

First optical sensor to measure oxygen in cells

06 June 2014 | News | By BioSpectrum Bureau

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A latest innovation launched by a German Biotechnology company now makes it possible to measure the real oxygen concentration directly inside the petri dish.

The optical sensor developed by ibidi GmbH determines the correct O₂ content, which is a critical factor in maintaining the natural behavior of cells in culture.

Oxygen sensitive beads, or nanoparticle reagents, are used in combination with the ibidi OPAL System.

By identifying changes in the fluorescence lifetime of these particles, the oxygen concentration in the immediate neighborhood, or directly inside the cells, can be determined.

"We are very excited to bring this innovative new technology into the market," said Dr Roman Zantl, president, ibidi GmbH. "We, along with Colibri Photonics, want to advance the knowledge of oxygen conditions in cell culture, because this is a crucial factor in cancer treatment," he added.

This original technology is an invaluable tool for mimicking the conditions of real tissue in in-vitro experiments.

For the first time, extra and intracellular O₂ concentrations in cells and tissues can be quickly determined in just a few seconds with the ibidi OPAL System. Subsequently, cell culture conditions can be adapted to the real conditions in tissues.

In contrast to existing technologies, the OPAL measurement is non-invasive and occurs in real time, making it ideal for in-vitro hypoxia conditions, such as 3D cultures, spheroid models, and tissues.

The OPAL technology was developed by ibidi's cooperative partner, Colibri Photonics, from Potsdam, Germany, and is now being marketed by ibidi GmbH.

Cells will only behave naturally when they are cultured under the specific conditions of their biological environment. In mammals, the most prominent conditions are temperature, pH, O₂ and CO₂ concentration, and constant concentrations of salts and nutrients.

In order to achieve biologically relevant results, it is crucial to maintain these conditions on the microscope stage during live cell imaging experiments.

In addition to controlling the oxygen concentration in the stage top incubator, it is indispensable to know the real oxygen concentration near the cells, or even inside the cells.

Since cells consume oxygen, the concentrations are typically much lower in cell clusters, such as tissue or spheroids.