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BRIEF COMMUNICATION

LARVAL DEVELOPMENT OF *ECHINOCOCCUS MULTILOCULARIS* IN BEIGE MICE WITH THE CHEDIAK-HIGASHI SYNDROME[1]

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The beige mouse has been investigated as a model of Chediak-Higashi syndrome with increased susceptibility to infection, partial oculocutaneous albinism and the presence of giant abnormal lysosomes in most granule-containing cells as the clinical and pathological manifestation.[6] Furthermore genetical defects in the beige mice resulting in decreased fusion of lysosomes with phagosomes, low bactericidal capacity, decreased chemotaxis of its neutrophils, defective natural killer (NK) cell activity and the inability of its eosinophils to bind tightly to antibody-coated parasite, have been also reported.[2,4] Defective NK cell function, which occurs in normal non-immune animals and lyses certain tumour cells *in vitro*, is a prominent feature of the beige mice.[8] NK cells, which have been proposed as a first level of defence against tumour growth,[9] may represent a heterogeneous grup of effector cells.[3] At the larval stage, *Echinococcus multilocularis* proliferates like tumours and metastasis of the parasite occurs in the intermediate hosts.[7] Complement, antibody, macrophage and T cell were proposed as factors involved in the resistance to the growth of *E. multilocularis* at the larval stage.[1,5] The role of NK cells and granulocytes in the resistance to *E. multilocularis* have not yet been investigated. In order to study the effect of genetical defects of bg^J/bg^J mice on larval development of *E. multilocularis*, cyst weight, brood capsule and protoscolex formation, and mortality-rate of the host were examined.

Conventional male beige (C 57 BL/6J-bg^J/bg^J) and normal heterozygote ($bg^J/+$)

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mice, aged 10-20 weeks at the commencement of experiments, were obtained from The Jackson Laboratory, Bar Harbor, Maine, USA, and bred in our department. The parasite used in this study was derived from an Alaskan strain of *E. multilocularis* and had been maintained by vegetative transfer in mice. A 1 ml aliquot of echinococcal cyst suspension in saline supplemented with 100 units/ml penicillin G and 100 μ/ml streptomycin sulphate was injected intraperitoneally into the mice. The infected mice were killed by bleeding, and the echinococcal cyst weight was determined. The cysts were fixed in 10% formalin and paraffin sections for microscopy were made and then stained with hematoxylin and eosin.

All of the mice injected bear echinicoccal cysts. No difference was noted in the echincoccal cyst weight of beige or heterozygote mice 15 or 18 weeks after injection (tab. 1). Brood capsule and protoscolex formations were determined from the sections. The former were observed in all cases at 15 weeks after injection and thereafter, and no differences were noted in the rate of protoscolex formation between the beige and the heterozygote mice (tab. 2). The number of brood capsules and protoscoleces varied widely among the mice. However, in the average number of

TABLE 1 *Echinococcal cyst weight of normal ($bg^J/+$) and beige (bg^J/bg^J) mice*

	WEEKS AFTER INJECTION	
	15	18
bg^J/bg^J	10.7±3.4* (34%**)	12.0±3.1 (35%)
$bg^J/+$	11.0±4.4 (31%)	13.3±3.5 (34%)

* Groups of 8–10 mice, Mean ± SD (g)
** Percentage of cyst weight to total weight of mice

TABLE 2 *Rate of protoscolex formation of E. multilocularis in normal ($bg^J/+$) and beige (bg^J/bg^J) mice*

	WEEKS AFTER INJECTION	
	15	18
bg^J/bg^J	5/8 *	8/11
$bg^J/+$	7/10	9/10

* No. positive / No. examined

TABLE 3 *Number of brood capsules and protoscoleces in sections of echinococcal cyst of normal ($bg^J/+$) and beige (bg^J/bg^J) mice*

	WEEKS AFTER INJECTION			
	15		18	
	brood capsules	protoscoleces	brood capsules	protoscoleces
bg^J/bg^J	170.8±203.4*	10.4±14.5	374.7±376.5	22.5±28.6
$bg^J/+$	141.9±106.4	6.5± 9.3	440.6±349.9	31.7±39.1

* Groups of 5–9 mice, Mean No. ± SD for each group counted from a 4 cm^2 section of cysts per mouse

brood capsules and protoscoleces in a 4 cm^2 section of the echinococcal cyst in both types of mice, no differences were noted (tab. 3). The rate of metastases formation in the thoracic cavity of the beige and heterozygote mice 15-18 weeks after injection was 3/19 and 5/20, respectively. As mentioned above, the development of the parasite in the beige mice was similar to that in the heterozygote mice. These results showed that genetical defects of the beige mouse had no effect on the development of the parasite. It appeared that NK cells may not play an important role in resisting infection by *E. multilocularis*. Furthermore, no difference was observed in the granulation tissue reaction of both types of mice, which included cell accumulation composed of eosinophils, lymphoid cells, plasma cells, giant cells and epithelioid cells. Moreover no difference was observed in the thickness of the laminated layer of the echinococcal cyst between the two groups of mice. The mortality-rate until 18 weeks after injection of the beige mice at 11/30 was higher than that of the heterozygote mice at 5/30.

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