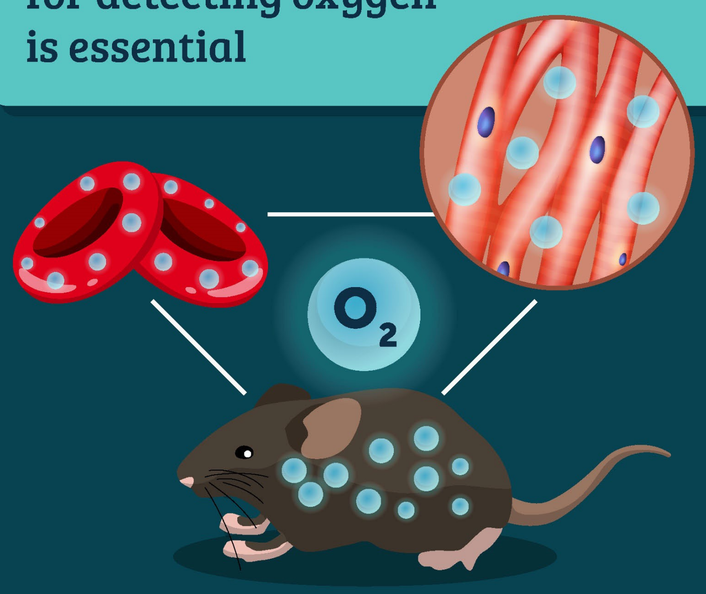
# Sensing Oxygen Distribution with Bioluminescent Bacteria

Chemical Science

Given the crucial role of oxygen in biological processes, developing accurate methods for detecting oxygen is essential

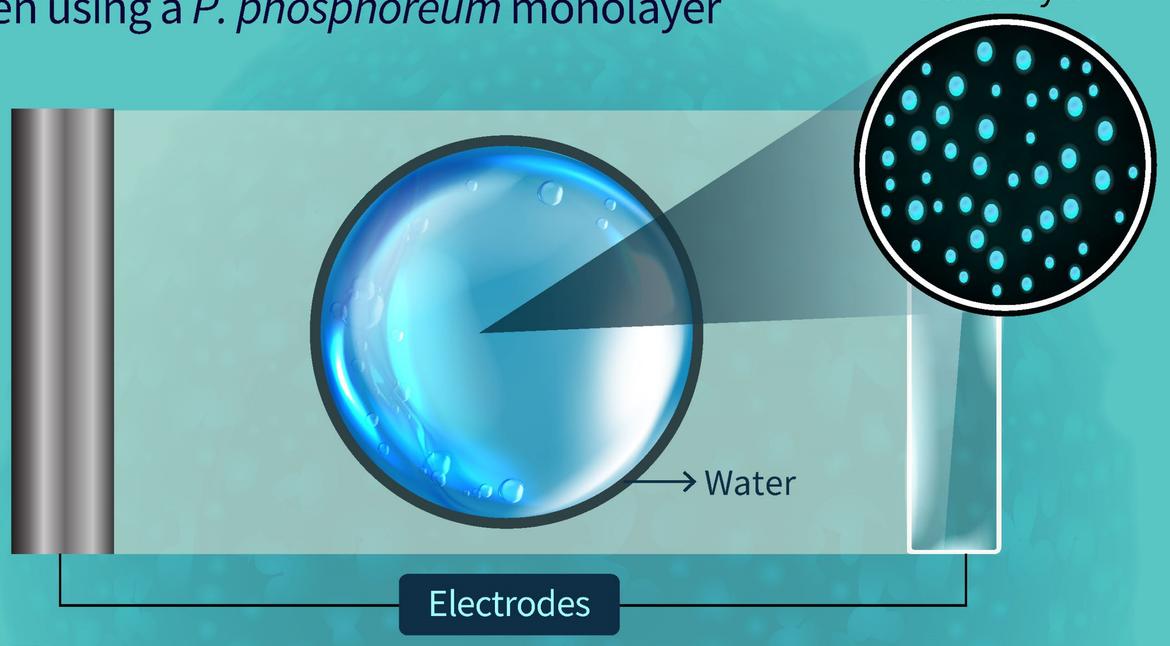


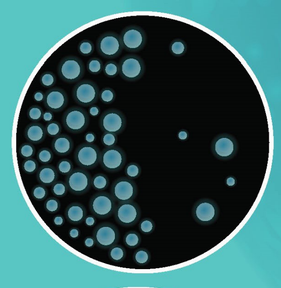

Most current techniques have slow reaction kinetics and are irreversible

Bioluminescent bacteria emit light in the presence of oxygen, making them a strong candidate for visual oxygen detection

## Can the bioluminescent bacteria *Photobacterium phosphoreum* guide the mapping of molecular oxygen distribution in real time?

A water electrolysis model is used to detect oxygen using a *P. phosphoreum* monolayer



During electrolysis, oxygen diffuses between electrodes in a spontaneous and stochastic wave

The oxygen wave can be observed in real time based on bioluminescent emission patterns that exhibit spatial heterogeneity and temporal dynamics

**Bioluminescent bacterial monolayers can be used to visualize the distribution of oxygen molecules in a sensitive, real-time and reversible manner**

Imaging the oxygen wave with a single bioluminescent bacterium
Chen, Cui, Wang et al. (2021) | Chemical Science | DOI: 10.1039/d1sc03310g

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