

## 8. Summary

**Analysis of synovial fluid in the horse – in particular the activity of the enzyme myeloperoxidase in synovia from diseased joints and tendon sheaths.**

**Objective:** The aim of the present work is to study the activity of the enzyme myeloperoxidase (MPO) in synovia from diseased joints and tendon sheaths in the horse and its relationship to other synovial parameters and clinical signs of orthopedic diseases.

**Materials and Method:** A total of 88 synovia samples were obtained from healthy joints (n=18) and from diseased joints (n=62) and tendon sheaths (n=8) of a total of 74 horses. Clinical diagnosis was achieved through anamnestic data, clinical and roentgenographic examination, and analysis of synovial fluid. An ultrasound examination was performed on the diseased tendon sheaths. Based on this information, samples were classified into 7 diagnostic groups: healthy controls (C) (n=18), chronic arthritis (CA) (n=28), osteoarthritis (OA) (n=12), osteochondrosis dissecans (OCD) (n=15), osteochondrosis dissecans with secondary osteoarthritis (OCD + osteoarthritis) (n=4), tenosynovitis (TS) (n=8) and septic arthritis (SA) (n=3). Synovial fluid was analyzed for pH, total protein concentration, total white blood cell count, viscosity and activity of MPO. The activity of MPO in synovia was compared irrespective of the clinical diagnosis with synovial pH, total protein concentration, total white blood cell count, synovial viscosity, and the degree of lameness.

**Results:** pH mean value in the control group was  $7,377 \pm 0,062$  (range: 7,239 – 7,491). The lowest pH mean was detected in the group of SA ( $7,274 \pm 0,071$ ; range: 7,200 – 7,342). At least 75% of all samples from the groups of CA, OA, OCD, OCD + osteoarthritis and TS presented pH values within the range observed in the controls. This was also the case for 2 of the 3 samples diagnosed with SA.

Synovial mean total protein concentration was  $0,867 \pm 0,491$  (range: 0,1 – 1,8 g/dl). At least 75% of the samples from the groups of CA, OA, OCD, OCD + osteoarthritis showed values equal or below 1,2 g/dl. Mean total protein concentration was higher in the groups of TS (mean:  $2,025 \pm 1,358$  g/dl; range: 0,4 – 4,2 g/dl) and SA (mean:  $3,867 \pm 1,629$ ; range:  $2,0 \pm 5,0$  g/dl).

Total white blood cell count in the control group showed a maximum of 500 cells/ $\mu$ l. At least 75% of all samples from the controls and the groups of CA, OA, OCD, OCD + osteoarthritis showed values equal or below 200 cells/ $\mu$ l. The group of TS showed a total white blood cell count with a range of 400 – 3200 cells/ $\mu$ l. The groups of SA showed the highest values of this study, with total white blood cell counts ranging from 13 100 to 29 800 cells/ $\mu$ l.

MPO-activity mean value for healthy controls was  $0,150 \pm 0,313$  mU/ $\mu$ l (range: 0,0 - 1,2 mU/ $\mu$ l). MPO-activity of at least 50% of samples from the groups of CA, OA, OCD + osteoarthritis and 75% of samples diagnosed with OCD fell within the range detected in the controls. All three samples from the groups of SA as well as the great majority of samples from the group of TS were above the range observed in the controls but overlapped with activity detected in a few samples from other groups of diseased joints.

Viscosity of synovia was normal in all controls samples and in the majority of samples from the groups of OA, OCD, OCD + osteoarthritis. The majority of samples from the group with CA and TS showed decreased or severely decreased viscosity. All three samples from the group of SA presented severely decreased viscosity.

All samples from healthy controls as well as the majority of samples from OCD came from sound limbs. Samples from the group of CA came mostly from limbs showing doubtful or mild degrees of lameness. The majority of samples from the group of OA, OCD + osteoarthritis and TS were taken from limbs presenting mild to moderate degrees of lameness. Severe degree of lameness was only observed in all three samples diagnosed with SA.

Samples with the same activity of MPO showed different values of pH. Samples showing the same total protein concentration showed different values of MPO-activity. This was also the case for samples with the same total white blood cell count.

Samples with a normal viscosity (n=56) presented a mean MPO-activity of  $0,668 \pm 1,520$  mU/ $\mu$ l; range: 0,0 – 8,1 mU/ $\mu$ l). The mean value of MPO-activity was higher in the other 2 groups of samples showing a decreased (n=9) or severely decreased (n=23) viscosity. MPO-activity detected in at least 50% of samples with decreased or severely decreased synovial viscosity overlapped with the range of MPO-activity detected in samples with physiologically normal viscosity.

Mean activity of MPO was higher in samples obtained from all 4 groups of lame limbs than in synovia acquired from sound limbs. However, MPO-activity of at least 50% of the observation from the groups of doubtful, mild and moderate lameness overlapped with activity of the enzyme detected in the group of sound limbs. Samples from joints of severely lame limbs (n=3) also overlapped with some values detected in the other groups.

**Conclusion:** In the present study, it was impossible to differentiate at least 50% of samples from joints diagnosed with CA, OA, OCD + osteoarthritis and 75% of samples with OCD from normal controls solely based on the activity of MPO. MPO-activity of all 3 samples from the group SA and in the great majority of samples of the group with TS was higher than in healthy controls but overlapped with activities detected in a few samples of joints affected with non-septic conditions.

There seems to be no relationship between MPO-activity in synovia and synovial pH, total protein concentration, total white blood cell count or viscosity in the samples analyzed in the present study. Nor does there seem to be any relationship between MPO-activity in synovia and the degree of lameness.