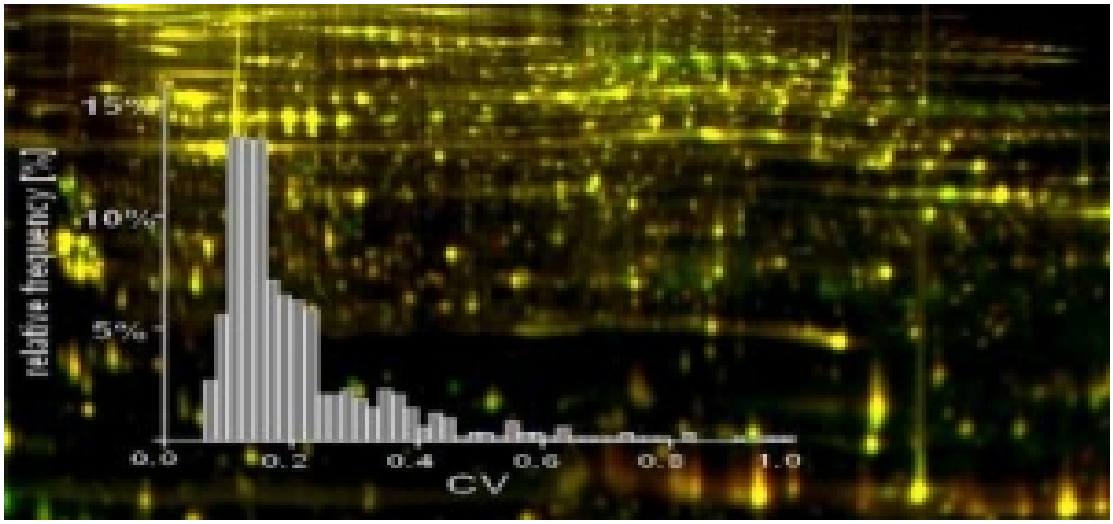
This study was conducted while Vandrey was a doctoral candidate at the University of Vermont. It was supported by grants from the National Institute on Drug Abuse.

Other researchers who contributed to this study are Alan Budney, Ph.D., of the University of Arkansas for Medical Studies, Little Rock; John Hughes, M.D., of the University of Vermont; and Anthony Ligouri, Ph.D., of Wake Forest University School of Medicine.

Adapted from materials provided by Johns Hopkins Medical Institutions, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080124145015.htm

Searching For Amyloid Interactions



Graph displaying the range of biological variation of the platelet proteome overlaid on a colored 2D-gel used to measure platelet protein expression. (Credit: Rudolf Oehler, Medical University of Vienna)

ScienceDaily (Jan. 25, 2008) — Researchers have undertaken a large-scale investigation into the molecular environment of the amyloid precursor protein (APP), a protein centrally associated with Alzheimer's disease.

A defining hallmark of Alzheimer's is the extracellular accumulation of amyloid plaques in the diseased brain. These plaques arise from the cleavage of APP, which generates short, sticky fragments called amyloid B-peptides. Despite intense research efforts, however, the function of APP remains enigmatic and only a few proteins are known to interact with it.

Gerold Schmitt-Ulms and colleagues employed a technique called 'time-controlled transcardiac perfusion cross-linking" to uncover more APP-interacting proteins. They pumped a chemical through a mouse's body that would permanently cross-link any proteins that were in close proximity. They could then fish out APP from the brain and study what it was linked to.

From their perfusion, Schmitt-Ulms and colleagues confirmed eight previously reported APP interactions and also identified over 30 new, potentially interacting proteins. They also mapped the interactions of two proteins related to APP that are not known to cause disease, to sense which interactions the three related proteins had in common and which were APP-specific; interestingly the majority of the potential binding partners were specific to APP.

This work constitutes the most comprehensive analysis of the APP interactome to date and may finally shed light on the functional roles of APP in the brain. The researchers believe further investigations of these new interactions may reveal an "Achilles' heel" in the biology of APP that can be exploited for diagnosis or therapy.

Adapted from materials provided by American Society for Biochemistry and Molecular Biology, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080122154805.htm

Alendronate Can Help Prevent Bone Fractures In Many Postmenopausal Women

ScienceDaily (Jan. 25, 2008) — Giving 10mg per day of the bisphosphate drug alendronate to women after their menopause can help prevent loss of bone mass, reducing their risk of fractures, a Cochrane Review has found. This finding applies to women who have started to lose their bone mass but have no fractures (primary prevention), as well as those who have lost significant bone mass and/or have had fractures (secondary prevention).

Healthy bones constantly break down and rebuild their structure. The process is sensitive to hormones and once women have passed through the menopause the balance is disturbed; their bones tend to break down slightly more than they build. Over time this leads to a noticeable loss of bone mass, and weakening of the bones. Once the bones become too weak they are prone to fracture.

A team of Cochrane Researchers set out to evaluate the evidence behind the use of alendronate for primary and secondary prevention of bone fractures in these women. Alendronate works by inhibiting the bone break down process.

By studying the outcomes of eleven trials that involved a total of 12,068 women the researchers found significant evidence of both primary and secondary prevention against breaking bones in the back (vertebrae). In secondary prevention, there was also a statistically significant protection against fractures of other bones including those in the hip and wrist.

"This work revealed no increase in side effects in the women who were using the drugs, despite the fact that some studies outside clinical trials raise the possibility of stomach and jaw complaints," says lead author Dr George Wells, who works in the Department of Epidemiology and Community Medicine at the University of Ottawa.

"As a woman gets older, her risk of having on-going health problems or dying is significantly greater if she has reduced bone density and then breaks a bone such as a hip, so it is important to find effective preventative therapies with low or no side-effects," says Wells.

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080122203154.htm

Nitrogen Fixation Process In Plants To Combat Drought In Various Species Of Legumes

ScienceDaily (Jan. 25, 2008) — The regulation of the biological fixation of nitrogen in hydric stress conditions varies with the different species of legume plants studied. This was the conclusion of Ruben Ladrera Fernández in his PhD thesis, "Models of regulation of nitrogen fixation in response to drought: Soya and Medicago", in which the different ways of distinct species of legumes respond to drought conditions are explained.

Biological fixation of nitrogen

In his thesis Mr Ladrera explains that nitrogen is the most abundant element in the terrestrial atmosphere but that it is a very poor source of nutrition for plants. This apparent paradox is due to the fact that atmospheric nitrogen is inert and cannot be used by living things and thus has to be reduced to other chemical forms such as nitrate (NO3-) or ammonium (NH4+) in order to be used by plants. This situation causes a disproportionate amount of nitrogenous fertilisers to be used for agriculture, giving rise to various environmental problems such as contamination of soil and water or the emission of oxides of nitrogen into the atmosphere.However, some organisms are able to reduce atmospheric nitrogen to ammonium for its subsequent metabolic use, which is known as the biological fixation of nitrogen (BFN). These nitrogen-fixing organisms (also called diazotrophs), can fix nitrogen either as free living or in symbiosis with plants. Amongst the various nitrogen-fixing symbiotic associations, the agriculturally most important is that carried out by plants belonging to the legume and bacteria families, generically known as rhizobes.

In this symbiosis — according to the research undertaken by Mr Ladrera — bacteria dwelling in specialised organs of plant roots known as nodules are capable of using atmospheric nitrogen and reducing it to ammonium, which is exported to the plant, this providing the carbon from photosynthesis to the bacteria and which is necessary to carry out bacteroidal respiration.

What happens in drought or hydric stress

Rubén Ladrera states in his thesis that BFN is a process highly sensitive to drought, to such an extent that it is rapidly inhibited in hydric stress conditions and thus causes significant losses of leguminous crops at a worldwide level. However, it is still not known what the exact mechanism responsible for this inhibition is. Various mechanisms have been put forward, amongst which is a limiting of oxygen in the nodules, a process of retroinhibition using nitrogen and a limiting of the carbon flow to the bacteria.In this context, the effect of drought on the nodular metabolism and on the plant in different species of legumes (Soya, alfalfa and Medicago truncatula) was studied. To this end, Mr Ladrera used plants from different varieties of each species and that demonstrated different tolerances to hydric stress, with the aim of identifying factors involved in the regulation of BFN.The results of the research show a limiting of the carbon flow to the bacteria is produced as well as an accumulation of nitrogenated compounds in the nodule (but not in the leaves) of the Soya plants subject to drought, at the same time as the inhibition of the BFN. These results show that the regulation of the BFN in Soya, in hydric stress conditions, is produced at a localised level, in the nodule itself, and that the metabolism of carbon and nitrogen is involved in this.Nevertheless, in the case of other species analysed - alfalfa and Medicago truncatula -, drought caused an accumulation of carbonated compounds in the nodules, which indicates the regulation of BFN in these species is produced independently of nodular carbon metabolism.

