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Endoscope for Analyte Consumption Rate Determination with Single Cell Resolution for In Vivo Applications

Determination of consumption/secretion rates of single-cell resolution has great potential for delivering detailed insights into early onset and development of various disease states as well as drug and stimulus response. Due the lack of sensitivity of current technologies, this information is difficult to obtain. Single cell measurements in vivo are especially challenging because of closely packed cells in tissues and the extremely low levels of analyte concentration changes induced by individual cells.

Researchers at the Biodesign Institute of Arizona State University have developed a novel device and method for determining the change rates of biological analytes in vivo with single-cell resolution. The gradient of analytes of interest can be determined along one or multiple directions with respect to the cell. This device has a dual operation mode which markedly increases measurement sensitivity and accuracy.

This technology enables multiparameter measurements of cellular function in tissues in vivo with single-cell resolution. It can be utilized for a variety of applications in the clinic which require in vivo assessment of tissue health.

Potential Applications

- Measurement of cellular function of tissue in vivo
 - Metabolic activity and profile
 - Hormone and/or cytokine secretion rates
 - Diagnostics
 - Drug screening
 - Response monitoring
- The device can be equipped with in vivo imaging capability for 3D mapping and characterization
 - Monitoring and patient risk stratification for esophageal adenocarcinoma
 - Inspecting skin lesions

Benefits and Advantages

- Increased measurement sensitivity
- Can measure many different analytes simultaneously
- Increased accuracy - helps the clinician make informed decisions and enables better prognostic capabilities
- Flexible materials - allows for in vivo applications under complex geometrical confinements

For more information about the inventor(s) and their research, please see [Dr.](#)

Meldrum's directory webpage[Dr. Meldrum's Biodesign directory webpage](#)