

New sensor to aid in vitro fertilization

January 5 2016, by Tony Crawshaw

The tricky process of monitoring early-stage embryos during the in vitro fertilization process could become much easier with the development of a new fibre-optic sensor that can measure concurrently, hydrogen peroxide and pH (acidity-alkalinity concentrations) in solution.

The sensor, the first of its kind, was reported in the research journal 'Sensors' and consists of a single [optical fibre](#), the tip of which has been functionalised with a reactive fluorescent coating.

Lead author on the paper, Malcolm Purdey, Researcher at the ARC Centre of Excellence for Nanoscale BioPhotonics (CNBP) and the University of Adelaide, believes the sensor has the potential to be used across a broad range of biological applications, but that it is particularly well suited to the IVF industry.

"Unregulated production of [hydrogen peroxide](#) by an embryo, as well as fluctuating levels of pH, can indicate embryonic stress, impacting [embryo development](#)," said Purdey.

"Our state-of-the-art sensor is a single strand of optical fibre that is completely non-invasive. It could be placed right next to the embryo causing no disruption to its development, monitoring critical stages of the IVF process."

Purdey notes that currently, a number of issues exist in monitoring the health of an embryo.

"Current clinical examinations are solely visually based. Even recent prototype [sensors](#) would need multiple fibres, detectors and light sources to be hooked up", he said.

"Our dual sensor has the potential to monitor multiple embryonic parameters objectively, with a single piece of technology. We'll be able to better understand the dynamic processes taking place, at this, the very earliest stage of life."

According to Purdey, the sensor also has the potential for broader application as well.

"Hydrogen peroxide is an indicator of cell stress and possible illness. In the future, our sensor could be used inside of the body, to examine cells in the arteries to look for evidence of vascular disease. It could also be used to aid cancer detection too."

Purdey concluded, "It's a really exciting time for our research - we believe our sensor, or some future form of it, will have a significant impact in helping improve the lives of Australians."

More information: Malcolm Purdey et al. A Dual Sensor for pH and Hydrogen Peroxide Using Polymer-Coated Optical Fibre Tips, *Sensors* (2015). [DOI: 10.3390/s151229893](https://doi.org/10.3390/s151229893)

Provided by Macquarie University

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