These differences — concludes the author of the PhD thesis – appear to be due to the greater tolerance shown by the species of the Medicago genus to drought conditions.The PhD work was directed by Professor César Arrese-Igor Sánchez and senior lecturer Ms Esther González García from the Department of Environmental Sciences at the Public University of Navarre.

Adapted from materials provided by Basque Research.

http://www.sciencedaily.com:80/releases/2008/01/080123085302.htm

How Much You're Willing To Pay Depends On What You Were Just Doing

ScienceDaily (Jan. 25, 2008) — Your shopping buddy turns to you and asks, "Which one of these would you get?" Or, you're talking with your spouse about which candidate you'd like to vote for before switching on the nightly news. Turns out simply being asked to make a choice-- especially if you're in a hurry or have something on your mind -- will make you like the next thing you see more, says a new study from the Journal of Consumer Research. The researchers found that asking people to choose among things primed them to think about positive attributes -- and caused them to be in a positive frame of mind when evaluating the next item they saw.

"Simply asking participants to decide if they would buy (vs. reject) each of a set of products disposed them to search for favorable attributes before unfavorable ones in an unrelated product evaluation situation," explain Hao Shen and Robert S. Wyer, Jr. (both of the Hong Kong University of Science and Technology). "As a result, they evaluated the product they considered in the second situation more favorably than they otherwise would."

The study expands our understanding of "memory priming." As the researchers explain, our knowledge about a product or service usually involves norms -- such as typical prices, typical amenities, and brand reputation associated with, say, a hotel. However, the researchers also reveal that this prior knowledge can be influenced by "procedural knowledge priming," or, by introducing consumers to an activity that affects what they evaluate.

In another experiment, the researchers had participants in Hong Kong rank the prices of hotel rooms in three cities either from high-to-low or low-to-high. They were then asked to indicate how much they would pay for a hotel room, among other questions. When a lot of information was presented, those who ranked the prices from most expensive to least expensive were willing to pay an average of $19 more than those who had been asked to rank the hotels from lowest to highest priced.

In addition, "participants estimated the average price of hotel rooms in a city to be higher if they had rank[ed] prices from highest to lowest in a prior task than if they had ranked them from lowest to highest," the researchers explain.

They continue: "Unrelated experiences can activate a search process that governs the order in which favorable and unfavorable product descriptions are identified and the evaluations that are made on the basis of them."

Journal reference: Hao Shen and Robert S. Wyer, Jr., "Procedural Priming and Consumer Judgments: Effects on the Impact of Positively and Negatively Valenced Information." Journal of Consumer Research: February 2008.

Adapted from materials provided by University of Chicago Press Journals, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080123125551.htm

Warmer Ocean Could Reduce Number Of Atlantic Hurricane Landfalls

Hurricane Katrina on Aug. 28, 2005. (Credit: NOAA)

ScienceDaily (Jan. 25, 2008) — A warming global ocean — influencing the winds that shear off the tops of developing storms — could mean fewer Atlantic hurricanes striking the United States according to new findings by NOAA climate scientists. Furthermore, the relative warming role of the Pacific, Indian and Atlantic oceans is important for determining Atlantic hurricane activity.

The article, to be published on January 23 in Geophysical Research Letters, uses observations to show that warming of global sea surface temperatures is associated with a secular, or sustained long-term increase, of vertical wind shear in the main development region for Atlantic hurricanes. The increased vertical wind shear coincides with a downward trend in U.S. landfalling hurricanes.

"We looked at U.S. landfalling hurricanes because it is the most reliable Atlantic hurricane measurement over the long term," says Chunzai Wang, a physical oceanographer and climate scientist with NOAA's Atlantic Oceanographic and Meteorological Laboratory in Miami and lead author on the article. "Using data extending back to the middle nineteenth century, we found a gentle decrease in the trend of U.S. landfalling hurricanes when the global ocean is warmed up. This trend coincides with an increase in vertical wind shear over the tropical North Atlantic and the Gulf of Mexico, which could result in fewer U.S. landfalling hurricanes." For the article, Wang worked with Sang-Ki Lee of the Cooperative Institute for Marine and Atmospheric Studies-University of Miami.

In terms of hurricane strength, Wang notes, "The vertical wind shear is not the only factor affecting Atlantic hurricane activity, although it is an important one." Other factors include atmospheric humidity, sea level pressure, and sea surface temperature.

This study also suggests that where the global ocean warming occurs is important for determining the vertical wind shear in the Atlantic hurricane main development region — within the 10°-20° North latitude belt that stretches from west Africa to Central America. Whether future global warming increases Atlantic hurricane activity will probably depend on the relative role induced by sustained long-term warming over the tropical oceans.

Observations from 1854 to 2006 show a warming of sea surface temperature occurring almost everywhere over the global ocean, with large warming in tropical regions of the Pacific, Atlantic, and Indian oceans. Warmer waters in the tropical Pacific, Indian and North Atlantic oceans produce

opposite effects upon vertical wind shear; that is, warming in the tropical Pacific and Indian oceans increase vertical wind shear in the Atlantic hurricane main development region, while warming in the tropical North Atlantic decreases vertical wind shear. Overall, warming in the Pacific and Indian oceans is of greater impact and produces increased levels of vertical wind shear which suppresses Atlantic hurricane activity.

The National Oceanic and Atmospheric Administration, an agency of the U.S. Commerce Department, is dedicated to enhancing economic security and national safety through the prediction and research of weather and climate-related events and information service delivery for transportation, and by providing environmental stewardship of our nation's coastal and marine resources. Through the emerging Global Earth Observation System of Systems (GEOSS), NOAA is working with its federal partners, more than 70 countries and the European Commission to develop a global monitoring network that is as integrated as the planet it observes, predicts and protects.

Adapted from materials provided by National Oceanic And Atmospheric Administration.

http://www.sciencedaily.com:80/releases/2008/01/080124115808.htm

Protein That Controls Hair Growth Also Keeps Stem Cells Slumbering

ScienceDaily (Jan. 25, 2008) — Like fine china and crystal, which tend to be used sparingly, stem cells divide infrequently. It was thought they did so to protect themselves from unnecessary wear and tear. But now new research from Rockefeller University has unveiled the protein that puts the brakes on stem cell division and shows that stem cells may not need such guarded protection to maintain their potency.

This research, to be published in the January 25 issue of Cell, raises questions about what stem cells need in order to maintain their ability to regenerate tissue. It may also be key in developing new treatments for thinning hair.

The impetus for the work began five years ago when Elaine Fuchs, head of the Laboratory of Mammalian Cell Biology and Development, and several researchers in her lab discovered that the protein NFATc1 was one of only a few that are highly expressed within the stem cell compartment of the hair follicle. Clinical research, meanwhile, showed that a particular immunosuppressant that inhibits NFATc1, a drug called cyclosporine A, has a rather unsightly side effect: excessive hair growth.

Fuchs and Valerie Horsley, a postdoc in her lab, realized that there was a connection between the drug's side effect and the abundance of NFATc1 within the hair follicle's stem cell compartment -- the bulge. The mice they treated with the drug grew fur at a much faster rate than mice they did not treat. The researchers then showed that this excessive hair growth was due to increased stem cell activity within the bulge, a process that cranked up the production of hair. Specifically, the hair cycle shifted gears from its resting phase, when stem cells slumber, to its growth phase, when stem cells proliferate.

To maintain their multipotent properties, though, it appears that these stem cells hardly needed much "rest" at all. These findings came as a surprise to the researchers, who, like their colleagues, had believed that stem cells proliferating infrequently protected them from depletion or mutations that would lead to hair loss. "It seems like the resting phase isn't as necessary as was once thought," says Horsley. "Even though these stem cells are highly proliferative, they still maintain their stem cell character."

