



NOVEL GAS FLOW SYSTEM FOR HIGH THROUGHPUT DETERMINATION OF OXYGEN DISSOCIATION CURVES (ODC)

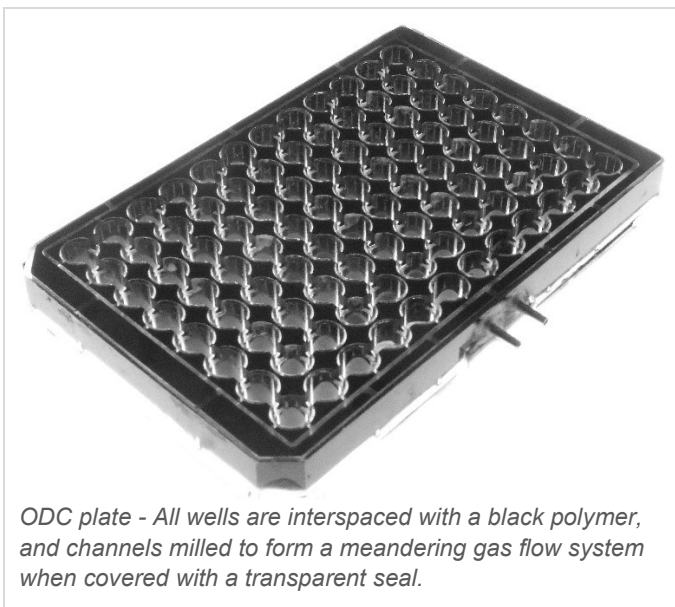
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INVENTION NOVELTY

On behalf of Medical University of Innsbruck, we offer a new method for analysing the effect of changing gas concentrations on biological samples. The described novel gas flow system allows e.g., the precise and efficient ODC determination in blood samples using a simple adaption of standard microplate reader and modified plates but is not limited to ODC measurement.

VALUE PROPOSITION

Real-time, high throughput analysis of biological samples exposed to rapidly changing gas compositions is challenging and cannot be accomplished by conventional scientific instruments. Specifically, the high throughput recording of hemoglobin ODC was not possible. This problem was solved by designing a gas perfused 96-well microplate for fluorescence plate readers with widespread applications beyond the specific, original aim. The simple adaption of standard laboratory instruments enables application in the fields of clinical diagnostics, toxicology and research.



TECHNOLOGY DESCRIPTION

A 96-well plate has been developed that allows gas flow through the cavities via a meandering gas flow channel. Up to 92 samples of whole or hemolyzed, buffered or unbuffered blood can be analyzed within ~25 min. Oxygen saturation is measured in each well with dual wavelength spectroscopy, and oxygen partial pressure using fluorescence lifetime of commercial oxygen sensors at the in- and outlet ports of the gas-flow system. A particular plating method ensures a thin but still adherent layer of red blood cells for optimal fluorescence measurement. To guarantee stable conditions during ODC measurement, an environmentally controlled box (EC-Box) has been created. This EC-Box is temperature-controlled and contains the experimental setup (e.g., humidifiers, a specifically designed cover for the microplate reader, tubes and valves).

COMMERCIAL OPPORTUNITY

Method and device are available for in-licensing.

DEVELOPMENT STATUS

A laboratory prototype to demonstrate the proof of concept has been realized.

PATENT SITUATION

A PCT application has been filed in October 27, 2021

FURTHER READING

Woyke et al. (2021). High-throughput determination of oxygen dissociation curves in a microplate reader—A novel, quantitative approach. *Physiological Reports*. 2021;9:e14995: <https://doi.org/10.14814/phy2.14995>

