Nanotech diagnostic can indicate cancer or thrombotic risk in one drop of blood

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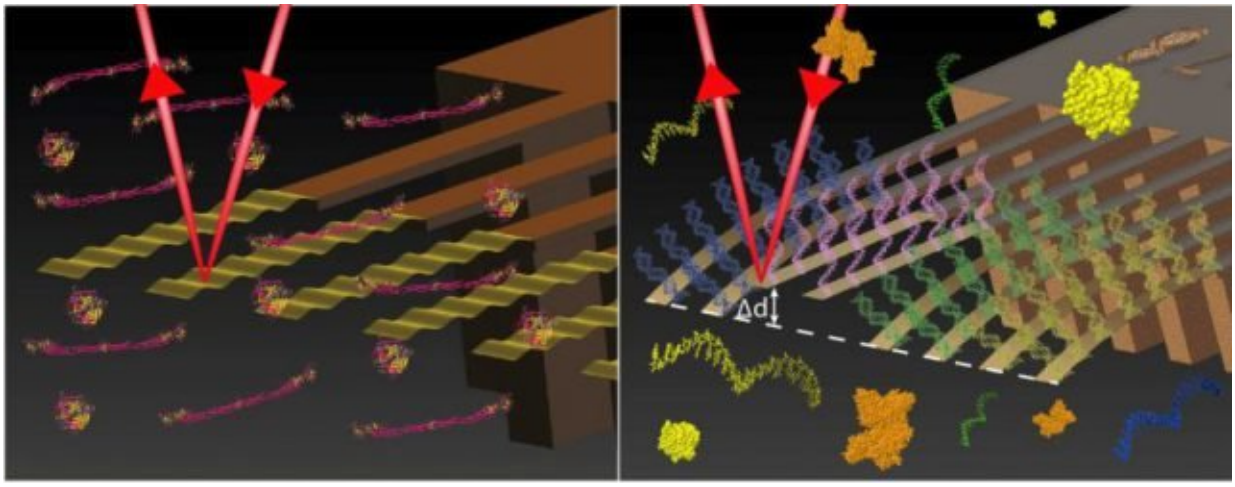

Credit: Trinity College Dublin

A team of international researchers led by Professor Martin Hegner, Investigator in CRANN and Trinity's School of Physics, have developed an automated diagnostic platform that can quantify bleeding – and thrombotic risks – in a single drop of blood, within seconds.

The researchers exploited micro-resonators for real-time measurements of the evolving strength of the blood plasma clot. Along with the clinically measured clotting time, other insightful parameters, from specific factor deficiency to global coagulation parameters (used to assess fibrinolysis), can also be extracted. These technical developments

introduce a miniaturised global haemostasis assay with the capability of fine-tuning factor replacement – or anti-coagulation therapies (left image, below).

In collaboration with the multinational, Hoffman-la-Roche, the researchers report a novel strategy for quick, reliable and quantitative diagnostics of expression patterns of non-coding short RNA in blood plasma or cell cultures. They directly detect label-free specific miRNA biomarkers relevant to cancer and adverse drug effects in blood-based samples (right image, below).

Professor Hegner's work focuses on the development of innovative nanotechnological automated diagnostic platforms that underpin next-generation medical devices. The collaboration with the multinational Hoffman-la-Roche, a world leader in in-vitro diagnostics, enabled this scientific study and provides the possibility to further miniaturise this device for portable point-of-care testing for the market and society.

Professor Hegner said: "This has significant implications for a non-invasive, rapid and personalised diagnosis using nanomechanical sensors. We believe that the comprehensive direct diagnostic approach to analyse blood haemostasis and the abundance of specific miRNA in cells and serum has a significant impact on various areas including but not limited to cancer diagnostics or drug-adverse effects where such markers are excreted into the blood stream."

The research has been published in *Nanoscale*.

Provided by Trinity College Dublin

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