tion of germinal cells and the formation of brood capsules.

In an immunohistological study using the sections of immature and mature metacestodes with various WPI sera, brood capsule and germinal layer, which is composed of germinal cells, was stained heavily besides the surface and parenchyma of protoscoleces, and calcareous corpuscles. This finding supports the result of ELISA, and the host antibody response was strongly stimulated by the increased proliferation of germinal cell which was required for the fomation of brood capsules and germinal layers.

In ELISA using a polysaccharide antigen extracted from mature metacestode, the OD value suddenly increased at 9 WPI. It is suggested that the antigen expression increased dramatically during this period, and induced the strong antibody response.

It was concluded that antibody response was greatly stimulated by the active proliferations of the germinal cells which were observed in brood capsule and protoscoleces formation during 9 to 16 WPI.

The findings in this study contribute to the establishment of serodiagnostic methods for detection of alveolar echinococcosis in domestic and wild animals as well as in humans.

Ecological study on the hookworm, *Uncinaria lucasi*, of northern fur seal, *Callorhynus ursinus*, in bering island, russia

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In July and August, 1995, a survey was performed on pups of northern fur seals (*Callorhynus ursinus*) for the hookworm (*Uncinaria lucasi*) infection in Northwestern Rookery in Bering island, Kommandorski Islands, Russia. *U. lucasi* were collected from the intestines of 26 dead pups in the rookery and its biological characteristics was determined. Moreover, day age estimation of 23 pups was performed using their teeth and the relationship of the parasite development, burden and distribution in the intestine and age of seals were compared.

U. lucasi were found in 84.6% (22/26) of the dead pups. Among 23 pups performed age estimation, larva were found in 50% of the pups with 3–10 days of age and adult parasites were in 100% (15/15) with 15–35 days of age. Because the pathogenicity of larval *U. lucasi* is weak, only 50% of the pups with less than 10 days old were parasitized and the external traumas were recognized on their bodies, it is predicted that the mortality of those pups was not due to the parasite infection. On the other hand, all the dead pups with 15–35 days old harbored numerous adult *U. lucasi* which are pathogenic to the hosts. In these pups, 2 of them harbored less than 800 worms, 5 with 800 to 1,600 and 8 with more than 1,600. Therefore, it is predicted that the mortality of those pups was due to the large number of infection with adult *U. lucasi*, although the possibility of other causes of the mortality can not be denied. In the individual pups, *U. lucasi* was most often found in the middle of the small intestine. Because no difference was observed in the larvae and adult distribution in the intestines of those pups, it is suggested that *U. lucasi*

develops to adult at the same site where it initially attaches to the host intestine. In 3 pups with about 17–26 days of age, most of the parasites were found in the lower part of the small intestine and also in the large intestine. This finding suggests that the expulsion of the parasite could occur as early as 14 days of infection. Density effect was observed on number and size of the parasites. The size of the parasites in the same site of the intestine of the different hosts decreased as the total number of the parasites in one host increased. Moreover, the size of the parasites was differed among the different sites of the intestine in the same host. The comparison of the age of the pups and the development of the parasite revealed that the parasites can develop into adult in 14 days old hosts. The color test of feces in the rectum was carried out as an indicator of the amount of blood in the feces. Pups which showed high level of red color in their feces ranked to heavy infection of the parasites. Further studies are required for investigating a correlation of the rectum color, blood contents and parasite burden. In this survey, the mean number of the parasites in a dead pup (X) was 1,200 and standard deviation (S) was 1,005. Therefore, $S^2/X \gg 1$. This indicates over dispersion in the distribution of *U. lucasi* in their hosts.

It is concluded that transmammal infection with *U. lucasi* in the northern fur seals occurs only during the first week after birth and this period is critical for *U. lucasi* to complete its life cycle. *Uncinaria* infection is common in the seals of Bering island, and the population of fur seal is exposed to *U. lucasi* with high mortality risk.

Analysis of a mouse cDNA which can complement the first meiotic-deficient mutant of the fission yeast *Schizosacchromuces pombe*

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Meiosis is a key step of sexual reproduction in all eukaryotic organisms. The molecular controls of meiosis, however, are poorly understood compared with those over of mitosis. Meiotic cells undergo premeiotic DNA synthesis which is followed by the first and second meiotic divisions to yield haploid cells. This process is highly conserved among a variety of species from yeast to mammals. Total testis cDNA library from mouse was constructed in a fission yeast expression vector. Using the genetic functional complementation method, a mouse cDNA clone which can rescue *sme2* mutation has been identified. This mutant was arrested before the first meiotic phase I. A 1.2-kb cDNA clone was obtained, named poly (A) binding protein 3 (*Pabp3*), which contains an open reading of 906 nucleotides encoding a predicted 32-kD protein. The amino acid sequence includes a clear match to the RNA-recognition motif (RRM). Furthermore, a search of the Genebank database revealed that the *Pabp3* protein has 95.8% amino acid identity with the bovine poly (A) binding protein II (PABII). These results strongly suggest that *Pabp3* is the mouse homolog of PABII, which stimulates poly (A) polymerase. Poly (A) polymerase synthesizes poly (A) tails rapidly only when the substrate RNA is bound simultaneously