

New device could monitor anticoagulant treatments to deliver personalized therapies

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Researchers of the Consejo Superior de Investigaciones Científicas (CSIC), the Catalan Institute of Nanoscience and Nanotechnology (ICN2) and CIBER Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN) have developed a biosensor device to monitor anticoagulants such as Sintrom (acenocoumarol) and deliver a

personalized therapy in which the patient or doctor can adjust the drug dose to achieve the optimal effect.

The researchers designed this plasmonic device containing gold nanostructures to which specific bioreceptors can be attached in order to detect biomarkers in a reproducible and accurate way using a small sample of the patient's blood and without the need for any prior treatment.

Previously, the Nanobiotechnology for Diagnostics (Nb4D) Group of the CSIC's Institute for Advanced Chemistry of Catalonia (IQAC-CSIC), led by Prof. M. Pilar Marco, produced specific antibodies capable of recognizing Sintrom and demonstrated its usefulness in a clinical study using an immunoanalytical technique with high sample throughput.

Both groups are integrated into the Bioengineering, Biomaterials and Nanomedicine Networking Biomedical Research Centre (CIBER-BBN).

Building on their previous results, the two groups collaborated to develop an automated biosensor device allowing a personalized dose adjustment of this oral [anticoagulant](#). Their results were recently published in *Biosensors and Bioelectronics*.

Prof. Laura Lechuga says, "we have studied the optimal conditions to develop this biosensor device and have obtained excellent sensitivity to detect the anticoagulant, which indicates that it is possible to measure very low concentrations of this drug."

Since it is a quantitative and highly sensitive technology, this [device](#) is very suitable for its use in clinical environments, where it could provide a real time follow-up of the medication, or even for patients to manage the medication themselves, a significant breakthrough for people receiving anticoagulants.

Patients suffering from cardiovascular diseases or thromboembolic disorders are usually treated with anticoagulants such as Sintrom to prevent blood clots formation.

The problem is this [treatment](#) entails risks, explain the researchers. "For example, in case the dose is too low, it would not achieve the expected effect and blood clotting may occur; On the other hand, in case the dose is too high, it could cause side effects such as internal bleeding. The right dose depends on many factors such as weight, age, diet and interaction with other medications."

More information: E. Cristina Peláez et al, Nanoplasmonic biosensor device for the monitoring of acenocoumarol therapeutic drug in plasma, *Biosensors and Bioelectronics* (2018). [DOI: 10.1016/j.bios.2018.08.011](https://doi.org/10.1016/j.bios.2018.08.011)

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