



5-year research activities –PI reporting form

Reporting period July 1st, 2015 – June 30th, 2020

Research Title

Potential of new biomarkers and accuracy of new test systems in small animal clinical pathology.

Research Theme: Translational Medicine, Clinical Research

Research Institute/Chair: Medizinische Kleintierklinik/
Chair: Prof. Dr. Katrin Hartmann

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Summary for Lay Reader

Laboratory tests are a fundamental part of the medical care for companion animals. Reliable point-of-care tests that need small sample volumes and use low-cost and simple equipment make diagnostic procedures fast and affordable, and benefit animals and their owners. New biomarkers in the blood could help monitoring organs that are not easily accessible, like heart and brain, or may facilitate tumour diagnosis. The findings in dogs or cats may even be transferable to human disease diagnosis.

Research Objectives

Laboratory tests are necessary for accurate diagnoses, and both supply and demand are rising fast in veterinary medicine. In close collaboration with the clinicians of the small animal clinics, we try to validate existing test systems and to investigate new biomarkers for several different diseases. The focus is on practicability, accuracy, cost-effectiveness and animal welfare. In dogs and cats, the sample volume can be very limited, and even a simple venipuncture can turn out to be stressful for individual animals. Point-of-care laboratory service and cost-effectiveness is an issue for the owners and veterinarians alike, since fast results of clinically relevant laboratory parameters are aiding the diagnostic process and can prevent multiple appointments or inappropriate treatments.

The routine laboratory samples can also be used to explore new biomarkers. Some diseases in dogs and cats are comparable to human diseases, which makes them useful natural animal models.

In the last years we have scrutinized existing test systems like LAMP-based systems for the detection of infectious diseases or point-of-care systems for urinalysis, explored new tests for rapid genotyping of dogs, and studied microRNAs as potential new biomarkers in cardiomyopathies and tumors.

Key Findings

New point-of-care systems in veterinary medicine have to be tested rigorously and have been found to not always live up to the expectations of the clinicians. The small animal clinics provides well-defined sample material to test these devices and have collaborations with laboratory manufacturers and suppliers in the veterinary field.

Canine T-cell lymphomas display distinct microRNA expression patterns that may act as diagnostic markers, and that show similarities T-cell lymphoma microRNA dysregulation in mice and humans. The tumour development may follow similar pathways in these species.

Selected publications in this research area

1. Joos, D, Leipig-Rudolph, M, Weber, K. Tumour-specific microRNA expression pattern in canine intestinal T-cell-lymphomas. *Veterinary and comparative oncology* 2020.
2. Gunther, S, Felten, S, Wess, G, Hartmann, K, Weber, K. Detection of feline Coronavirus in effusions of cats with and without feline infectious peritonitis using loop-mediated isothermal amplification. *J Virol Methods* 2018; 256: 32-36.
3. Selder, R, Weber, K, Bergmann, M, Geisweid, K, Hartmann, K. Sensitivity and specificity of an in-clinic point-of-care PCR test for the diagnosis of canine leishmaniasis. *Veterinary journal* 2018; 232: 46-51.
4. Stiedl, CP, Weber, K. Fast and simple detection methods for the 4-base pair deletion of canine MDR1/ ABCB1 gene by PCR and isothermal amplification. *Journal of veterinary diagnostic investigation* 2017; 29(2): 176-80.
5. Weber, K, Rostert, N, Bauersachs, S, Wess, G. Serum microRNA profiles in cats with hypertrophic cardiomyopathy. *Mol Cell Biochem* 2015; 402(1-2): 171-80.

Selected Seminars/Talks/Other InformationSelected Talks (Dr. Karin Weber)

Mandatory testing for antibiotic resistance in veterinary medicine- suggestions for new test systems, Seminar DiagnostikNet-BB, Berlin, Germany, 9.5.2019.

Tumor-specific microRNA expression in canine intestinal T-cell lymphomas and analysis of microRNA function in a canine T-cell lymphoma cell line, European Congress of Veterinary Internal Medicine for Companion Animals (ECVIM-CA), Rotterdam, The Netherlands 06.09.2018.

Fast and simple MDR1-Genotyping in dogs: Towards a Point-of-Care Test, European Congress of Veterinary Internal Medicine for Companion Animals (ECVIM-CA), , Lisbon, Portugal, 11.09.2015.

Current Awards/Research Grants

PIs	Project type/co-applicants/% share	Funder	Project title	Start date	End date
Weber	Prospective clinical study/100%	Pharmaceutical company	Clinical performance of a handheld urine analysis device	2020	2021
Weber	Student research project/100%	VetResearch	Accuracy and reliability of diagnosing bacteriuria by automated urine sediment analysis	2019	2019
Weber	Individual grant/100%	DFG	Functional analysis of deregulated microRNAs in canine intestinal T-cell lymphomas	2018	2019