

New Patent Dramatically Improves DNA Analysis

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A basic scientist in the Department of Surgery at Jefferson Medical College and the Kimmel Cancer Center at Jefferson has shared a patent on what may someday be a ubiquitous tool in DNA analysis. The discovery could have a range of applications, from forensics to cloning to bioterrorism.

Jonathan Brody, Ph.D., assistant professor of surgery and colleague Scott Kern, M.D., at Johns Hopkins University in Baltimore, have developed a technique that makes a DNA separation technique called electrophoresis five times faster and less expensive than now is possible. “It could save millions of dollars a year, just by speeding up processes,” says Dr. Brody.

Most molecular biology-based techniques involve electrophoresis, the main way scientists analyze DNA. But the ingredients involved in the process have been unchanged for 30 years. “It turns out that all of the buffers people have been using for 30 years have been the wrong choice,” he says, because the standard method is more expensive and takes longer. “This solution that we found is literally a better, faster way of doing it.”

According to Dr. Brody, the patent hinges on the pair’s finding, through trial and error, that the compound lithium boric acid in DNA electrophoresis is the optimal solution for this process.

In electrophoresis, solutions conduct electric current necessary to

separate negatively charged DNA molecules. DNA is put through jellylike “gels,” and smaller DNA molecules move more quickly than larger ones as the current passes through. The researchers found, after much experimentation, that lithium boric acid would be a better buffer solution for the process than current 30-year-old methods.

“A process that normally takes around one and a half, two hours to do can be done in 10 minutes – in some instances it can be 10-fold faster,” he explains.

“A lot of our science is abstract and incremental,” he notes. “How often do you get a chance to impact nearly every field in science at once”

According to Dr. Brody, the finding is “not just a useful discovery for cancer research, but also for the neurosciences, developmental biology – increasingly, many fields involve DNA analysis.” The process has already been gaining acceptance and use internationally.

“It’s becoming more widespread, but like anything in science, it will take time to become a fixture,” he says. “Scientists are like most people: we don’t necessarily like to change.”

Source: Thomas Jefferson University

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