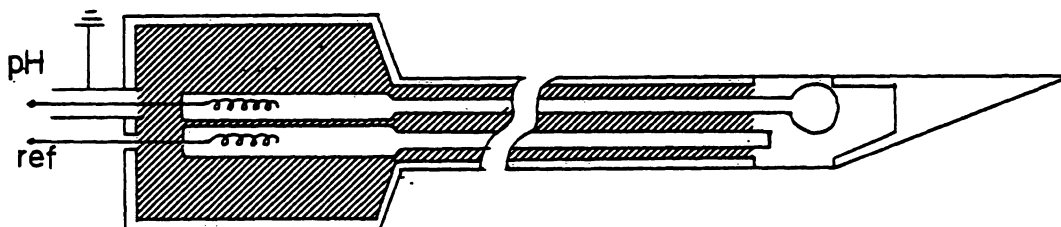


Present status of continuous measurements of pH with the glass electrode. II. Presentation of a new Needle-pH-Electrode.

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The principle of the electrode is shown schematically in the figure. A hyperdemic needle (o.d. 0.7 mm, length up to 8 cm) serves as an electrical shield and as a cutting instrument. Via a side-hole (the normal front hole is sealed) a spherical pH-glass bulb (o.d. 100 μm) and a diffusion bridge reference electrode make contact with the external solution or tissues. These internal electrodes are connected via glass tubes and AG/AgCl electrodes to external cables. The electrode has an impedance of about



$5 \times 10^9 \Omega$ and can therefore be used with conventional pH-meters. The electrode has been tested in rats skin and rats muscle during inhalation of CO_2 and infusion of intravenous NaHCO_3 . The values recorded with the new electrode correlated well with arterial pH ($r=0.82$, $p=0.001$) and pH recorded with an older type of electrode ($r=0.8$, $p=0.001$) (Contron [®]). The slope of the electrode was $58.0 \text{ mV} \pm 3.4 \text{ mV/pH}$ (37°C) and the drift during experiments (typ. 3 hours) was less than 1.5 mV . The response time in vivo was $3.7 \text{ min} \pm 2.5$ (mean \pm SD).