Using genetically engineered mice bred by colleagues at Harvard Medical School, Horsley and Fuchs then further explored what happens when skin stem cells lack NFATc1. They found that these mice looked exactly like the hairy mice that were treated with cyclosporine A: The loss of NFATc1 didn't stop the hair cycle, but rather shortened the resting phase and prompted precocious entry to the growth state.

In probing the underlying mechanisms mediating this process, Horsley and Fuchs discovered that NFATc1, a transcription factor, blocks the expression of a gene that provides the cell cycle with "go ahead" signals at certain checkpoints. By blocking these signals, NFATc1 prevents the stem cells from dividing, preventing unnecessary wear and tear. These same cells, if treated with cyclosporine A, show a rapid loss of the transcription factor, an effect that turns the light green at these checkpoints.

For those with thinning hair, this research may hold promise. As people age, the resting phase of the hair cycle gets longer and longer such that the stem cells proliferate less frequently and hair does not grow at the rate it once did. "If we could use a local and more specific inhibitor of NFATc1 than cyclosporine A to stimulate these stem cells, which are just sitting there during an extended resting phase, we might be able to promote new hair growth," says Fuchs, who is Rebecca C. Lancefield Professor at Rockefeller and an investigator at the Howard Hughes Medical Institute. "In a sense, by blocking NFATc1 activity in our older mice, their hair follicles were brought back to what appeared to be a more youthful state."

So far, these proliferating stem cells lacking NFATc1 have not led to increased tumor formation, which is often a dangerous byproduct of triggering stem cells into action. "This is the first case where

we have been able to activate the hair cycle without accompanying signs of tumorigenesis," says Fuchs. "If we can control the activation process of follicle stem cells without promoting tumorigenesis, then this would be a big move in the right direction."

This research was supported in part by the National Institutes of Health, American Society for Clinical Investigation and the Damon Runyon Cancer Research Foundation. Fuchs is a faculty member in Rockefeller's Center for Clinical and Translational Science, which is supported by the NIH's Clinical and Translational Science Award (CTSA) program.

Adapted from materials provided by Rockefeller University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080124132512.htm

CERN: Celebrating The Lowering Of The Final Detector Element For Large Hadron Collider

The 15th and last piece of the CMS detector, an endcap of 1430 tonnes, was lowered 100 metres underground. (Credit: Image courtesy of CERN)

ScienceDaily (Jan. 25, 2008) — In the early hours of the morning the final element of the Compact Muon Solenoid (CMS) detector began the descent into its underground experimental cavern in preparation for the start-up of CERN's Large Hadron Collider (LHC) this summer. This is a pivotal moment for the CMS collaboration, as the experiment is the first of its kind to be constructed above ground and then lowered, element by element, 100 metres below. It marks the culmination of eight years of work in the surface hall, and moves CMS into final commissioning before registering proton-proton collisions at the LHC.

The journey started 14 months ago, when the first of 15 elements of the CMS detector was carefully lowered, with just a few centimetres of leeway, by a huge gantry crane, custom-built by the VSL group. The final element is an asymmetrical cap that fits into the barrel element of the experiment and weighs around 1430 tonnes. It includes fragile detectors that will help identify and measure the energy of particles created in LHC collisions."CMS is unique in the way that the detector was constructed in very large elements in a surface assembly building and then lowered underground", explained Austin Ball, CMS Technical Coordinator. "This is likely to become a model for future experiments, as the technique can now be considered proven."

There are many advantages to planning an experiment in this way, such as the ability to save time by working simultaneously on the detector while the experimental cavern was being excavated. There were also fewer risks when working on the surface, and elements of detector could be tested together before lowering them.Experiments at the LHC will allow physicists to take a big leap on a journey that started with Newton's description of gravity. Gravity is ubiquitous since it acts on mass, but so far science is unable to explain why particles have the masses they have. Experiments such as CMS may provide the answer. LHC experiments will also probe the mysterious missing mass and dark energy of the Universe, they will investigate the reason for nature's preference for matter over antimatter, probe matter as it existed close to the beginning of time and look for extra dimensions of spacetime.

"This is a very exciting time for physics," said CMS spokesman Tejinder Virdee, "the LHC is poised to take us to a new level of understanding of our Universe."

Adapted from materials provided by CERN.

http://www.sciencedaily.com:80/releases/2008/01/080122154445.htm

Simplified Scoring System May Better Predict Cardiovascular Disease Risk

ScienceDaily (Jan. 25, 2008) — Physicians currently evaluate a patient's risk for heart disease, stroke and other cardiovascular diseases (CVD) individually, but a new assessment tool could gauge risk of overall ,or global, CVD and a range of cardiovascular diseases at one time, according to a study published in Circulation: Journal of the American Heart Association.This new index is particularly well suited for use by office-based primary care physicians, who could estimate patients' overall CVD risk by using a simple, single scoring system, researchers said.

Applying the new system to 12 years of patient data, researchers found that the scoring index accurately assessed who would have a CVD event (such as stroke or heart attack). The index demonstrated accuracy for men and women for global CVD, and, with minor adjustments to the index, permitted reliable estimation of a person's risks for specific types of CVD."Individuals with a high overall CVD risk require more aggressive risk factor modification," said Ralph B. D'Agostino, Sr., Ph.D., chair and professor of mathematics and statistics at Boston University and co-principal investigator of the Framingham Heart Study. "The goal of therapy for cholesterol disorders, diabetes and hypertension should be linked to the global CVD risk."

D'Agostino and his colleagues analyzed data on 8,491 participants (average age 49) in the Framingham Heart Study, all of whom were free of CVD at the start of the study. The researchers used standard statistical methods to develop male- and female-specific scoring systems, or algorithms for estimating risk of developing a first CVD. These scoring systems incorporated age, levels of total cholesterol and high-density lipoprotein cholesterol, systolic blood pressure, treatment for high blood pressure, smoking and diabetes status. The researches then evaluated the algorithms' ability to estimate overall CVD risk and the scoring systems' accuracy for predicting the occurrence of individuals' CVD (coronary disease, stroke, peripheral artery disease or heart failure).

Over 12 years, 1,174 of the participants developed a first CVD diagnosis. Each of the risk factors incorporated into the global risk-assessment system correlated significantly with 10-year CVD risk. When study participants were separated into five groups (quintiles) according to risk score, the top quintile of risk scores identified 60 percent of women and 49 percent of men who had CVD.The gender-specific global CVD risk-assessment algorithms were then adapted to predict the risk of the individual components of the global CVD risk. The process involved multiplying the risk predicted by the general risk scoring system by the proportion of the general first CVD diagnoses accounted for by an individual type of CVD. The results were compared with those produced by statistical models the researchers developed specifically for the individual components. The comparison showed that "the general CVD risk formulation provides as good discrimination of individual CVD outcomes as does the individual disease-specific" scoring systems.

The authors noted that several disease-specific systems have been developed to predict a person's risk of developing a specific type of CVD. Because risk factors for the different types of CVD are similar, a single risk-assessment tool that incorporates the common risk factors would help physicians predict a person's overall CVD risk as well as the risk for a given type of CVD."Our study was motivated by our presumption of a need to simplify risk prediction in office-based practices by replacing disease-specific algorithms with a single general global CVD prediction tool," the authors said, adding that the validity in other populations should be evaluated in future studies.

Co-authors are Ramachandran S. Vasan, M.D.; Michael J. Pencina, Ph.D.; Philip A. Wolf, M.D.; Mark Cobain, Ph.D; Joseph M. Massaro, Ph.D.; and William B. Kannel, M.D.

The Framingham Study is funded by the National Heart, Lung, and Blood Institute.

Adapted from materials provided by American Heart Association.

http://www.sciencedaily.com:80/releases/2008/01/080122165609.htm

New Technique Safely Combines Programming Languages

ScienceDaily (Jan. 25, 2008) — Dutch computer scientist Martin Bravenboer has developed new techniques that make it easier to combine programming languages. Thanks to these techniques, software is no longer sensitive to the most common method of misuse by hackers: so-called injection attacks.

