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Proteomic analysis of urine obtained from diabetic dogs

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Statement of the Problem: Diabetes mellitus is a common endocrinopathy of dogs with potentially devastating microvascular complications. In terms of the aetiology, pathogenesis, and the course of the disease, canine diabetes is remarkably similar to type 1 diabetes in humans, the insulin-dependent diabetes mellitus. Diabetic nephropathy is a renal disease which arises as the consequence of diabetes. Standard biomarkers including serum creatinine, estimated glomerular filtration rate, and albuminuria are imprecise, do not directly measure renal tissue injury, and are relatively insensitive to small changes in renal function. Thus, availability of novel biomarkers that are sensitive, specific, and precise as well as able to detect kidney injury and predict clinically significant outcomes would be widely useful in diabetic nephropathy. In this study we aimed to analyze the protein composition of the urine collected from the healthy animals and compare it to the two diabetic groups (1: without microalbuminuria, 2: with microalbuminuria). We tried to identify an early biomarkers of nephropathy. They could be later used for both diagnostic and treatment of dog patients. **Methods:** After obtaining urine, we performed 2-dimensional electrophoresis, followed by Delta2D software analysis, which allowed to select and identification with MALDI-TOF spectrometry, statistically significant differentially expressed proteins. **Result:** Our study has revealed 492 common urine proteins from the diabetic and control group. From these proteins 5 has shown statistically significant different expression ($p \leq 0.05$), and so they were excised from the electrophoretic gel and were positively identified by MALDI-TOF MS. To further evaluate the 5 differentiating proteins, the Panther program (<http://www.pantherdb.org>) was used to assign them to appropriate biological process **Conclusion:** Significant number of identified proteins play a role in intracellular signaling – vesicle formation, bonding, transport through membranes. This may suggest that first signs of kidney diabetic cellular impairment may be recognized in urine composition before any clinical signs occur. Further studies involving more animals and more targeted approach may be an option for the upcoming research.

Biography

Dagmara Winiarczyk is a Clinical teacher and Adjunct in Department of Internal Diseases in Small Animals, University of Life Sciences in Lublin. After Phd she started to focus her research interest to diabetes and using proteomic technics to discover novel protein from biological fluid. From 2016 she realise a project from Polish National Center entitled: "Proteomic analysis of tear film from diabetic dogs using mass spectrometry MALDI-TOF"

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