

Multi-Variate Luminescent Detection in Single Cells

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Funded by the National Institutes of Health, the Microscale Life Science Center was formed to conduct multi-variate detection of single cells in real-time. Using fluorescent and phosphorescent reporters, metabolic parameters such as gene expression and environmental indicators will be monitored in response to perturbation. The bacterium, *Methylobacterium extorquens* AM1, is of particular interest due to its ability to grow on methanol, which is a cheap, renewable, biofeedstock.

Expression of genes important for C1 metabolism can be followed through the use of fluorescent protein reporters. In addition, environmental concentrations of oxygen are monitored by means of an immobilized porphyrin dye. Luminescence is detected using a Zeiss LSM 5 Pascal microscope with an Andor iXon CCD camera. The intent of this work is to develop real-time detection of metabolic activity and environmental oxygen concentrations, with a goal of monitoring oxygen consumption rates of single cells as a gauge of cell health.