29. Analysis of downregulation of cellular energy demand by 2D measurements of intracapillary HbO2, Hb, pO2, and redox state of cytochromes

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Abstract:
Rapid microlightguide spectrometers (EMPHO IIa/b) and a multiwire pO2 electrode are applied for measurements of heterogeneous distribution of tissue oxygenation and redox state of respiratory enzymes in heart and rat liver. Optical and pO2 measurements are noninvasively performed by use of sensors placed on the surface of tissue. Measurements in isolated perfused rat and in dog heart in situ were performed in order to investigate the relation between myocardial oxygenation and
function. The tissue monitoring in liver was initiated by optical and polarographic monitoring in the hemoglobin free perfused organ. Subsequently, erythrocytes were added to the perfusate in several steps. The experiments reveal clear evidence that a protective system of tissue is activated whencritical pO2 values at the lethal corner of micro vessels fall off a critical threshold around 5 mmHg, thus causing a depletion of oxidative metabolism.