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Saliva spits out chemical exposure information

Home testing of saliva to measure personal hormone levels is gaining popularity with dozens of companies offering do-it-yourself, mail-in test kits. Scientists at Pacific Northwest National Laboratory envision a day when it may be nearly as easy to detect chemical exposure or even nerve gas poisoning—simply by analyzing a victim's saliva. And the results would be almost immediate.

Using sophisticated mass spectrometry equipment, PNNL researchers have been able to identify a common pesticide based on the breakdown products in the saliva of rats exposed to known amounts of the pesticide. The researchers are working now to develop a simpler, portable microanalytical sensor system to quickly diagnose pesticide exposure in humans and a modeling method that can estimate the dose. Researchers say the technology could be adapted to test for a variety of contaminants, including chemical warfare agents. For more information, see PNNL's Web site at **http://www.pnl.gov/news/2003/03-39.htm**.

Sky-high icebergs carried boulders from Rockies to Washington state

Geologists have uncovered a scene in the Pasco Basin of south-central Washington that shows how boulders piggybacked icebergs from what is now Montana and came to rest at elevations as high as 1,200 feet.

The rocks were left after ice dams near Missoula, Mont., broke, re-formed and broke again from 1 million to 2 million years ago to as recently as 13,000 years ago. The floodwaters backed up behind Wallula Gap, a narrow opening through which the Columbia River flows today. Rattlesnake Mountain was the highest peak protruding from the 800-foot-deep temporary body of water, dubbed Lake Lewis. The rocks and boulders were left as Lake Lewis receded after a few days like a slowly draining bathtub.

PNNL scientists surveyed and analyzed the mostly granite-strewn debris fields over 15 square miles of Rattlesnake Mountain, discovering rafted rocks as long as 14 feet. Certain types of rock were concentrated along northeast-running gullies. Scientists think that the speed of the flowing water varied as it crossed an uneven surface, and that may have created eddies that forced an ice jam in the deeper, quieter waters at the back of these gullies. Certain types of rocks decreased in number as the surveyors worked up the mountainside, possibly indicating there were smaller successive floods. To read more about this research see PNNL's Web site at **http://www.pnl.gov/news/2003/03-41.htm**.

PNNL scientist discusses future hydrogen economy

Pacific Northwest National Laboratory's Moe Khaleel recently discussed the possibilities and the obstacles to a future hydrogen economy during a lecture at Columbia Basin College in Pasco, Wash. Khaleel, director of the Laboratory's hydrogen and transportation programs, talked about his energy vision for the future—a world where cars, trucks, homes and businesses run on emissions-free hydrogen. Fuel cells—devices that transform hydrogen and oxygen into electricity and water—are the technology that will make this vision possible. But first, Khaleel said, economic and technical barriers to the hydrogen economy, such as fuel cell cost and hydrogen storage in vehicles, must be overcome. To see an article on Khaleel's lecture, visit the Tri-City Herald Web site at **http://www.tricityherald.com/tch/business/story/4206999p-4219278c.html**.

New material drinks up mercury

A new material for "absorbing" mercury from low-volume waste streams has surpassed developers' expectations at Pacific Northwest National Laboratory. Thiol-SAMMS' mercury-absorbing capabilities were tested at PNNL this year and at DOE's Oak Ridge National Laboratory earlier. Thiol-SAMMS is an easy-to-use technology that absorbs mercury in liquids and can be easily disposed of afterwards. Lab scientists predict that thiol-SAMMS will result in huge savings to users who are faced with costly disposal of mercury in the waste stream. Ninety-nine percent of thiol-SAMMS' mercury-absorbing action takes place in the first five minutes, making it significantly faster than commercially available sorbents. Thiol-SAMMS can absorb 60 percent of its weight in mercury and the SAMMS technology can be custom designed to seek out a variety of contaminants, including radionuclides. Thiol-SAMMS is now available for low-volume waste streams and researchers are working on an engineered form of thiol-SAMMS for large-volume waste streams.

Nerve gas fingerprints etched in light

In 1995 hundreds of Tokyo subway rescuers were exposed to sarin, a deadly nerve gas, hours before police confirmed its identity. Earlier this year, soldiers in Iraq worried about a similar fate. Pacific Northwest National Laboratory scientists have now come up with a way to warn commuters, emergency crews and troops about a toxic gas release. A device called a high resolution infrared spectrometer can be pointed at a suspect cloud to read light emitted and absorbed. Thanks to PNNL's highly precise catalog of chemical-agent spectral signatures, the instrument detects from the light the presence of sarin, soman, VX, mustard gas and other common nerve and blistering agents. National Institute of Standards and Technology researchers collaborated on recent tests of the PNNL system at Utah's Dugway Proving Ground.

Two PNNL researchers elected AAAS Fellows

Two researchers from Pacific Northwest National Laboratory have been elected Fellows of the American Association for the Advancement of Science (AAAS).

Tom Ackerman

Tom Ackerman and Paul Ellis, both of PNNL's Fundamental Science Directorate, were elected as members whose "efforts on behalf of the advancement of science or its applications are scientifically or socially distinguished." AAAS began recognizing its distinguished members with the distinctive honor of Fellow in 1874.

Ackerman, a Battelle Fellow and chief scientist for DOE's Atmospheric Radiation Measurement (ARM) program, is being recognized for pioneering studies of radiative properties of aerosols, for developing millimeter-wave radar for measuring cloud properties and for technical leadership of the nation's principal atmospheric radiation research program. Ackerman joined PNNL in 1999 after serving as a professor of meteorology at Penn State University and a research scientist at the NASA Ames Research Center in California.

Paul Ellis

Ellis, a Laboratory Fellow, is being honored for contributions to the field of multinuclear magnetic resonance spectroscopy and its applications to bioinorganic chemistry, short-range structure and bonding and chemical catalysis. Following a 23-year career as a member of the chemistry faculty at the University of South Carolina, he joined PNNL in 1993 to lead the development and commissioning of the magnetic resonance instrumentation laboratories at the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL). The EMSL's magnetic resonance laboratory is recognized as being world-class in its capability and in the expertise of its staff. For more information see PNNL's Web site at **http://www.pnl.gov/news/2003/03-40.htm**.

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