

Faster, simpler diagnosis for fibromyalgia may be on the horizon

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Researchers have developed a reliable way to use a finger-stick blood sample to detect fibromyalgia syndrome, a complicated pain disorder that often is difficult to diagnose.

If it were someday made available to primary care physicians, the test could knock up to five years off of the wait for a diagnosis, researchers predict.

In a pilot study, the scientists used a high-powered and specialized microscope to detect the presence of small molecules in blood-spot samples from patients known to have [fibromyalgia](#).

By "training" the equipment to recognize that molecular pattern, the researchers then showed that the microscope could tell the difference between fibromyalgia and two types of arthritis that share some of the same symptoms.

Though more analysis is needed to identify exactly which molecules are related to development of the disorder itself, the researchers say their pilot data are promising.

"We've got really good evidence of a test that could be an important aid in the diagnosis of fibromyalgia patients," said Tony Buffington, professor of veterinary clinical sciences at The Ohio State University and senior author of the study. "We would like this to lead to an objective test for primary care doctors to use, which could produce a

diagnosis as much as five years before it usually occurs."

Patients with fibromyalgia are often desperate by the time they receive treatment because of the lengthy process required to make a diagnosis. The main symptoms, [persistent pain](#) and fatigue, mimic many other conditions, so physicians tend to rule out other potential causes before diagnosing fibromyalgia. Additional symptoms include disrupted sleep and memory or thought problems. An estimated 5 million American adults have the disorder, according to the National Institute of Arthritis and Musculoskeletal and Skin Diseases.

"The importance of producing a faster diagnosis cannot be overstated, because patients experience tremendous stress during the diagnostic process. Just getting the diagnosis actually makes patients feel better and lowers costs because of reductions in anxiety," said Kevin Hackshaw, associate professor of medicine, division of rheumatology and immunology, at Ohio State's Wexner Medical Center and lead author of the study.

The study is published in the Aug. 21, 2013, issue of the journal *Analyst*.

The technology used in this work is infrared microspectroscopy, which identifies the biochemical content of a blood sample based on where peaks of molecules appear in the infrared spectrum. The technology offers hints at the molecules present in the samples based on how molecular bonds vibrate when they are struck by light.

The spectroscopy works on dried blood, so just a few drops from a finger stick produce enough blood to run this test.

Researchers first obtained [blood samples](#) from patients diagnosed with fibromyalgia (14), rheumatoid arthritis (15) and osteoarthritis (12). These other conditions were chosen for comparison because they

produce similar symptoms as fibromyalgia, but are easier to diagnose.

The scientists analyzed each sample with the infrared microspectroscopy to identify the molecular patterns associated with each disease. This functioned as a "training" phase of the study.

When the researchers then entered blinded blood samples into the same machinery, each condition was accurately identified based on its molecular patterns.

"It separated them completely, with no misclassifications," Buffington said. "That's very important. It never mistook a patient with fibromyalgia for a patient with arthritis. Clearly we need more numbers, but this showed the technique is quite effective."

The researchers also analyzed some of the potential chemicals that could someday function as biomarkers in the fibromyalgia blood samples, but further studies are needed to identify the [molecules](#) responsible for the spectral patterns, he said.

Though an infrared [microscope](#) can be expensive, Buffington said the testing could be affordable if a central lab existed to run the samples. That the method can use dried blood samples makes this concept feasible because dried blood can be legally sent via U.S. mail, he noted.

Why is a veterinarian pursuing this type of research? Buffington is a renowned expert on domestic cats, including a painful bladder disorder they suffer called interstitial cystitis (IC). This syndrome also occurs in humans.

It turns out that the origins of IC, like such human disorders as irritable bowel syndrome and fibromyalgia, cannot be traced to the specific area of the anatomy most affected by the syndrome. These disorders are

categorized as medically unexplained or functional syndromes, and Buffington has explored the possibility that a common link exists among these types of diseases, and that they might have origins in the central nervous system.

Buffington has filed two invention disclosures with the university, and Ohio State has filed multiple patent applications for the testing method, in the United States and internationally. In November, Ohio State was issued U.S. Patent 8,309,931 on a rapid diagnostic method for functional syndromes in humans and cats.

Provided by The Ohio State University

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