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A STUDY ON SERUM AND SYNOVIAL FLUID
KERATAN SULFATE IN HORSES

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Keratan sulfate (KS) in serum and synovial fluid is thought to be a useful marker of cartilage degradation because KS distribution is limited to aggrecans and the cornea.

The assay system for the measurement of equine KS, inhibition-ELISA, was modified using proteoglycan (PG) monomers from equine articular cartilage.

To investigate the relationship between cartilage metabolism and developmental orthopedic diseases (DOD), serum KS was measured in a group of normally growing foals (control group) and foals predisposed to develop DOD (DOD group). Serum and synovial fluid KS were measured in a pony intra-articularly injected with chymopapain and 8 arthroscopically operated horses. Alkaline phosphatase (ALP) and lactic dehydrogenase (LDH) concentrations as well as antibodies to type II collagen in serum and synovial fluid were also measured in comparison with KS.

Serum KS in all foals was extremely high up to 3 months of age. The KS level in the DOD group was significantly higher than in the control group. Serum and synovial fluid KS in the chymopapain-injected pony increased threefold and sixtyfold, respectively, within 24 hours after the treatment.

In horses with arthroscopic surgery, serum KS showed the same changes as in the synovial fluid.

The serum ALP level in foals up to 3 months of age was extremely higher, but there was no significant difference between the two groups. Synovial fluid ALP and LDH increased after chymopapain-injection and arthroscopic surgery.

Antibodies to type II collagen in foals varied in the first 3 months after birth. In the chymopapain-injected pony and horses with arthroscopic surgery, the antibodies in serum did not show the same changes as in the synovial fluid.

These results suggest that the serum and synovial fluid KS levels reflect the cartilage metabolism. Furthermore, the higher activities of cartilage in the DOD group during the first 3 months might be related to the pathophysiology of DOD.