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**Significance of the hydrogen ion concentration in synovial fluid in rheumatoid arthritis.**

Farr M, Garvey K, Bold AM, Kendall MJ, Bacon PA.

The hydrogen ion (H<sup>+</sup>) concentration and pCO<sub>2</sub> were measured in the synovial fluid (SF) from the knee joints of 130 patients with arthritis by an acid-base analyser (ABL2 Acid-Base Laboratory), using a simple technique which prevented contact with air. H<sup>+</sup> concentration was significantly higher in SF from 60 RA patients (mean 64.4 n mol/l; range 38-142 n mol/l) compared with patients with OA (mean 44 n mol/l; range 29-56 n mol/l), and 40 with other arthritides (mean 52 n mol/l). The H<sup>+</sup> concentration in the SF showed a significant association with other variables of local inflammation-platelet, total leucocyte and polymorph counts, 5-nucleotidase, acid phosphatase and IgA levels in the SF and the clinical knee score, but not with the volume of the effusion. A similar relationship between these variables of inflammatory activity and SF pCO<sub>2</sub> was also established. A higher SF H<sup>+</sup> concentration was also found in systemically active disease, but no difference in SF pH between seropositive and seronegative patients. Whilst the pH of SF approximated to that of the blood in OA, it was significantly lower in the SF in RA. SF pH is a useful marker of local inflammatory activity, and its measurement is simple, reliable and rapid. It is relevant because changes in pH influence many of the processes involved in inflammation and the pH difference between SF and blood influences the transfer of drugs into the joint.