A. LINDEN, A. M. MASSART-LEËN, T. ART, H. AMORY, D. DESMECHT, F. ROLLIN &P. LEKEUX *(Laboratory for Functional Investigation, Faculty of Veterinary Medicine, University of Liège, B-4000 Liège,• Laboratory for Veterinary Physiology-Faculty of Veterinary Medicine Univer sity of Ghent, B-9000 Gent).*

Characterization of the physiological work by measurement of plasma cortisol values in horses competing in 5 different sports disciplines.

Eighty horses were investigated in this study. They were competing in 5 disciplines of various intensity and duration : gallop race (G : ***n*** = 10), trot race (T : *n = 10),* show-jumping (J : ***n*** = 20), endurance ride (E : ***n*** = 8) and cross-country *(C : n* = 32).

Venous blood samples were collected at rest and 2 min after exercise and analysed for plasma cortisol concentration. Blood samples were immediately centrifuged and, after separation, plasma was frozen at -20°C. All the samples were assayed in the same laboratory within one month of collection. Plasma cortisol concentration was determined by a radioimmunoassay technique (RIA). All samples were assayed in duplicate with an assay detection limit of 0.24 µg/dl. The experimental procedure was the same during the whole investigation in order to allow a reliable comparison between the 5 types of exercise.

The mean resting cortisol values were : 3.59 ± 0.48 µg/dl, 3.52 ± 0.40 µg/dl, 2.81 ± 0.20 µg/dl, 3.85 ± 0.33 µg/dl and 2.22 ± 0.43 µg/dl in the groups E; T; G; C and J respectively. The jumping horses had resting cortisol concentrations significantly lower (P <_ 0.05) when compared to the other groups.

All the disciplines induced a significant increase in cortisol concentration. The mean post-excercise cortisol values were : 9.91 ± 1.49 µg/dl, 7.11 ± 0.95 µg/dl, 6.79 ± 0.38 µg/dl, 6.36 ± 0.37 µg/dl and 4.32 ± 0.52 µg/dl in the groups E; T; G; C and J respectively.

When expressed in relative changes (exercise to rest ratio), the endurance ride induced a relative increase in plasma cortisol concentration significantly more important (P:50.01) than exercises of high intensity like gallop and trot race. The show-jumping induced a slight relative cortisol change, significantly inferior (P<_0.05) to the other disciplines. A fixed linear model including *the discipline effect* influences significantly the variations of resting (P<_0.05) and post-exercise (P_<0.001) plasma cortisol values.

In conclusion, this study suggests that, in horses, the type of discipline influences significantly the plasma cortisol levels both at rest and immediately after exercise.