

Reproduction ensures species survival. Because of that mate choice is important and never random. In result wild animals, free roaming horses included, do not experience any reproductive related problems and they offspring is healthy, and able to survive without veterinary assistance. In controlled conditions horses are mated based on human preferences what influence reproduction outcome. In controlled conditions horses experience various reproductive related disorders and their fertility is lower compare to free roaming horses. Each year reproductive disorders are a huge challenge for both veterinarians and horse owners and are often associated with high financial expenses. Mechanisms underlying equine reproductive disorders are not fully explained and the most common post-partum disorder – retained fetal membranes remains unknown. This is why we decided to investigate how free roaming horses choose their mates in order to achieve reproductive success and why if mare and stallion are mated according to human preferences such mating is relatively often associated with various reproductive disorders. There are many factors that influence reproduction and genetic factors are one of them. According to the literature in majority of the species a genetic factor – Major Histocompatibility Complex Class I (MHC I) is involved in every step of reproduction, from the mate choice through pregnancy to parturition. We suspect that also equine reproduction is strongly influenced by MHC I. We think that free roaming horses choose their mates with respect to MHC I and that MHC I influence reproductive disorders in horses.

MHC I genes are inherited in 50% from a father and 50% from a mother. One of the role of MHC I molecules is to signal which cells are “self” and which are “non-self”. During pregnancy fetal MHC I molecules (which are in 50% “non-self”, since they are inherited from a father) should induce tolerance. During parturition fetal MHC I should signal to the maternal immune system that it is time to expel the fetus followed by fetal membranes expulsion. This is why the interactions between maternal and fetal (inherited in 50% from a father) MHC I are so important. In our project we want to combine clinical observations on mate choice in free roaming horses and common equine reproductive disorders (repeated breeding/inseminations, abortions, dystocia, retained fetal membranes, weak neonates) with molecular research in order to determine the influence of genetic factor – MHC I on mate choice and reproductive disorders in horses. We chose 2 horse breeds: Polish Koniks and Friesian horses. Koniks are known for their high fertility and part of the population is kept in free roaming conditions and part on breeding farms. Friesians suffer from various reproductive disorders, mainly retained fetal membranes. We want to determine the set of MHC I genes carried by all tested mares, stallions and foals and compare the results with the actual mate choice in free roaming Koniks and the incidence of reproductive disorders in Koniks and Friesians from breeding farms. We also want to confirm the presence of MHC I molecules and inflammatory markers in equine placenta during parturition.

Based on the obtained results we aim to explain the mechanisms underlying mate choice and reproductive related disorders in horses. Without the full knowledge on the mechanisms underlying certain disorders effective treatment or prevention is impossible. We think that results of our experiment and new knowledge gained in the field of equine reproduction might help veterinarians to treat them more effectively in the future. We also hope that thanks to the knowledge gained from our project horse owners will be able to take more reasonable decisions on horse breeding.