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American Chemical Society

American Chemical Society's Weekly PressPac -- May 20, 2009

ARTICLE #1 FOR IMMEDIATE RELEASE

An advance in solving the mysterious machine-workers' disease
Journal of Proteome Research

IMAGE: Scientists are reporting an advance toward solving a mysterious machine-workers' disease.
Click here for more information.

Scientists in Ohio are reporting a long-awaited advance toward making the workplace safer for more than one million machinists in the United States who may be exposed to disease-causing bacteria in contaminated metalworking fluids. Those fluids become airborne during machining of metal parts. The study appears in the current edition of ACS' monthly *Journal of Proteome Research*.

In the report, Jagjit S. Yadav and colleagues note that a bacterium called *Mycobacterium immunogenum* (*M. immunogenum*) was first identified in 2000 as the potential cause of a mysterious disease that had been occurring among machinists. The illness, called hypersensitivity pneumonitis (HP), is an inflammation of the lung resulting from the body's immune reaction to bacteria, mold, and other airborne particles. At HP outbreak sites, *M. immunogenum* is known to colonize metalworking fluids, used to cool the cutting tools that grind metals. Workers inhale the infected particles as they spray into the air from drills and other cutting tools. HP's symptoms include fever, cough, shortness of breath and chills.

The scientists describe their first-of-its kind identification of 33 proteins in *M. immunogenum* that seem to be involved in triggering the immune response likely responsible for HP. Those proteins could serve as the basis for a test to identify workplace contamination with *M. immunogenum*, and targets for developing medications or vaccines to treat and prevent the condition, the study says.

ARTICLE #1 FOR IMMEDIATE RELEASE
"Immunoproteomic Identification of Secretory and Subcellular Protein Antigens and Functional Evaluation of the Secretome Fraction of Mycobacterium immunogenum, a Newly Recognized Species of the *Mycobacterium chelonae* — *Mycobacterium abscessus* Group"

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http://pubs.acs.org/stoken/presspac/presspac/full/10.1021/pr8009462

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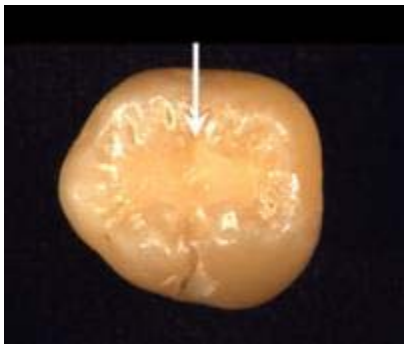

IMAGE: Researchers are reporting progress toward a stronger material for dental cavities using ingredients from the human body. Arrow points to a filling made of "composite. "

Click here for more information.

ARTICLE #2 FOR IMMEDIATE RELEASE

Stronger material for filling dental cavities has ingredients from human body
ACS Applied Materials & Interfaces

Scientists in Canada and China are reporting development of a new dental filling material that substitutes natural ingredients from the human body for controversial ingredients in existing "composite," or plastic, fillings. The new material appears stronger and longer lasting as well, with the potential for reducing painful filling cracks and emergency visits to the dentist, the scientists say. Their study appears in the current edition of *ACS Applied Materials & Interfaces*, a monthly journal.

Julian X.X. Zhu and colleagues point out that dentists increasingly are using white fillings made from plastic, rather than "silver" dental fillings. Those traditional fillings contain mercury, which has raised health concerns among some consumers and environmental issues in its production. However, many plastic fillings contain controversial ingredients (such as BisGMA) linked to premature cracking of fillings and slowly release bisphenol A, a substance considered as potentially toxic to humans and to the environment.

The scientists developed a dental composite that does not contain these ingredients. Instead, it uses "bile acids," natural substances produced by the liver and stored in the gallbladder that help digest fats. The researchers showed in laboratory studies that the bile acid-derived resins form a hard, durable plastic that resists cracking better than existing composites.

ARTICLE #2 FOR IMMEDIATE RELEASE
"New Dental Composites Containing Multimethacrylate Derivatives of Bile Acids: A Comparative Study with Commercial Monomers"

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http://pubs.acs.org/stoken/presspac/presspac/full/10.1021/am8002395

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ARTICLE #3 FOR IMMEDIATE RELEASE

Long-sought way to make "nano-raspberries" may fight foggy windows and eyeglasses

The Journal of Physical Chemistry C

In an advance toward preventing car windshields and eyeglasses from fogging up, researchers in China are reporting development of a new way to make raspberry-shaped nanoparticles that can give glass a permanent antifogging coating. Their study is scheduled for the June 11 edition of ACS' *The Journal of Physical Chemistry C*, a weekly publication.