Until recently, it was difficult to combine programming languages. In his PhD thesis, Martin Bravenboer presents techniques that make it possible to combine programming languages in a safer and more reliable manner.

Software that makes use of these methods is no longer sensitive to the most common method of misuse by hackers: so-called injection attacks. Unlike previously proposed solutions for dealing with such attacks, Bravenboer's method provides absolute security, is simpler for the programmer to apply and can be used in all environments where injection attacks occur.

Consequently it is not just specific for the SQL database query language: the method can be applied to arbitrary combinations of embedded languages, without any additional effort being required from the programmer.

This project is being carried out within the Jacquard programme of NWO. Jacquard aims to strengthen the Dutch knowledge position in the area of software engineering by heavily involving the commercial sector in the direction scientific research should take. This is realised by simultaneously carrying out theoretical, empirical and experimental research.

Adapted from materials provided by Netherlands Organization for Scientific Research.

http://www.sciencedaily.com:80/releases/2008/01/080124092529.htm

Trailblazers Don't Always Come Out Ahead

ScienceDaily (Jan. 25, 2008) — It's not always best to be first, finds a new study from the Journal of Consumer Research. Researchers from Purdue, Indiana University, and UConn examine how consumers will evaluate new products when they are released by an existing brand (known as "brand extension"). They find that many products may actually benefit from having competition, entering the market as followers rather than as the first of its kind.

New types of products are constantly being developed and introduced. When a brand releases a product that has never been offered by any brand before, it is the "pioneer" product, and consumers can't evaluate it in the same way they evaluate existing products, the researchers explain. For example, Clorox was the pioneer brand for disinfectant wipes.

Other brands that then release similar products are termed "followers." Mr. Clean and Lysol both released disinfectant wipes after Clorox, and this research focuses on how people evaluate follower products differently than pioneer products.

Specifically, James L. Oakley (Purdue University), Adam Duhachek (Indiana University), Subramanian Balachander (Purdue University), and S. Sriram (University of Connecticut) reveal how to predict when a follower might actually enjoy more success than the pioneer, even though pioneer products often outperform follower products in the long term.

"Previous brand extension research . . . has focused on a static view, not a dynamic context when brand extensions enter a category sequentially," the researchers explain. "This dynamic view is more representative of how extensions are evaluated, reflecting a context-dependent perceptual model of extension evaluation based on the presence or absence of comparison brands."

In a series of experiments, the researchers find that pioneer products are generally evaluated by consumers based on their impressions of the parent brand. In other words, when deciding whether to try the disinfectant wipes, consumers ask themselves, "Do I trust the Clorox brand?"

However, once a type of product is already on the market, subsequent entries are judged more on the basis of "fit" with the parent brand, that is, whether it makes sense that this brand is releasing this type of product.

"The implications of the findings, within the parameters of our study context, are that low fit brands are best served to enter the market as a pioneer -- if the low fit brand is a later entrant, consumer evaluation of their brand extension is impacted negatively," the researchers explain."

They continue: "High fit brands, on the other hand, should not be deterred by the presence of a lower fit pioneer as the presence of a comparison brand of lower fit improves the evaluation of their extension relative to the singular evaluation context when entering as a pioneer."

Journal reference: James L. Oakley, Adam Duhachek, Subramanian Balachander, and S. Sriram, "Order of Entry and the Moderating Role of Comparison Brands in Brand Extension Evaluation." Journal of Consumer Research: February 2008.

Adapted from materials provided by University of Chicago Press Journals, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080123125601.htm

Nanotubes Help Advance Brain Tumor Research

Benham Badie, M.D., director of the Department of Neurosurgery and the Brain Tumor program at City of Hope, performs a minimally invasive procedure to surgically remove a pituitary tumor. Nanotube technology may help in the development of new treatments that would require only minimally invasive procedures no matter the location of the brain tumor. (Credit: City of Hope)

ScienceDaily (Jan. 24, 2008) — The potential of carbon nanotubes to diagnose and treat brain tumors is being explored through a partnership between NASA's Jet Propulsion Laboratory, Pasadena, Calif., and City of Hope, a leading cancer research and treatment center in Duarte, Calif.

Nanotechnology may help revolutionize medicine in the future with its promise to play a role in selective cancer therapy. City of Hope researchers hope to boost the brain's own immune response against tumors by delivering cancer-fighting agents via nanotubes. A nanotube is about 50,000 times narrower than a human hair, but it length can extend up to several centimeters.

If nanotube technology can be effectively applied to brain tumors, it might also be used to treat stroke, trauma, neurodegenerative disorders and other disease processes in the brain, said Dr. Behnam Badie, City of Hope's director of neurosurgery and of its brain tumor program.

"I'm very optimistic of how this nanotechnology will work out," he said. "We are hoping to begin testing in humans in about five years, and we have ideas about where to go next."

The Nano and Micro Systems Group at JPL, which has been researching nanotubes since about 2000, creates these tiny, cylindrical multi-walled carbon tubes for City of Hope.

City of Hope researchers, who began their quest in 2006, found good results: The nanotubes, which they used on mice, were non-toxic in brain cells, did not change cell reproduction and were capable of carrying DNA and siRNA, two types of molecules that encode genetic information.

JPL's Nano and Micro Systems Group grows the nanotubes on silicon strips a few square millimeters in area. The growth process forms them into hollow tubes as if by rolling sheets of graphite-like carbon.

Carbon nanotubes are extremely strong, flexible, heat-resistant, and have very sharp tips. Consequently, JPL uses nanotubes as field-emission cathodes -- vehicles that help produce electrons -- for various space applications such as x-ray and mass spectroscopy instruments, vacuum microelectronics and high-frequency communications.

"Nanotubes are important for miniaturizing spectroscopic instruments for space applications, developing extreme environment electronics, as well as for remote sensing," said Harish Manohara, the technical group supervisor for JPL's Nano and Micro Systems Group.

Nanotubes are a fairly new innovation, so they are not yet routinely used in current NASA missions, he added. However, they may be used in gas-analysis or mineralogical instruments for future missions to Mars, Venus and the Jupiter system.

JPL's collaboration with City of Hope began last year, after Manohara, Badie and Dr. Babak Kateb, City of Hope's former director of research and development in the brain tumor program, discussed using nanostructures to better diagnose and treat brain cancer. Badie said his team's nanomedical research continues, and the next goal will be to functionalize and attach inhibitory RNA to the nanotubes and deliver it to specific areas of the brain.

The JPL and City of Hope teams published the results of the study earlier this year in the journal NeuroImage.

Badie says that JPL's contribution to City of Hope's nanomedicine research has been invaluable.

"The fact that we can get pristine and really clean nanotubes from Manohara's department is unique," he said. "The fact that we are both collaborating for biological purposes is also really unique."

The collaboration between JPL and City of Hope is conducted under NASA's Innovative Partnership Program, designed to bring benefits of the space program to the public.

Adapted from materials provided by NASA/Jet Propulsion Laboratory.

