“A new measurement system enables combination of continuous glucose monitoring (CGM) and insulin infusion. A sensor system comprising an optical glucose biosensor and an optical oxygen sensor is integrated into the insulin infusion catheter of an insulin pump.” Nacht et al (2014).

Reference:

Catheter system for continuous glucose measurement and simultaneous insulin infusion
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Abstract:

A new measurement system enables combination of continuous glucose monitoring (CGM) and insulin infusion. A sensor system comprising an optical glucose biosensor and an optical oxygen sensor is integrated into the insulin infusion catheter of an insulin pump. Both sensors rely on near infrared (NIR) phosphorescent porphyrin dyes, wherefore the signals can be read out transcutaneous and non-invasively with a custom-built phase fluorometer measurement module. The spectral properties of the indicator dyes and the optical setup of the measurement module were optimized to enable independent read-out in two channels. Dynamic ranges from 0mmHg to 160mmHg oxygen and 0mg/dL to 360mg/dL glucose (LOD 2mg/dL) are covered by the oxygen and the glucose sensor, respectively. In-vivo measurements in pigs demonstrate good correlation of reference blood glucose levels and glucose values obtained with the presented sensor system. The evaluation of the clinical accuracy of the system with Clarke Error Grid Analysis showed similar results to CGM-devices currently on the market.

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