

Protein markers of canine epididymal semen

ABSTRACT

The aims of the study: a) to review molecular biomarkers identified to date as useful indicators of canine semen quality, b) to analyze the proteome of canine cauda epididymal fluid in relation to sperm motility and the age of the dog, and c) to select potential protein markers present in canine epididymal fluid associated with epididymal sperm motility and animal age.

The first study systematized current knowledge on molecular biomarkers considered useful for the assessment of canine reproductive functions. It was demonstrated that both proteins and non-protein substances, such as lipids, carbohydrates, and ions, may serve as valuable indicators of canine semen quality.

In the second study, for the first time, comprehensive proteomic profiling of canine cauda epididymal fluid was performed using nanoUPLC-Q-TOF/MS. Motility-dependent changes in the composition of the epididymal fluid proteome were identified, together with higher content of ALB, CRISP2, LCNL1, and PTGDS in epididymal fluid associated with spermatozoa exhibiting good motility. The findings for ALB and PTGDS were confirmed by Western blot analysis, indicating their potential role as markers of canine epididymal sperm motility.

The third study focused on the effect of age on the protein composition of canine cauda epididymal fluid. Ageing was shown to induce changes in the abundance of ALB, GPX5, and PTGDS. The obtained results suggest that these proteins may serve as biomarkers of ageing processes in the canine epididymis.

The conducted studies enabled the characterization of the protein microenvironment of canine cauda epididymal fluid and provided new knowledge about its relationship with sperm motility and epididymal ageing processes.

Keywords: biomarkers; epididymal fluid; epididymal sperm; proteome; dog