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SIGNIFICANCE OF SERUM AND SYNOVIAL FLUID  
KERATAN SULFATE CONCENTRATIONS  
IN HORSES

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Recently, keratan sulfate (KS) concentrations in serum and synovial fluid have been measured quantitatively as a useful marker of cartilage catabolism, and the indications of their levels have also been discussed.

The assay system, inhibition-ELISA, for the measurement of equine KS was modified by using proteoglycan (PG) monomers purified from equine articular hyaline cartilage. First, 1.8 mg of KS was purified from 30 mg of PG monomers. The molar ratios of glucosamine/galactosamine and glucosamine/galactose were 15.46 and 0.75, respectively.

In a horse in which experimental chondrectomy at a small part of carpal joint was done by laser surgery, the serum KS level increased 2 to 5 weeks after the operation. The serum KS levels in horses with arthroscopic surgery increased for up to 10 days after the operation. After a decrease to pre-operation level, the serum levels again increased between the second and seventh week. Synovial KS levels showed the same changes as serum KS.

In a trainee horse, the serum KS level increased remarkably just after galloping, and then decreased after one hour. Serum KS levels were measured in groups of horses newly coming to a racehorse training center (newcomer group), in horses out of training (resting group), and in horses in training (training group). The KS level in 2-year-old horses of the newcomer group was significantly higher than 3-year-old horses of the same group. The KS level in 3-year-old horses of the training group was significantly higher than that of the resting group.

Some horses with corneal diseases, periostitis, arthritis, and fractures had higher serum KS levels than in normal horses.

These results suggested that the serum and synovial fluid KS levels could reflect damage and repair of the cartilage. Serum KS levels changed with training and age. The increase of the serum KS level after training might be from mechanical loading. The high levels of serum KS in younger horses might indicate high levels of the cartilage metabolism in the prematurity period. It is suggested that the higher level of serum KS in the training group than in resting group could indicate a low level of tolerance to mechanical loading. The measurement of serum KS levels could have potential for

clinical application. Further investigation is, however, needed to understand the correlation between the serum KS level and the pathophysiology.