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defense against *B. microti*.

2. The role of cytokine and nitric oxide (NO) was studied in *B. caballi* infection in horses. The expression of cytokine mRNA was determined by using reverse transcriptase polymerase chain reaction in *B. caballi*-infected horses for 2 weeks after infection. One horse expressed IFN- $\gamma$ , tumor necrosis factor (TNF- $\alpha$ ) and interleukin-2 mRNAs, and another horse expressed TNF- $\alpha$  mRNA. The expression of interleukin-4 mRNA was not observed in any of the two horses. In the dexamethazone-treated horses, high NO production was observed in the late phase of *B. caballi* infection, although the parasitemia was very low. Treatment of the horse with an inhibitor of NO synthesis showed the decreased NO production and increased parasitemia, however, the horse died with the infection. These results suggested that NO is a critical effector molecule in defense against *B. caballi*. TNF- $\alpha$  and NO may contribute to the pathogene-

sis in *B. caballi* infection.

3. A 30 kDa immunodominant surface antigen (p30) of *B. equi* has been used as a diagnostic antigen. The B cell epitopes on this molecule recognized by infected horse sera and monoclonal antibody (MAb) 36/133.97 against p30, were determined. A synthetic peptide of p30 with amino acid sequence of  $^{123}\text{FYQEVLFKGF}^{\text{EAV}}^{135}$  exhibited strong positive reaction with the infected horse sera. In contrast, MAb 36/133.97 recognized different region of p30, as a peptide synthesized with amino acid sequence of  $^{27}\text{ASGAVVDFQLESI}^{39}$  reacted strongly. In competitive inhibition enzyme-linked immunosorbent assay, the binding of MAb 36/133.97 to recombinant p30 was inhibited by horse antibodies, although they did not recognize same or an overlapping epitope.

The results of the present study has a bearing on the development of diagnostic and preventive methods of Babesia parasite infection.

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## Biodiversity of helminth parasites in Mongolia.

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In this study, the biodiversity and community structure of helminths of wild mammals in Mongolia was investigated, and helminth biodiversity and community in different populations of *Microtus brandti* were analyzed.

The species diversity of helminth parasites was investigated on the basis of collections made during field surveys in 1994-1996 in Mongolia, where 1678 mammals belonging to 50 species

were examined. A total of 76 species of parasites, including 31 species of cestodes, 2 acanthocephala, 42 nematodes and one pentastomid species were identified. Of these, new geographic records were made for 21 species, and new hosts were registered for 26 species. The species determination of some helminths that are undistinguishable using morphological criteria was conducted using DNA study and/or ex-

perimental methods. The DNA sequence of mitochondrial cytochrome c oxidase subunit I gene (COI) of the taeniid cestode from snow leopard, *Uncia uncia* was obtained and compared with that of *Taenia hydatigena*. The sequences differed at 34 of the 384 (or 8.6%) nucleotide positions examined. The cestode was identified as *Taenia kotlani*. The taxonomical belongings of the metacestodes of *Mesocestoides lineatus* collected from *Microtus brandti* in Mongolia was first proved on the basis of the adult tapeworms obtained from the experimentally infected dogs.

The distribution of helminths was not restricted to certain natural zone, due to the interchanges mainly in steppen zone, which is sandwiched between forest and desert. In general, the helminth fauna of wild mammals in Mongolia suggested very old and heterogeneous character, consisting of the species that specific to the Afro-Asian deserts, the Eurasian boreal forests, the Eurasian alpine, the Eurasian steppes, the highland Asia, Central Asian steppe, and

Siberia. That is corresponding with the unique location of Mongolia as an ecological transition zone in Central Asia where Siberian taiga forest, Central Asian steppe, the Altai mountains and the Gobi desert meet.

The helminth biodiversity and community in eight populations of Brandt's vole, *Microtus brandti* have been studied and total of 15 species of helminths were recorded. Species richness varied from 3 to 9 (mean 5.87) among different localities and in different sampling year in the same locality. The helminth biodiversity changed among years and correlated negatively with host density. The relative share of caecal nematodes have been decreased following the host decrease in density, while relative share of intestinal, tissue and cavity absorbers increased. The relative density by *Syphacia* spp. and *Catenotaenia afghana* correlated with host density. These species are suggested as reliable bioindicators of the host population.

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### Evaluation of Experimentally Induced Canine Liver Disease and Portal Hemodynamics Using Ultrasonography as a Non Invasive Diagnostic Method

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The liver performs a lot vital of functions in the body. This central role in many anabolic and catabolic processes makes it prone to injury by a wide variety of metabolic, infectious or toxic agents, leading to clinical signs which are at times not specific for the liver. No single laboratory

test is capable of describing the full extent of damage. Diagnosis and the necessary treatment are quite challenging.

The determination of serum concentrations of liver specific enzyme profiles is the most widespread method used. The values however