



## Sweet DREAMS: Powerful Mass Spectrometry Method Awarded Patent

A trio of researchers—one from EMSL and two who are past or present staff members of the Pacific Northwest National Laboratory (PNNL)—were recently awarded U.S. Patent 6,787,760 for development of a powerful proteomic mass spectrometry technique that enables researchers to analyze more proteins in less time and with greater accuracy, while obtaining a more thorough understanding of important cellular processes.

The patented technique—Dynamic Range Enhancement Applied to Mass Spectrometry, or DREAMS—was developed by Harold Udseth, Technical Group Leader of EMSL's High-Performance Mass Spectrometry Facility; PNNL researcher Richard D. Smith, a frequent EMSL user; and former PNNL staff scientist Mikhail Belov, who now works in the private sector.

DREAMS—particularly suited for ion cyclotron resonance or Fourier transform ion cyclotron resonance mass spectrometry applications—uses components such as arbitrary waveform generators, quadrupole ion filters, and high-speed computational technology to automatically enhance signals from proteins that exist in small quantities. Proteins in fewer numbers often provide researchers with clues to important cellular processes, such as how diseases develop. Thus, DREAMS works by first generating a mass spectrum, and then trapping and selectively ejecting multiple ions using resonant radio frequency excitation in the quadrupole ion filter based on information from the previous spectrum.

Under development for the past three years, DREAMS allows researchers to obtain nearly twice the proteomic information in a single experiment than other mass spectrometry methods and is key to identifying the low-level proteins that the other methods normally miss. Its developers are now working to implement DREAMS more routinely into research performed at EMSL.

Combined, Belov, Smith, and Udseth have been awarded more than 20 patents. DREAMS was developed at EMSL for the U.S. Department of Energy's Office of Biological and Environmental Research.

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