Importance and Etiology of Pseutdotuberculosis in Goats and Sheep in Switzerland

Max M. Wittenbrink[1], Maya Diehl[1], Fabienne Niederer[1], Louis Corboz[1], Marietta Schönmann[1], Ludwig E. Hoelzle[1]
[1]Institute of Veterinary Bacteriology, Veterinary Faculty, University of Zurich, Winterthurerstrasse 268, CH-8057 Zurich

Key words
Goat, Sheep, Corynebacterium pseudotuberculosis, Prevalence, Pathogenic significance, Serodiagnostic, Switzerland

Aim of the study
Analysis of the humoral immune response of goats and sheep against the antigenic pattern of Cp. to develop a sensitive and specific serological assay.

Material and methods
Cp.-strains were isolated from goats and sheep suffering from clinical pseudotuberculosis. In parallel, blood sera were collected from diseased animals as well as from healthy controls. Cp.-strains were typed by means of biochemical reactions, ribotyping and sequence analysis of the PLD gene according to acknowledged methods. The humoral immune response was analysed by means of ELISA and Western blot against recombinant PLD as well as electrophoretically separated Cp. antigens (SDS-PAGE) according to established protocols.

Results and significance
A total of 86 temporally and geographically diverse clinical C. pseudotuberculosis (Cp.) strains from sheep and goats in Switzerland presented an identical phenotype and were classified on the basis of acknowledged biological characteristics as the biotype ovis of Cp. The high phenotpycial relatedness correlates well with data from genetic analyses of a panel of 30 clinical caprine and ovine Cp. strains which were subjected to a combination of ribotyping of whole genomic DNA after EcoRI digestion, and PCR-RFLP analysis as well as nucleotide sequence analysis of the Phospholipase D gene (PLD).
The immunoreactivity of caprine and ovine serum panels from animals with confirmed natural Cp. infection and from non-infected controls were analysed by Western blotting in order to determine immuno-dominant antigens of Cp. representatives. Apart from the 30 kDa PLD, a variety of other Cp. proteins which were specifically immunoreactive with sera from naturally infected animals were identified. In Western blotting ovine sera showed different reaction patterns here from caprine sera. Singular partial antigen of Cp. such as a 69 kDa protein (a putative invasive protein) and a 40 kDa protein were recognised only by ovine sera. Yet goat sera reacted exclusively with three protein bands of 57, 34 and 29 kDa. Said results point out that in pseudotuberculosis of small ruminants there are vital differences in the host-pathogen interactions which are diagnostically relevant too. Based on these results a Western blot method for serodiagnostics was established.

Publications, posters and presentations
Diehl, M. (2006) Analysis of the PLD gene of Corynebacterium pseudotuberculosis. Vet. Med. Thesis, University of Zurich.
Scherrer, T.; Wittenbrink M.M.; Schönmann, M.; Hoelzle, L.E.; (2006) New aspects for the serodiagnosis of Corynebacterium pseudotuberculosis infection in small ruminants. In: Swiss Society for Microbiology: 65th Annual Assembly of the SSM; p.170.
Niederer, F. (2007) Identification oand characterization of an immunodominant protein of Corynebacterium pseudotuberculosis and establishment of a recombinant serological assay. Thesis, University of Zurich.

Project *1.02.20*

Project duration *January 2003 - December 2005*