

**Syngeneic Marrow Graft: Effect on Persistence of Preirradiation Immunity  
To *Hymenolepis nana* in Mice. (31854)**

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Preirradiation-acquired immunity to the dwarf tapeworm *Hymenolepis nana* persists longer in X-irradiated (950 r) mice treated with bone marrow from nonimmune mice of the same inbred strain (syngeneic marrow) than in similarly irradiated mice implanted with rat marrow(1). In the present study we examined the relationship of the number of injected syngeneic marrow cells to persistence of immunity. A positive relationship would indicate that the postirradiation administration of syngeneic marrow makes less severe (or prevents) a radiation-induced depression of acquired immunity.

*Materials and methods.* Male C3BF<sub>1</sub>/Cum mice (Cumberland View Farms, Clinton, Tenn.) were host animals and donors of syngeneic marrow. At the time of irradiation the host mice weighed  $41 \pm 1$  g (mean  $\pm$  S.E.) and were 28 weeks old. Rat marrow was obtained from male Sprague-Dawley rats (Sprague-Dawley, Inc., Madison, Wisc.).

The radiation source was a Keleket X-ray machine operated under the following conditions: 250 kv constant potential, 15 ma, approximately 78 r/min, inherent filtration equivalent to 0.25 mm Cu, added filtration 1.0 mm Al, target-to-midline of mouse 82 cm. During irradiation the mice were confined individually in perforated Plexiglas containers on a rotating (18 rev/min) Plexiglas turntable.

Mice were infected with *H. nana* by administration of the eggs(1). The development of worms was indicated by the presence of parasite eggs in the feces. When eggs were no longer found, each animal was given a second dose of *H. nana* eggs. Mice that did not become infected after the initial egg dose and those that became infected after the preirradiation challenge dose of parasite eggs were discarded. The immunized mice were exposed to 950 r whole-body X-irradiation.

The day after irradiation syngeneic marrow from nonimmune mice or rat marrow was administered by tail-vein injection(2). Twenty-two days after irradiation each animal was challenged with *H. nana* eggs to test for persistence of immunity. The mice were killed 93 to 96 hours after the egg-challenge and cysticercoids (larvae) in the small intestine were counted(3). A differential lysis test, performed 3 days before the animals were killed, indicated that the mice with implanted rat marrow had  $67 \pm 4\%$  (mean  $\pm$  S.E.) circulating rat erythrocytes(4).

*Results and conclusions.* The Mann-Whitney *U* test was used to compare groups (Table I) and a difference was considered significant if the probability value was  $\leq 0.05$  (5). Infection rates in the mice treated with rat marrow and in the nonimmune controls were not significantly different. Apparently the rat-mouse chimeras did not retain any acquired immunity to the parasite.

Cysticercoids were seen in 15 of 17 mice injected with 1 million syngeneic marrow cells. In contrast, only 2 of 15 mice that received 40 million syngeneic marrow cells were infected. The difference in infection rates between these two groups was significant. Thus, resistance to reinfection with *H. nana* was greater in the mice treated with the larger number of syngeneic marrow cells.

We conclude that transplanted syngeneic bone marrow from nonimmune donors makes less severe (or prevents) a radiation-induced depression of acquired immunity to *H. nana*. There are at least two possible mechanisms: 1) A humoral factor derived from the syngeneic marrow graft stimulates function in immunologically committed cells injured by the radiation. 2) Persisting antigen (or an immunologically committed cell fraction) is transferred from the irradiated host cells to immunologically competent cells derived from

TABLE I. *Hymenolepis nana* Infection in X-Irradiated Mice Implanted with Bone Marrow. Each entry indicates the number of cysticercoids (larvae) in a single mouse 93 to 96 hours after post-irradiation challenge with parasite eggs.\*

Nonirradiated (controls)		Immunized & irradiated (950 r)		
Nonimmunized	Immunized	Syngeneic marrow		Rat marrow
		40 × 10 <sup>6</sup> cells	1 × 10 <sup>6</sup> cells	204 × 10 <sup>6</sup> cells
50	0	5	82	157
143	0	0	92	126
311	0	0	0	126
350	0	0	26	83
236	0	0	141	295
164	1	0	6	239
213	0	0	226	301
185	0	12	27	203
176	0	0	12	313
342	0	0	134	301
		0	22	382
		0	82	338
		0	0	319
		0	31	
		0	92	
			20	
			2	

\* Mice immunized with 14 × 10<sup>3</sup> parasite eggs 67 days before irradiation. Preirradiation challenge with 7.6 × 10<sup>3</sup> eggs 21 days before irradiation. Postirradiation challenge with 4.8 × 10<sup>3</sup> eggs 22 days after irradiation. Nonimmunized control mice were given only the "postirradiation" egg dose; immunized controls received the immunizing dose and the two challenge doses of parasite eggs.

the transplanted syngeneic marrow—the more donor marrow the more immunologically competent cells and, therefore, the greater

opportunity for transfer.

**Summary.** X-irradiated mice preimmunized to *Hymenolepis nana* were injected with either 1 million or 40 million syngeneic bone-marrow cells from nonimmune mice or with 204 million rat marrow cells. Twenty-two days after irradiation the mice were given *H. nana* eggs. Infection rates were lowest in the animals injected with the larger number of syngeneic marrow cells; the mice implanted with rat marrow had the highest infection rates. We conclude that transplanted syngeneic marrow from nonimmune donors makes less severe (or prevents) a radiation-induced depression of acquired immunity.

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### Effect of Corticosteroids on Amino Acid Incorporation into Protein by Rat Liver Ribonucleoprotein Particles. (31855)

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The effects of glucocorticosteroids and other steroid hormones on protein synthesis, as evaluated by amino acid incorporation, have been studied by several investigators and a variety of tissues have been used (1,2).

In a previous paper (3) on the incorporation of leucine-C<sup>14</sup> into protein, with cell-free preparations from rat liver, it was shown that the ribonucleoprotein (RNP) particles, prepared from liver of adrenalectomized rats up

to 15 days after adrenalectomy, have a greater incorporating activity than the corresponding particles from liver of normal rats. The present study was undertaken to investigate the amino acid incorporating activity of these liver particles after *in vivo* administration of exogenous corticosterone to the normal and adrenalectomized animals and after *in vitro* addition of corticosterone to the incubation system. An attempt was also