http://www.sciencedaily.com:80/releases/2008/01/080123182213.htm

A Step Forward In Targeted Pain Therapy

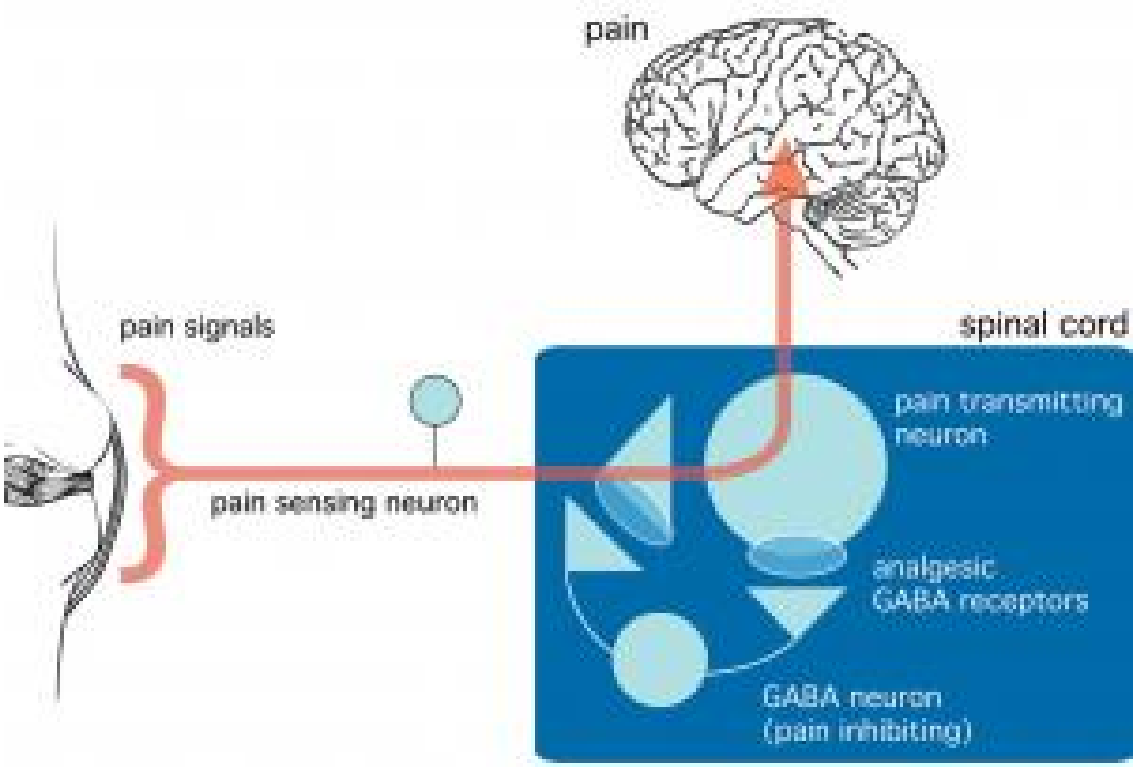


Diagram showing the pathway of pain from a joint to the brain. Pharmacological enhancement of spinal GABA receptor function inhibits the relay of pain signals to the brain. (Credit: Image courtesy of Swiss Federal Institute of Technology Zurich)

ScienceDaily (Jan. 24, 2008) — Our bodies sense painful stimuli through certain receptors located in the skin, in joints and many internal organs. Specialized nerve fibers relay these signals coming from the periphery to the brain, where pain becomes conscious. “The spinal cord is placed between these structures as kind of a pain filter”, says Hanns Ulrich Zeilhofer, Professor at the Institute of Pharmaceutical Sciences at ETH Zurich and at the Institute of Pharmacology and Toxicology of the University of Zurich.

That filter assures that pain is not evoked by everyday stimuli like light touch. This is accomplished by inhibitory nerve cells located in the spinal dorsal horn that release the messenger molecule-amino butyric acid (GABA) at specialized contacts between neighboring nerve cells, so-called synapses. GABA then activates chloride channels on those neighboring cells which relay the pain signals to the brain.

Activating pain inhibiting factors

In patients with chronic inflammatory diseases, such as rheumatoid arthritis or after nerve damage, for example following injuries, the pain inhibiting action of GABA becomes severely compromised. Pain signals are then conducted to the brain nearly unfiltered. Benzodiazepines, such as the sedative drug Valium®, which enhance the action of GABA, alleviate chronic pain when they are applied directly to the spinal cord via an injection into the spinal canal. In practice, however, such injections can only be done in very selected cases.

More often benzodiazepines are administered systemically, such as with tablets. In this instance, the benzodiazepines not only act in the spinal cord but also in the brain where they can have undesired, sometimes deleterious, effects on pain patients. The drugs cause sedation, impair memory, and can

even lead to addiction. In addition, during prolonged treatment their effect often fades with time. Classic benzodiazepines should therefore be avoided in chronic pain patients.

GABAA receptors as pain targets

It had been acknowledged for some time that GABA serves important functions in pain control. That benzodiazepines act on at least four different subtypes of GABA receptors was also known. Nonetheless, these receptors were largely neglected as potential targets for pain treatment.

The research team led by Ulrich Zeilhofer used genetically altered mice in experiments to target the GABA receptors that control spinal pain relay. They first induced a slight inflammation in one hind paw or irritated the sciatic nerve to induce pain. A few days later the mice received an injection of a benzodiazepine close to the spinal cord. Experiments with the mice allowed the researchers to identify two subtypes of GABAA receptors which mediate spinal pain control.

A challenge for drug design

For experiments with animals, drugs with the proposed receptor specificity are already available. Such experiments have confirmed that the pharmacological enhancement of spinal GABA receptor function inhibits the relay of pain signals to the brain. Further studies have also shown that these compounds did not lose their analgesic effects during prolonged treatment and did not lead to addiction.

Successful design of a drug that targets only those two subtypes of GABA receptors would be a big step forward in pain therapy. Chronic pain could be treated specifically and with fewer side effects. “The challenge is now for pharmaceutical companies to develop drugs that specifically target these receptors in humans”, says Zeilhofer.

Journal reference: "Reversal of pathological pain through specific spinal GABAA receptor subtypes" , Julia Knabl, Robert Witschi, Katharina Hösl, Heiko Reinold, Ulrike B. Zeilhofer, Seifollah Ahmadi, Johannes Brockhaus, Marina Sergejeva, Andreas Hess, Kay Brune, Jean-Marc Fritschy, Uwe Rudolph, Hanns Möhler & Hanns Ulrich Zeilhofer, Nature, Vol 451, 17 January 2008

Adapted from materials provided by Swiss Federal Institute of Technology Zurich, via AlphaGalileo.

http://www.sciencedaily.com:80/releases/2008/01/080121120828.htm

Cell Phone Sensors Detect Radiation To Thwart Nuclear Terrorism

Purdue physics professor Ephraim Fischbach, at right, and nuclear engineer Jere Jenkins review radiation-tracking data as part of research to develop a system that would use a network of cell phones to detect and track radiation. Such a system could help prevent terrorist attacks with radiological "dirty bombs" and nuclear weapons by blanketing the nation with millions of cell phones equipped with radiation sensors able to detect even light residues of radioactive material. Because cell phones already contain global positioning locators, the network of phones would serve as a tracking system. (Credit: Purdue News Service photo/David Umberger)

ScienceDaily (Jan. 24, 2008) — Researchers at Purdue University are working with the state of Indiana to develop a system that would use a network of cell phones to detect and track radiation to help prevent terrorist attacks with radiological "dirty bombs" and nuclear weapons.

Such a system could blanket the nation with millions of cell phones equipped with radiation sensors able to detect even light residues of radioactive material. Because cell phones already contain global positioning locators, the network of phones would serve as a tracking system, said physics professor Ephraim Fischbach. Fischbach is working with Jere Jenkins, director of Purdue's radiation laboratories within the School of Nuclear Engineering.

"It's the ubiquitous nature of cell phones and other portable electronic devices that give this system its power," Fischbach said. "It's meant to be small, cheap and eventually built into laptops, personal digital assistants and cell phones."

The system was developed by Andrew Longman, a consulting instrumentation scientist. Longman developed the software for the system and then worked with Purdue researchers to integrate the software with radiation detectors and cell phones. Cellular data air time was provided by AT&T.

The research has been funded by the Indiana Department of Transportation through the Joint Transportation Research Program and School of Civil Engineering at Purdue.

"The likely targets of a potential terrorist attack would be big cities with concentrated populations, and a system like this would make it very difficult for someone to go undetected with a radiological dirty bomb in such an area," said Longman, who also is Purdue alumnus. "The more people are walking around with cell phones and PDAs, the easier it would be to detect and catch the perpetrator. We are asking the public to push for this."

Tiny solid-state radiation sensors are commercially available. The detection system would require additional circuitry and would not add significant bulk to portable electronic products, Fischbach said.

The technology is unlike any other system, particularly because the software can work with a variety of sensor types, he said.

"Cell phones today also function as Internet computers that can report their locations and data to their towers in real time," Fischbach said. "So this system would use the same process to send an extra signal to a home station. The software can uncover information from this data and evaluate the levels of radiation."

The researchers tested the system in November, demonstrating that it is capable of detecting a weak radiation source 15 feet from the sensors.

