SPERM TRAINS AND MATING BEHAVIOUR IN WOOD MICE OF THE GENUS APODEMUS

K. Dvorakova¹, P. Stopka²

¹Developmental Biology, Charles University, Prague 2, Czech Republic; ²Zoology, Charles University, Prague 2, Czech Republic

There is evidence of possible correlation between mating behaviour, sperm morphology and sperm behaviour in the female reproductive tract prior to fertilization. As shown in *A. sylvaticus* (1), cooperation between spermatozoa of an individual confers a significant advantage for fertilization, where inter-male sperm competition is intense. In our study we aimed to focus on three other species of rodent genus *Apodemus*: *A. flavicolis, microps, agrarius* versus *A. sylvaticus*, whose either promiscuous or monogamous mating behaviour has already been demonstrated (Stopka et al., unpublished). We placed spermatozoa from cauda epididymis of adult males of selected species into mouse *in vitro* fertilisation medium, and compared sperm behaviour of individual species. Surprisingly, despite monogamous or polygamous mating behaviour, sperm of all the above species rapidly aggregated into motile trains, as in *A. sylvaticus*, consisting of hundreds of cells. However, size and cell–cell coupling differed between each species. This may point to another aspect besides mating behaviour that may be involved in building up a mechanism for successful sperm delivery to the egg. These unique and organised aggregations can significantly increase sperm progressive motility. A detailed study of the main cytoskeletal proteins, using immunofluorescent methods, together with confocal microscopy, shows that in sperm-sperm binding especially protein actin plays an important role. According to *in vitro* experiments, we speculate that the viscous environment of the female reproductive tract may have played a crucial role in the evolution of sperm behaviour. Disintegration of motile sperm trains was associated with the majority of spermatozoa undergoing a premature acrosome reaction. However, the mechanism that triggers it remains to be determined. To conclude, it is likely that a myriad of changes in social behaviour of particular species were not accompanied by changes in sperm behaviour, but instead they retained original ancestral tactics typical for the genus *Apodemus*.