Activity of N-acetyl-β hexosaminidase in serum and joint fluid of the knees of patients with juvenile idiopatic arthritis

Sirs,

In the pathogenesis of degenerative and inflammatory joint disease, the role of the lysosomal N-acetyl-β hexosaminidase (HEX) is of particular importance (1-3). We report the first data on HEX activity in the synovial fluid and serum of patients with juvenile idiopatic arthritis (JIA).

We studied 15 patients with JIA (5 girls, 10 boys; 6-16 years old). Four of them had polyarticular and 11 oligoarticular onset JIA. Duration of the disease was 0.5-10 years. At the time of sampling 6 patients were in a very active, and 9 in a subacute, period of disease according to Mallya and Mace (4). Rheumatoid factor was positive in 1 child and 2 children had antinuclear antibodies. We also studied two other groups: 15 patients with rheumatoid arthritis (RA) (10 female, 5 male; 22-74 years old; duration of the disease 5-30 years) with knees that were swollen and painful during physical examination, and effusion in the joint; and18 patients with injured anterior cruciate ligaments (ACL) (5 females, 13 males; 17-21 years old) 3 weeks to 27 months after injury. Arthrocentesis of the knee joints of JIA and RA patients was performed because of prolonged exudation or intra-articular injections of steroids. Samples of knee joint fluids from patients with ACL were collected during routine diagnostic arthroscopy. Activity of HEX in serum and synovial fluids was determined according to Zwierz *et al*. (5), and protein according to Gornall *et al*. (6). The study design was approved by the Ethical Committee of the Medical University of Bialystok, and all patients gave their informed consent.

In the synovial fluid of patients with JIA and RA, the specific activity of HEX amounted to 28.4 ± 20.0 μkat/kg protein and 25.3±10.4 μkat/kg of protein, respectively, and was significantly elevated in comparison to patients with ACL injury (5.1 ± 2.2 μkat/kg of protein); $p \leq 0.0001$ (Fig. 1). The specific activity of HEX in the synovial fluid of patients with JIA, RA and ACL injury was 8.3, 6.3 and 2.0 times higher than in the same patients' serum.

Our results indicate that in rheumatoidal diseases, excretion of HEX from joint tissues to synovial fluid is much higher than in non-rheumatoid diseases. It is worth noting that HEX activity increases even above 20 μkat/kg protein in the very active period of JIA. This is in agreement with reports of Stephens *et al*. (7) that HEX activity in the synovial fluid of RA patients is higher than those with osteoarthritis, and of Berenbaum *et al.* (8) that the specific activity of HEX in the synovial fluid of RA patients is higher than in their serum. The elevated activity of HEX in the synovial fluid of patients with JIA, similarly to RA patients, indicates damage to the lysosomes of the joint tissues. This may be of diagnostic value in children with prolonged exudate in the knee joint, resistant to pharmacological and physiotherapeutical treatment. In these cases we advise determining the HEX in the synovial fluid, where values above 10 μkat/kg of protein suggest rheumatoid disease. However, before introducing the above results to general practice, more investigation in a larger number of patients with JIA will be necessary.

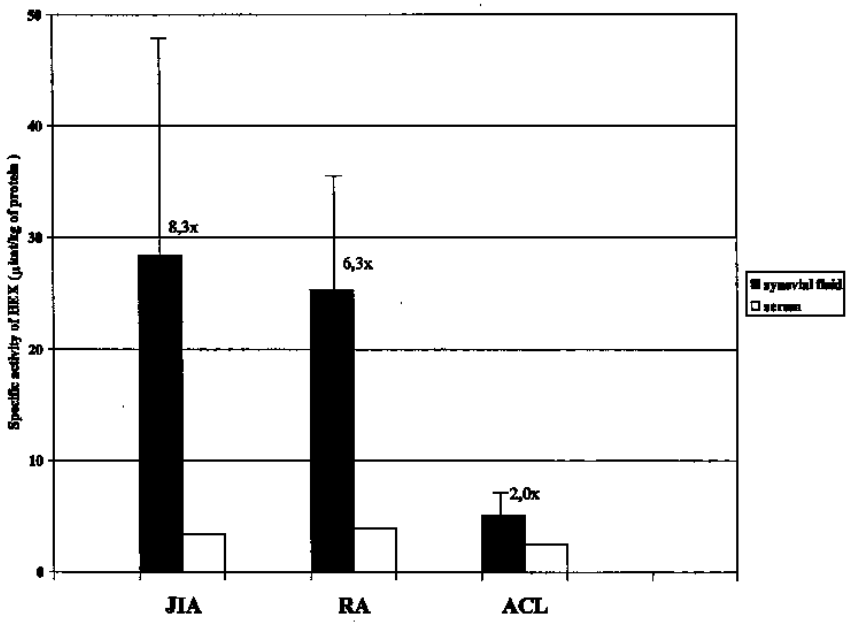

Fig. 1. Specific activity of N-acetyl-—hexosaminidase in the synovial fluid and serum of patients with idiopathic juvenile arthritis (JIA), rheumatoid arthritis (RA) and injured anterior cruciate ligaments (ACL).

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