"We set up a test source on campus, and people randomly walked around carrying these detectors," Jenkins said. "The test was extremely safe because we used a very weak, sealed radiation source, and we went through all of the necessary approval processes required for radiological safety. This was a source much weaker than you would see with a radiological dirty bomb."

Officials from the Indiana Department of Transportation participated in the test.

"The threat from a radiological dirty bomb is significant, especially in metropolitan areas that have dense populations," said Barry Partridge, director of INDOT's Division of Research and Development.

Long before the sensors would detect significant radiation, the system would send data to a receiving center.

"The sensors don't really perform the detection task individually," Fischbach said. "The collective action of the sensors, combined with the software analysis, detects the source. The system would transmit signals to a data center, and the data center would transmit information to authorities without alerting the person carrying the phone. Say a car is transporting radioactive material for a bomb, and that car is driving down Meridian Street in Indianapolis or Fifth Avenue in New York. As the car passes people, their cell phones individually would send signals to a command center, allowing authorities to track the source."

The signal grows weaker with increasing distance from the source, and the software is able to use the data from many cell phones to pinpoint the location of the radiation source.

"So the system would know that you were getting closer or farther from something hot," Jenkins said. "If I had handled radioactive material and you were sitting near me at a restaurant, this system would be sensitive enough to detect the residue. "

The Purdue Research Foundation owns patents associated with the technology licensed through the Office of Technology Commercialization.

In addition to detecting radiological dirty bombs designed to scatter hazardous radioactive materials over an area, the system also could be used to detect nuclear weapons, which create a nuclear chain reaction that causes a powerful explosion. The system also could be used to detect spills of radioactive materials.

"It's impossible to completely shield a weapon's radioactive material without making the device too heavy to transport," Jenkins said.

The system could be trained to ignore known radiation sources, such as hospitals, and radiation from certain common items, such as bananas, which contain a radioactive isotope of potassium.

"The radiological dirty bomb or a suitcase nuclear weapon is going to give off higher levels of radiation than those background sources," Fischbach said. "The system would be sensitive enough to detect these tiny levels of radiation, but it would be smart enough to discern which sources posed potential threats and which are harmless."

The team is working with Karen White, senior technology manager at the Purdue Research Foundation, to commercialize the system. For more information on licensing the cell phone sensor technology, contact White at (765) 494-2609

Adapted from materials provided by Purdue University.

http://www.sciencedaily.com:80/releases/2008/01/080122154415.htm

Scientists Create First Synthetic Bacterial Genome -- Largest Chemically Defined Structure Synthesized In The Lab

Top: Daniel G. Gibson, Ph.D., JCVI, lead author on synthetic M. genitalium publication. Bottom: Photo micrograph of synthetic Mycoplasma genitalium genome taken over a ~0.6 second period. (Credit: Images courtesy of J. Craig Venter Institute)

ScienceDaily (Jan. 24, 2008) — A team of 17 researchers at the J. Craig Venter Institute (JCVI) has created the largest man-made DNA structure by synthesizing and assembling the 582,970 base pair genome of a bacterium, Mycoplasma genitalium JCVI-1.0. This work, published online today in the journal Science by Dan Gibson, Ph.D., et al, is the second of three key steps toward the team's goal of creating a fully synthetic organism. In the next step, which is ongoing at the JCVI, the team will attempt to create a living bacterial cell based entirely on the synthetically made genome.

The team achieved this technical feat by chemically making DNA fragments in the lab and developing new methods for the assembly and reproduction of the DNA segments. After several years of work perfecting chemical assembly, the team found they could use homologous recombination (a process that cells use to repair damage to their chromosomes) in the yeast Saccharomyces cerevisiae to rapidly build the entire bacterial chromosome from large subassemblies.

"This extraordinary accomplishment is a technological marvel that was only made possible because of the unique and accomplished JCVI team," said J. Craig Venter, Ph.D., President and Founder of JCVI. "Ham Smith, Clyde Hutchison, Dan Gibson, Gwyn Benders, and the others on this team dedicated the last several years to designing and perfecting new methods and techniques that we believe will become widely used to advance the field of synthetic genomics."

The building blocks of DNA—adenine (A), guanine (G), cytosine (C) and thiamine (T) are not easy chemicals to artificially synthesize into chromosomes. As the strands of DNA get longer they get increasingly brittle, making them more difficult to work with. Prior to today's publication the largest synthesized DNA contained only 32,000 base pairs. Thus, building a synthetic version of the genome of the bacteria M. genitalium genome that has more than 580,000 base pairs presented a formidable

challenge. However, the JCVI team has expertise in many technical areas and a keen biological understanding of several species of mycoplasmas.

"When we started this work several years ago, we knew it was going to be difficult because we were treading into unknown territory," said Hamilton Smith, M.D., senior author on the publication. "Through dedicated teamwork we have shown that building large genomes is now feasible and scalable so that important applications such as biofuels can be developed."

Methods for Creating the Synthetic M. genitalium

The process to synthesize and assemble the synthetic version of the M. genitalium chromosome began first by resequencing the native M. genitalium genome to ensure that the team was starting with an error free sequence. After obtaining this correct version of the native genome, the team specially designed fragments of chemically synthesized DNA to build 101 "cassettes" of 5,000 to 7,000 base pairs of genetic code. As a measure to differentiate the synthetic genome versus the native genome, the team created "watermarks" in the synthetic genome. These are short inserted or substituted sequences that encode information not typically found in nature. Other changes the team made to the synthetic genome included disrupting a gene to block infectivity. To obtain the cassettes the JCVI team worked primarily with the DNA synthesis company Blue Heron Technology, as well as DNA 2.0 and GENEART.

From here, the team devised a five stage assembly process where the cassettes were joined together in subassemblies to make larger and larger pieces that would eventually be combined to build the whole synthetic M. genitalium genome. In the first step, sets of four cassettes were joined to create 25 subassemblies, each about 24,000 base pairs (24kb). These 24kb fragments were cloned into the bacterium Escherichia coli to produce sufficient DNA for the next steps, and for DNA sequence validation.

The next step involved combining three 24kb fragments together to create 8 assembled blocks, each about 72,000 base pairs. These 1/8th fragments of the whole genome were again cloned into E. coli for DNA production and DNA sequencing. Step three involved combining two 1/8th fragments together to produce large fragments approximately 144,000 base pairs or 1/4th of the whole genome.

At this stage the team could not obtain half genome clones in E. coli, so the team experimented with yeast and found that it tolerated the large foreign DNA molecules well, and that they were able to assemble the fragments together by homologous recombination. This process was used to assemble the last cassettes, from 1/4 genome fragments to the final genome of more than 580,000 base pairs. The final chromosome was again sequenced in order to validate the complete accurate chemical structure.

The synthetic M. genitalium has a molecular weight of 360,110 kilodaltons (kDa). Printed in 10 point font, the letters of the M. genitalium JCVI-1.0 genome span 147 pages.

"This is an exciting advance for our team and the field. However, we continue to work toward the ultimate goal of inserting the synthetic chromosome into a cell and booting it up to create the first synthetic organism," said Dan Gibson, lead author.

The research to create the synthetic M. genitalium JCVI-1.0 was funded by Synthetic Genomics, Inc.

Background/Key Milestones in JCVI's Synthetic Genomics Research

The work described by Gibson et al. has its genesis in research by Dr. Venter and colleagues in the mid-1990s after sequencing M. genitalium and beginning work on the minimal genome project. This area of research, trying to understand the minimal genetic components necessary to sustain life, began with M. genitalium because it is a bacterium with the smallest genome that we know of that can be grown in pure culture. That work was published in the journal Science in 1995.

In 2003 Drs. Venter, Smith and Hutchison made the first significant strides in the development of a synthetic genome by their work in assembling the 5,386 base pair bacteriophage ΦX174 (phi X). They did so using short, single strands of synthetically produced, commercially available DNA (known as oligonucleotides) and using an adaptation of polymerase chain reaction (PCR), known as polymerase cycle assembly (PCA), to build the phi X genome. The team produced the synthetic phi X in just 14 days.

