

Research Spotlight

Lasers, explosions, and a new patent on precision



Laser blasters and ion explosions are no longer relegated to video games and science fiction movies. In fact, thanks to two professors in the Department of Pharmacology and Toxicology, they could soon revolutionize the way many diseases are diagnosed and treated.

In February, Khalid M. Elased, R.Ph., Ph.D., assistant professor of pharmacology

and toxicology, and Mariana Morris, Ph.D., professor and chair of pharmacology and toxicology, received a patent for a new enzyme assay they developed based on Surface Enhanced Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (SELDI-TOF-MS). Essentially, SELDI-TOF-MS involves placing a minute biological sample onto a protein chip, blasting it with a laser, and measuring how quickly the various types of ionized molecules fly.

Elased and Morris created an assay that uses the technology to measure the activity of specific enzymes, such as those involved in the renin-angiotensin system (RAS), which plays a key role in conditions such as

hypertension and diabetes. The assay represents a significant improvement over existing methods, because it requires a much smaller sample, uses natural substrates (which are more accurate than artificial ones), provides very precise numerical measurements rather than relying on coloration, and supports multiplexing — screening for more than one enzyme at a time.

In developing the assay, Elased and Morris have earned a place at the forefront of an exciting movement exploring the use of proteomics to identify biomarkers for various diseases. Biomarkers are generating widespread interest in the scientific community, because precisely measuring minute quantities of proteins linked to specific diseases makes it possible to diagnose and treat many conditions much earlier and more effectively.

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Elased and Morris began work on the assay as a precursor to the opening of the department’s new Proteomics Analysis Lab (PAL), a dedicated facility with advanced, specialized equipment. After several years of work, the patent award and several publications and presentations are helping to spread the word about this remarkable new assay.

“No one else is doing this,” Elased said. “It’s something very unique.

“We are becoming known for this now,” he added. “This is the gold standard assay for measurement of the enzymes we’ve studied.”