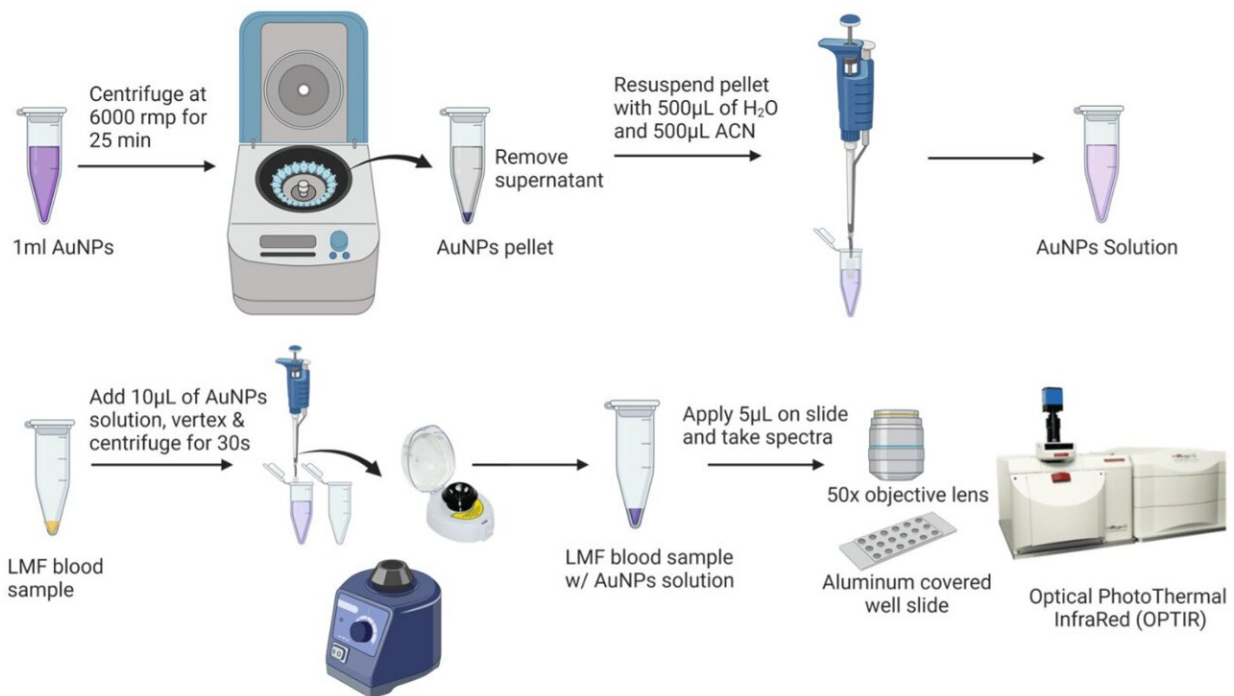


A blood test will diagnose fibromyalgia more reliably

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Low-molecular-weight fraction (LMF) blood sample preparation for SERS analysis. Credit: *Biomedicines* (2024). DOI: 10.3390/biomedicines12010133

A research team from the University of Rovira i Virgili, University of Ohio and the University of Texas has developed an innovative method that allows fibromyalgia to be reliably diagnosed from a blood sample. Identifying this disease nowadays is highly complex, especially because the symptoms are similar to those of other rheumatic pathologies and

persistent COVID.

This new study represents an important step forward in the accurate diagnosis and personalization of treatment for affected individuals, and at the same time opens new avenues for research into this pathology and [clinical care](#). The results of the study have been [published](#) in the journal *Biomedicines*.

Fibromyalgia is a chronic disease that affects 6% of the population worldwide and is characterized by widespread muscle pain and fatigue. The variety of symptoms can easily be confused with other disorders such as [rheumatoid arthritis](#), [systemic lupus erythematosus](#), osteoarthritis or chronic low back pain. This means that reaching a diagnosis is not easy or quick, and therefore, ends up having an impact on the quality of life and mental health of the people who suffer from it.

To carry out the study, the research team collected blood samples from three different groups: people diagnosed with fibromyalgia, people with similar rheumatic diseases and people without any of these pathologies, who served as a control group. A combination of techniques was used to isolate and analyze specific chemical signals in the blood that could help differentiate fibromyalgia from other diseases with similar effects on health, with the aim of opening a more accurate and faster diagnostic pathway.

The blood samples underwent a process called filtration, which allows the focus to be put on a very specific part of the blood that contains [small molecules](#), known as the low molecular weight fraction. These molecules can include a variety of substances, for example [amino acids](#), which act as the building blocks of proteins.

To analyze these tiny molecules, the researchers used the technique of Raman spectroscopy, which consists of "illuminating" the samples with a

special laser light and studying how they react. This technique makes it possible to observe which molecules are present and in what quantities, based on the way light interacts with them. To further refine this process, [gold nanoparticles](#) were used, which increase the signal they receive from the small molecules and make the results clearer and easier to interpret.

With the help of a statistical method, the samples were classified into categories on the basis of their chemical characteristics so that the differences between groups could be determined. The results highlighted that some patterns in small molecules, such as amino acids, could serve as "chemical signatures" to distinguish fibromyalgia from other diseases.

"This tool is fast, accurate and non-invasive, and can easily be integrated into the clinical environment to improve the quality of life of patients with [fibromyalgia](#)," says Sílvia de Lamo, a researcher from the URV's Chemical Engineering Department, who played a part in the research during a stay at Ohio University, where she collaborates with two research groups specializing in vibrational spectroscopy as a method for diagnosing diseases. The tool, which is still in the validation phase, could be available in health centers in about two years, according to the research team.

More information: Haona Bao et al, Early Diagnosis of Fibromyalgia Using Surface-Enhanced Raman Spectroscopy Combined with Chemometrics, *Biomedicines* (2024). [DOI: 10.3390/biomedicines12010133](#)

Provided by University of Rovira i Virgili

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