In June 2007 another major advance was achieved when JCVI researchers led by Carole Lartigue, Ph.D., announced the results of work on genome transplantation methods allowing them to transform one type of bacteria into another type dictated by the transplanted chromosome. The work was published in the journal Science, and outlined the methods and techniques used to change one bacterial species, Mycoplasma capricolum, into another, Mycoplasma mycoides Large Colony (LC), by replacing one organism's genome with the other one's genome.

Genome transplantation was the first essential enabling step in the field of synthetic genomics as it is a key mechanism by which chemically synthesized chromosomes can be activated into viable living cells. Today's announcement of the successful synthesis of the M. genitalium genome is the second step leading to the next experiments to transplant a fully synthetic bacterial chromosome into a living organism and "boot up" the cell.

Ethical Considerations

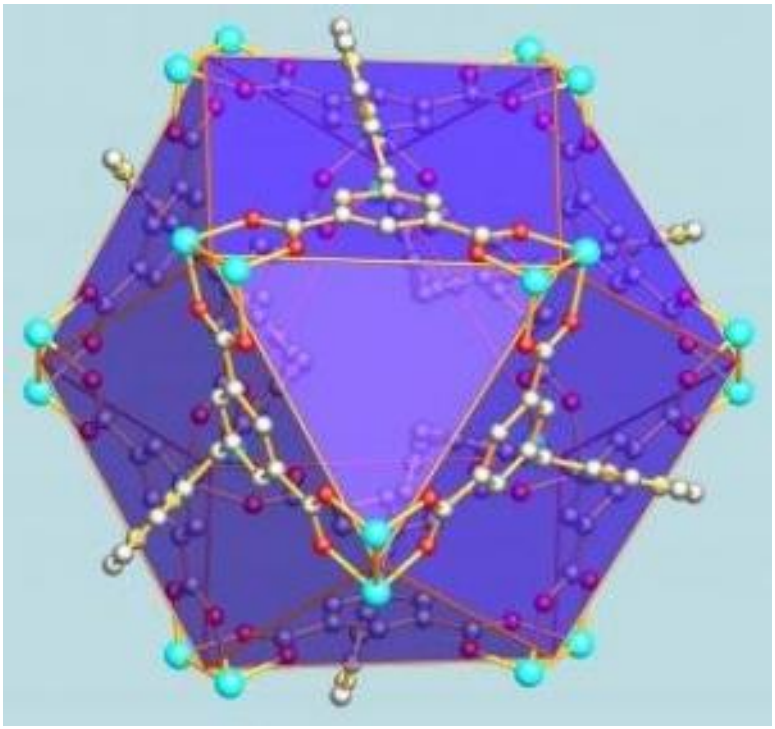
Since the beginning of the quest to understand and build a synthetic genome, Dr. Venter and his team have been concerned with the societal issues surrounding the work. In 1995 while the team was doing the research on the minimal genome, the work underwent significant ethical review by a panel of experts at the University of Pennsylvania (Cho et al, Science December 1999:Vol. 286. no. 5447, pp. 2087 – 2090). The bioethical group's independent deliberations, published at the same time as the scientific minimal genome research, resulted in a unanimous decision that there were no strong ethical reasons why the work should not continue as long as the scientists involved continued to engage public discussion.

Dr. Venter and the team at JCVI continue to work with bioethicists, outside policy groups, legislative members and staff, and the public to encourage discussion and understanding about the societal implications of their work and the field of synthetic genomics generally. As such, the JCVI's policy team, along with the Center for Strategic & International Studies (CSIS), and the Massachusetts Institute of Technology (MIT), were funded by a grant from the Alfred P. Sloan Foundation for a 20-month study that explored the risks and benefits of this emerging technology, as well as possible safeguards to prevent abuse, including bioterrorism. After several workshops and public sessions the group published a report in October 2007 outlining options for the field and its researchers.

Adapted from materials provided by J. Craig Venter Institute.

http://www.sciencedaily.com:80/releases/2008/01/080124175924.htm

New Methane Storage Technology Exceeds DOE Goals



This colorful image represents a nano-sized crystalline cage that shows promise as a superior storage material for methane. (Credit: Courtesy of Shengqian Ma, Miami University)

ScienceDaily (Jan. 24, 2008) — In a major advance in alternative fuel technology, researchers report development of a sponge-like material with the highest methane storage capacity ever measured. It can hold almost one-third more methane than the U.S. Department of Energy's (DOE) target level for methane-powered cars, they report in a new study.

Hong-Cai Zhou and colleagues note that lack of an effective, economical and safe on-board storage system for methane gas has been one of the major hurdles preventing methane-driven automobiles from competing with traditional ones.Methane stands out among various alternative fuels when its profusion and availability are considered. However, the lack of an effective, economic and safe on-board storage system is one of the major technical barriers preventing methane-driven automobiles from competing with the traditional ones, say the study authors.

Recently, highly-porous, crystalline materials called metal-organic frameworks (MOFs) have emerged as promising storage materials due to their high surface areas. However, none of the MOF compounds have reached DOE target levels considered practical for fuel storage applications, the scientists say.The report describes development of a new type of MOF, called PCN-14, that has a high surface area of over 2000 m2/g. Laboratory studies show that the compound, composed of clusters of nano-sized cages, has a methane storage capacity 28 percent higher than the DOE target, a record high for methane-storage materials, the researchers say.The article "Metal-Organic Framework from an Anthracene Derivative Containing Nanoscopic Cages Exhibiting High Methane Uptake" is scheduled for the Jan. 23 issue of ACS' Journal of the American Chemical Society.

Adapted from materials provided by American Chemical Society.

http://www.sciencedaily.com:80/releases/2008/01/080121101027.htm

Newly Discovered Active Fault Building New Dalmatian Islands Off Croatian Coast

Dubrovnik, a walled city on the southern Adriatic Sea that is a UNESCO-designated World Heritage site. The Dalmatian Islands, some of which are visible in the background, represent a growing fold-and-thrust belt that is rising from the Adriatic Sea. (Credit: Richard A. Bennett)

ScienceDaily (Jan. 24, 2008) — A newly identified fault that runs under the Adriatic Sea is actively building more of the famously beautiful Dalmatian Islands and Dinaride Mountains of Croatia, according to a new research report.

Geologists had previously believed that the Dalmatian Islands and the Dinaride Mountains had stopped growing 20 to 30 million years ago.

From a region northwest of Dubrovnik, the new fault runs northwest at least 200 km (124 miles) under the sea floor. The Croatian coast and the 1,185 Dalmatian Islands are an increasing popular tourist destination. Dubrovnik, known as "the Pearl of the Adriatic," is a UNESCO-designated World Heritage site.

At the fault, the leading edge of the Eurasian plate is scraping and sliding its way over a former piece of the African plate called the South Adria microplate, said lead researcher Richard A. Bennett of The University of Arizona in Tucson.

"It's a collision zone," said Bennett, a UA assistant professor of geosciences. "Two continents are colliding and building mountains."

Bennett and his colleagues found that Italy's boot heel is moving toward the Croatian coast at the rate of about 4 mm (0.16 inches) per year. By contrast, movement along parts of California's San Andreas fault can be 10 times greater.

The region along the undersea fault has no evidence of large-magnitude earthquakes occurring in the last 2,000 years. However, if the fault is the type that could move abruptly and cause earthquakes, tsunami calculations for the region need to be redone, he said.

"It has implications for southern Italy, Croatia, Montenegro and Albania."

At its southern end, the newly identified fault connects to a seismically active fault zone further south that caused a large-magnitude earthquake in Dubrovnik in 1667 and a magnitude 7.1 earthquake in Montenegro in 1979.

Geologists have been trying to figure out how the collision between the African and Eurasian continents is being played out in the Mediterranean.

Bennett was studying the geology of Italy's Alps and Apennine Mountains and realized he needed to know more about the mountains on the other side of the Adriatic.

Bennett and his colleagues published their article, "Eocene to present subduction of southern Adria mantle lithosphere beneath the Dinarides," in the January issue of the journal Geology. His co-authors are UA geoscientists Sigrún Hreinsdóttir and Goran Buble; Tomislav Bašiæ of the University of Zagreb and the Croatian Geodetic Institute; Željko Baèiæ and Marijan Marjanoviæ of the Croatian State Geodetic Administration in Zagreb; Gabe Casale, Andrew Gendaszek and Darrel Cowan of the University of Washington in Seattle.

