2009-10-09-203 Paratuberculosis databases updated (2009-10-08)
To: (08) Mycobacterial diseases; (23) Veterinary education; (27) Scientific information

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New publications in the PARATUBERCULOSIS database (633-637)

Antibody recognition to secreted proteins of Mycobacterium avium subsp paratuberculosis in sera from infected ruminants
Veterinary Microbiology, 138, 378-383

Two liquid culture media to obtain secreted proteins of Mycobacterium avium subsp. paratuberculosis at different incubation periods were evaluated. Middlebrook 7H9-OADC (7H9) and Watson-Reid (WR) broths were inoculated with a field strain of M. paratuberculosis and growth curves determined using nonlinear regression analysis. Most culture filtrate (CF) proteins were of low molecular weight and reacted strongly against sera from cultured-positive cases of paratuberculosis. CF proteins obtained in WR yielded a higher number of bands and were detected earlier than those obtained from 7H9. A high degree of variability in CF protein immunoreactivity was seen among infected animals. Sera from cattle with clinical paratuberculosis or heavy fecal shedders of M. paratuberculosis reacted more intensively and to more CF proteins than did sera from other infected cattle. Immunoblots showed differences in antibody binding to CF proteins when sera were absorbed with M. avium but not with others environmental mycobacteria. Immunoblots with sera from infected goats and a sheep showed reactivity with proteins of 32, 33 and 46 kDa both before and after the sera were absorbed with M. phlei. Antibodies found in serum of infected deer reacted with CF proteins in a similar way as did for cattle. These results suggest that a pool of CF proteins of M. paratuberculosis could be good candidates as antigens for serodiagnosis of paratuberculosis. (C) 2009 Elsevier B.V. All rights reserved

634 Click, R.E., Van Kampen, C.L. (2009)
Short communication: Progression of Johne's disease curtailed by a probiotic
Journal of Dairy Science, 92, 4846-4851

The naturally occurring inflammatory bowel disease Johne's, caused by Mycobacterium avium ssp. paratuberculosis (MAP), has many clinical manifestations in common with the human inflammatory bowel disease Crohn's disease. In addition, both lack preventive and curative therapies. Because a high percentage of Crohn's patients harbor MAP, it is not surprising that MAP is at the center of controversy as to its contribution. Special concern is being raised as to what role, if any, food animals play in transmission of MAP to humans. Because management practices, presently considered the best way to control the spread of MAP, have not and most likely will not eliminate MAP from food animals, other preventive or curative measures are needed. The results presented herein show that a unique bacterium, Dietzia sp. C79793-74, used as a probiotic, was therapeutic for adult paratuberculosis animals, and resulted in a cure rate of 37.5%

Loss of income from cows shedding Mycobacterium avium subspecies paratuberculosis prior to calving compared with cows not shedding the organism on two Minnesota dairy farms
Journal of Dairy Science, 92, 4929-4936

Quantification of the financial effect of Mycobacterium paratuberculosis infection on lactation performance is essential to encourage participation of dairy cattle producers in Johne's disease (JD) control programs. The objective of this study was to evaluate the differences in net income per lactation of cows shedding Mycobacterium paratuberculosis before calving compared with test-negative cows. Two Minnesota dairies were enrolled in the study and fecal samples were collected from 1,048 cows during the close-up period. Milk production, clinical diseases (other than clinical JD), and reproductive performance data were recorded for each cow. Overall, fecal-culture-positive (FCP) cows produced 1,355 kg less than fecal-culture-negative (FCN) cows.
Fecal-culture-positive cows that survived their current lactation produced $276 less in milk income than cows that were FCN ($1,956 vs. $1,680; SD $526, $570). Fecal-culture-positive cows were 3.0 (95% confidence interval: 1.6-5.8) times more likely to be culled than FCN cows. The mean days open (number of days from calving to conception) was not statistically significant and the cost differences for clinical disease other than JD were small and neither statistically nor economically significant between FCP and FCN cows. Among all FCP cows, income over feed costs losses were $366 per cow per lactation compared with FCN cows. Among FCP nonculled cows, income over feed costs losses were $276 more compared with FCN cows and this difference was statistically significant. There was a total loss of $155 per lactation for nonculled FCP cows retained in the herd compared with FCN cows retained in the herd. Among culled cows, FCP cow losses were $50 less because of age at culling and $120 for reduced beef value. This totaled a loss of $441 for culled FCP cows compared with culled FCN cows. The losses as a result of lower lactation performance and early culling from the herd should alarm dairy producers and motivate them to implement the appropriate control measures for the disease.

Romano, M., Huygen, K. (2009)
**DNA vaccines against mycobacterial diseases**
Expert Review of Vaccines, 8, 1237-1250

Bacteria belonging to the genus Mycobacterium can cause several infectious diseases affecting humans and animals. Here, we reviewed the latest advances in the development of DNA vaccines against TB, Buruli ulcer and Johne's disease. Current understanding of the immunity to the respective causative pathogens indicates that the use of DNA vaccines encoding mycobacterial antigens could lead to efficient vaccination strategies. Moreover, characterization of protective mycobacterial antigens has been greatly facilitated by the analysis of immune responses induced after DNA vaccination. In addition, work aiming at optimizing DNA vaccines against mycobacterial diseases and research related to the controversial development of postexposure and therapeutic DNA vaccines are also discussed.

**DNA vaccines in veterinary use**
Expert Review of Vaccines, 8, 1251-1276

DNA vaccines represent a new frontier in vaccine technology. One important application of this technology is in the veterinary arena. DNA vaccines have already gained a foothold in certain fields of veterinary medicine. However, several important questions must be addressed when developing DNA vaccines for animals, including whether or not the vaccine is efficacious and cost effective compared with currently available options. Another important question to consider is how to apply this developing technology in a wide range of different situations, from the domestic pet to individual fish in fisheries with several thousand animals, to wildlife programs for disease control. In some cases, DNA vaccines represent an interesting option for vaccination, while in others, currently available options are sufficient. This review will examine a number of diseases of veterinary importance and the progress being made in DNA vaccine technology relevant to these diseases, and we compare these with the conventional treatment options available.

New publications in the CROHN'S DISEASE AND PARATUBERCULOSIS database (320-321)

**New insights into the pathogenesis of Crohn's disease: are they relevant for therapeutic options?**
Swiss Medical Weekly, 139, 527-534

During the last few years significant advances have been achieved in the understanding of the pathogenesis of inflammatory bowel disease (IBD). A genetic susceptibility to Crohn's disease has been proven by identification of variations as risk factor NOD2/CARD15. Functional data on NOD2/CARD15 and NF-kappa B activation indicate that an inflammatory reaction of the intestinal mucosa, as an immediate response of the innate immune system, may be necessary for the maintenance of gut homeostasis. Crohn's disease is now also discussed as an impaired and inadequate immune reaction and no longer only as a hyper-responsiveness of the mucosal immune system. Data on NOD2/CARD15 expression suggest that macrophages and epithelial cells could be the locus of the primary pathophysiological defect and that T-cell activation might just be a secondary effect inducing chronication of the inflammation, perhaps as backup mechanism to insufficient innate immunity. In addition to NOD2/CARD15 there are more "innate" pathways by which commensal and pathogenic bacteria can directly be hindered to invade the human body (such as interaction with Toll like receptors, TLRs and defensins). The "germ-
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