Junhui He and colleagues note that researchers have been working on anti-fog technology for years. Fogged-up windows are a safety hazard and a nuisance that affect millions of people. Existing technology, including sprays that must be reapplied to stay effective, has many drawbacks. Researchers knew that raspberry-shaped nanoparticles could be the ideal solution by disrupting the process in which water droplets fog glass. Until now, however, there has been no commercially feasible way to make these particles.

The scientists describe an efficient one-step method for making nano-raspberries. In laboratory studies, the researchers coated glass slides with the particles, cooled the slide, and then exposed it to steam. Unlike ordinary glass, it remained crystal clear, opening the door to possible commercial applications, the researchers say.

ARTICLE #3 FOR IMMEDIATE RELEASE
"Facile Fabrication of Raspberry-like Composite Nanoparticles and Their Application as Building Blocks for Constructing Superhydrophilic Coatings"

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ARTICLE #4 FOR IMMEDIATE RELEASE

New memory material may hold data for one billion years
Nano Letters

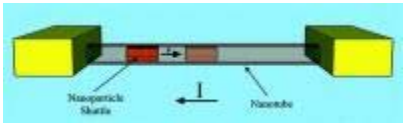

IMAGE: Scientists are reporting an advance toward a memory device capable of storing data for more than one billion years.
Click here for more information.

Packing more digital images, music, and other data onto silicon chips in USB drives and smart phones is like squeezing more strawberries into the same size supermarket carton. The denser you pack, the quicker it spoils. The 10 to 100 gigabits of data per square inch on today's memory cards has an estimated life expectancy of only 10 to 30 years. And the electronics industry needs much greater data densities for tomorrow's iPods, smart phones, and other devices.

Scientists are reporting an advance toward remedying this situation with a new computer memory device that can store thousands of times more data than conventional silicon chips with an estimated lifetime of more than one billion years. Their discovery is scheduled for publication in the June 10 issue of ACS' *Nano Letters*, a monthly journal.

Alex Zettl and colleagues note in the new study that some of today's highest-density experimental storage media can retain ultra-dense data for only a fraction of a second. They note that William the Conqueror's Doomsday Book, written on vellum in 1086 AD, has survived 900 years. However, the medium used for a digital version of the book, encoded in 1986, failed within 20 years.

The researchers describe development of an experimental memory device consisting of an iron nanoparticle (1/50,000 the width of a human hair) enclosed in a hollow carbon nanotube. In the presence of electricity, the nanoparticle can be shuttled back and forth with great precision. This creates a programmable memory system that, like a silicon chip, can record digital information and play it back using conventional computer hardware. In lab and theoretical studies, the researchers showed that the device had a storage capacity as high as 1 terabyte per square inch (a trillion bits of information) and temperature-stability in excess of one billion years.

ARTICLE #4 FOR IMMEDIATE RELEASE
"Nanoscale Reversible Mass Transport for Archival Memory"

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http://pubs.acs.org/stoken/presspac/presspac/full/10.1021/nl803800c

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ARTICLE #5 EMBARGOED FOR 9 A.M., EASTERN TIME, May 25, 2009

Long-forgotten research may yield new malaria treatments
Chemical & Engineering News

An unlikely friendship between a 94-year-old retired scientist and a biochemist at Rutgers University has lead to the revival of a World War II-era research program to develop new drugs against malaria, the deadly mosquito-borne disease that kills almost one million people annually, according to an article scheduled for the May 25 issue of *Chemical & Engineering News*, ACS' weekly newsmagazine.

C&EN senior editor Lisa Jarvis explains in the article that existing anti-malaria drugs are losing effectiveness as the parasite responsible for the disease develops resistance. The article describes how the retired Merck researcher provided a long forgotten 1947 research paper detailing the company's early efforts to identify and test tropical plants that might fight malaria. Though the paper described some 600 plants that showed promise against the disease, scientists never pursued a more rigorous program to study the plants.

Armed with public and private funding, a biochemist at Rutgers is now resurrecting this research project. University scientists have already identified 60 promising plants from the group and found at least 10 active substances that could be turned into promising drugs. Chemists will eventually try to make the most active substances more potent, last longer, and minimize their side-effects, the article notes.

ARTICLE #5 EMBARGOED FOR 9 A.M., EASTERN TIME, May 25, 2009
"Research resurrection"

This story will be available on May 25 at: http://pubs.acs.org/cen/business/87/8721bus2.html

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Journalists' Resources

Save the Date: ACS August National Meeting
Join more than 11,000 scientists expected to gather in Washington, D. C., Aug. 16-20 for one of the year's largest and most important scientific conferences. The 238th National Meeting of the American Chemical Society will feature 8,000 reports on new discoveries about chemistry, medicine, health, food, fuels, the environment and other topics. For advance complimentary news media registration: https://www.xpressreg.net/register/acsf089/media/start.asp.