The research was funded by the Croatian Geodetic Administration and the U.S. National Science Foundation.

The Croatian mountains and coasts are relatively understudied, in part because of years of political turmoil in the region, he said. So he teamed up with Croatian geologists.

Bennett is an expert in a technique called geodesy that works much like the GPS in a car.

"We put GPS units on rocks and watch them move around," he said. "We leave an antennae fixed to a rock and record its movement all the time. We basically just watch it move."

Just as the GPS in a rental car uses global positioning satellites to tell where the car is relative to a desired destination, the geodesy network can tell where one antenna and its rock are relative to another antenna.

Recent improvements in the technology make it possible to see very small movements of the Earth. He said, "In Croatia we can resolve motions at the level of about one mm per year."

The researchers found that the motion between Italy's boot heel and Eurasia is absorbed at the Dinaride Mountains and Dalmatian Islands.

Combining geodetic data with other geological information revealed that the movement is accommodated by a previously unknown fault under the Adriatic.

Bennett likens movement of the Eurasian plate to a snowplow blade piling up snow in front of it. The snow represents the sea floor being pushed up to form the Dalmatian Islands and the Dinaride Mountains.

"You can see hints of new islands out there," he said.

But those islands may not provide seaside vacations forever. Bennett said the Adriatic Sea is closing up at the rate of 4.5 km (2.8 miles) per million years. If things continue as they are now, he calculates the eastern and western shores of the Adriatic Sea will meet in about 50 to 70 million years.

"This new finding is an important piece in the puzzle to understanding Mediterranean tectonics," he said.

He plans to set out more antennas to learn more about current movement of the region and to figure out what the fault has been doing for the past 40 million years.

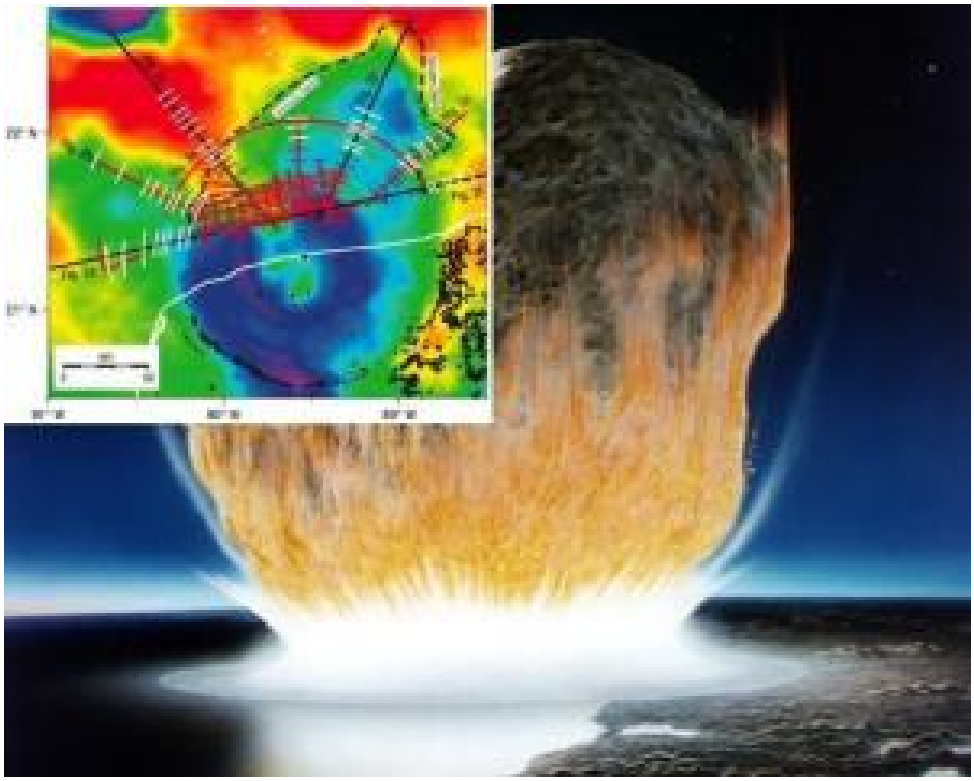
The additional information will also help gauge the region's earthquake potential.

Bennett said, "We want to see if the fault is freely slipping or is accumulating strain and therefore may produce a large earthquake in the future."

Adapted from materials provided by University of Arizona.

http://www.sciencedaily.com:80/releases/2008/01/080122154347.htm

Seismic Images Show Dinosaur-killing Meteor Made Bigger Splash



A new study reveals that the asteroid that killed the dinosaurs landed in deeper water than once thought, perhaps explaining why its effects were so severe. Inset: 1996 (black) and 2005 (red) seismic surveys are shown over the Bouguer gravity anomaly map showing the buried Chicxulub impact crater. (Credit: Map from Nature Geoscience / Illustration courtesy of NASA)

ScienceDaily (Jan. 24, 2008) — The most detailed three-dimensional seismic images yet of the Chicxulub crater, a mostly submerged and buried impact crater on the Mexico coast, may modify a theory explaining the extinction of 70 percent of life on Earth 65 million years ago.

The Chicxulub crater was formed when an asteroid struck on the coast of the Yucatan Peninsula. Most scientists agree the impact played a major role in the "KT Extinction Event" that caused the extinction of most life on Earth, including the dinosaurs.

According to Sean Gulick, a research scientist at the Institute for Geophysics at The University of Texas at Austin's Jackson School of Geosciences and principal investigator for the project, the new images reveal the asteroid landed in deeper water than previously assumed and therefore released about 6.5 times more water vapor into the atmosphere.

The impact site also contained sulfur-rich sediments called evaporites, which would have reacted with water vapor to produce sulfate aerosols. According to Gulick, an increase in the atmospheric concentration of the compounds could have made the impact deadlier in two ways: by altering climate (sulfate aerosols in the upper atmosphere can have a cooling effect) and by generating acid rain (water vapor can help to flush the lower atmosphere of sulfate aerosols, causing acid rain). Earlier studies had suggested both effects might result from the impact, but to a lesser degree.

"The greater amount of water vapor and consequent potential increase in sulfate aerosols needs to be taken into account for models of extinction mechanisms," says Gulick.

An increase in acid rain might help explain why reef and surface dwelling ocean creatures were affected along with large vertebrates on land and in the sea. As it fell on the water, acid rain could have

turned the oceans more acidic. There is some evidence that marine organisms more resistant to a range of pH survived while those more sensitive did not.

Gulick says the mass extinction event was probably not caused by just one mechanism, but rather a combination of environmental changes acting on different time scales, in different locations. For example, many large land animals might have been baked to death within hours or days of the impact as ejected material fell from the sky, heating the atmosphere and setting off firestorms. More gradual changes in climate and acidity might have had a larger impact in the oceans.

Gulick and collaborators originally set out to learn more about the trajectory of the asteroid. They had hoped the crater's structure in the subsurface would hold a tell-tale signature. Instead, the structure seemed to be most strongly shaped by the pre-impact conditions of the target site.

"We discovered that the shallow structure of the crater was determined much more by what the impact site was like before impact than by the trajectory of the impactor," says Gulick.

If scientists can determine the trajectory, it will tell them where to look for the biggest environmental consequences of impact, because most of the hazardous, shock-heated and fast-moving material would have been thrown out of the crater downrange from the impact.

Researchers at Imperial College in London are already using computer models to search for possible signatures in impact craters that could indicate trajectory regardless of the initial surface conditions at the impact site.

"As someone who simulates impact events using computers, this work provides valuable new constraints on both the pre-impact target structure and the final geometry of the cratered crust at Chicxulub," says Gareth Collins, a research fellow at Imperial College.

The study "Importance of pre-impact crustal structure for the asymmetry of the Chicxulub impact crater" appears in the February 2008 print edition of the journal Nature Geoscience.

Collaborators on the project included Gail Christeson of the Institute for Geophysics, Penny Barton at the University of Cambridge, Joanna Morgan and Mike Warner at Imperial College, and several graduate students.

Adapted from materials provided by University of Texas at Austin.

http://www.sciencedaily.com:80/releases/2008/01/080123125543.htm