Press releases, briefings, and more from ACS' 237th National Meeting
www.eurekalert.org/acsmeet.php.
http://www.ustream.tv/channel/acslive.

Must-reads from C&EN: Drug firms take a hit in first quarter
The world-wide economic crisis took a toll on drug companies in the first quarter of 2009. In an industry used to healthy, single-digit growth rates, the statistics were not good. Combined quarterly sales for the world's leading 13 pharmas dropped about1 percent and earnings rose by only 1.3 percent. No drug companies lost money, but double digit earnings declines at some top firms raised warning flags. For a free copy of this C&EN story about pharma companies' economic problems, send an e-mail to m_bernstein@acs.org.

ACS pressroom blog
The American Chemical Society's Office of Public Affairs (OPA) has created a new pressroom blog to highlight prominent research from ACS' 34 journals. The blog includes daily commentary on the latest news from the weekly PressPac, including video and audio segments from researchers on topics covering chemistry and related sciences, including nanotechnology, food science, materials science and the environment. The pressroom blog will also cover updates on ACS' awards, the national meetings and other general news from the world's largest scientific society.

Bytesize Science blog
Educators and kids, put on your thinking caps: The American Chemical Society has new blog for Bytesize Science, a science podcast for kids of all ages. The Bytesize blog contains entertaining video podcasts and audio episodes of the latest and greatest news from the frontiers of chemistry, including a video detailing a discovery about the bug-eating pitcher plant and an audio episode on a new use for magnolia tree bark.

ACS satellite pressroom: Daily news blasts on Twitter
The American Chemical Society's Office of Public Affairs (OPA) new satellite press room has quickly become one of the most popular science news sites on Twitter with daily updates on the latest research from ACS' 34 peer-reviewed journals and other news, including links to compelling podcast series, information on the upcoming 237th National Meeting, and the latest recipients of ACS' national awards. To receive press room updates, create a free account at https://twitter.com/signup. Then visit http://twitter.com/ACSpressroom and click the 'join' button beneath the press room logo.

ACS Press Releases
General science press releases on a variety of chemistry-related topics.

General Chemistry Glossary
http://antoine.frostburg.edu/chem/senese/101/glossary.shtml

New CAS Web site on everyday chemicals
Whether you want to learn more about caffeine, benzoyl peroxide (acne treatment), sodium chloride (table salt), or some other familiar chemical, CAS Common Chemistry can help. The new Web site provides non-chemists and others with useful information about everyday chemicals by searching either a chemical name or a corresponding CAS Registry Number. The site currently contains approximately 7,800 chemicals of general interest as well as all 118 elements from the periodic table, providing alternative names, molecular structures, a Wikipedia link, and other information.

From Chemical Abstracts Service (CAS)
CAS Science Connections is a series of articles that showcases the value of CAS databases in light of important general-interest science and technology news. Ranging in topics from fruit flies to Nobel Prize winners, the CAS - Science Connections series points to the CAS databases for a more complete understanding of the latest news.

Save the Date: Green Chemistry conference on sustainability begins June 23
Jean-Michel Cousteau, noted explorer, film-producer and environmentalist, and Len Sauers, Ph.D., Vice President of Global Sustainability for The Procter & Gamble Company, are the featured keynote speakers at the upcoming 13th annual Green Chemistry & Engineering Conference in June in College Park, Md. The focus of this year's conference, June 23-25 at the Marriott Inn and Conference Center, is on progress made toward research objectives identified in the National Academy of Sciences' 2006 report, "Sustainability in the Chemical Industry: Grand Challenges and Research Needs." Sauers will address the convention on June 24, Cousteau on June 25. For more information on the conference, please visit http://www.gcande.org/.

Podcasts

Global Challenges/Chemistry Solutions
Don't miss this special series of ACS podcasts on some of the 21st Century's most daunting challenges, and how cutting-edge research in chemistry matters in the quest for solutions. This sweeping panorama of challenges includes topics such as providing a hungry, thirsty world with ample supplies of safe food and clean water; developing alternatives to petroleum to fuel the global economy; preserving the environment and assuring a sustainable future for our children; and improving human health. Launched in 2008, this award-winning series continues in 2009 with updates and fresh content. Subscribe to Global Challenges using iTunes or listen and access other resources at the ACS web site www.acs.org/GlobalChallenges.

Bytesize Science, a new podcast for young listeners
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The American Chemical Society is a nonprofit organization chartered by the U.S. Congress. With more than 154,000 members, ACS is the world's largest scientific society and a global leader in providing access to chemistry-related research through its multiple databases, peer-reviewed journals and scientific conferences. Its main offices are in Washington, D.C., and Columbus, Ohio.

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