

# Preliminary Report on the Effects of L-Triiodotyronine, Radioactive Iodine<sup>131</sup>, and Methimazole on Experimental Murine Leprosy

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Lurie *et al.*<sup>1</sup> have found that administration of thyroid hormones can increase the level of native resistance to tuberculosis in rabbits, and that thyroidectomy and antithyroid drugs have the opposite effect.

On the other hand, the harmful effects of iodides on the clinical manifestations of human leprosy are well known. O'Byrne<sup>2</sup> and Rojas<sup>3</sup> have reported favourable responses in the treatment of this disease with thiouracil and methimazole.

These reports would indicate a substantial difference in the effects of thyroid-related compounds on two infections produced by bacteria which are so closely related taxonomically. To further investigate these relations we treated mice with thyroid-related compounds and then infected them with another closely related mycobacteria, the Stefansky bacillus.

Seventy albino-swiss mice, 7 weeks old, were divided into 4 groups and were treated as shown in the Table I.

TABLE I  
Treatments and inoculation of the mice divided by groups

Group	Mice Number	Treatment		Inoculation* Day
		Drug	Duration (days)	
1	10	None	—	16th
2	20	Methimazole**	1st to 65th	16th
3	20	Iodine <sup>131</sup> ***	9th	16th
4	20	L-Triiodotyronine****	1st to 65th	16th

\* 0.5 cc. of a suspension of bacilli in saline solution inoculated intraperitoneally. (Approx.  $5 \times 10^7$  bacilli.)

\*\* Methimazole (Tapazol, Lilly Lab.) was administered in the drinking water in 0.1% solution.

\*\*\* 85 microcuries in 0.5 cc. administered intraperitoneally in a single dose.

\*\*\*\* L-Triiodotyronine was mixed with the diet (100 microgm./100 gm. of food).

All animals were fed Purina Lab Chow.

## RESULTS

Lesions were found in all surviving mice. In order to do a quantitative analysis, granulomata were counted in liver tissue<sup>4</sup>. To avoid investigator bias, granulomata were counted in slides

labelled randomly, without knowledge of the precedence of each slide ('blind counts'). Results were expressed as number of granulomata per square mm. of liver tissue, as seen in Table 2.

TABLE 2

Average number of granulomata found in the livers of the experimental animals. In parenthesis: percentage of mice in each experimental group

Experimental Group	Mice Survival	Granulomata per square millimetre of tissue						Average of averages
		40 or less		41—79		80 or more		
		Mice	Percentage	Mice	Percentage	Mice	Percentage	
Control	10 of 10	2	(20)	1	(10)	7	(70)	118
Methimazole	13 of 20	3	(23)	2	(15)	8	(61)	106
Iodine <sup>131</sup>	10 of 20	14	(74)	0	(00)	5	(26)	73
L-Triiodotyronine..	6 of 20	6	(100)	0	(00)	0	(00)	5

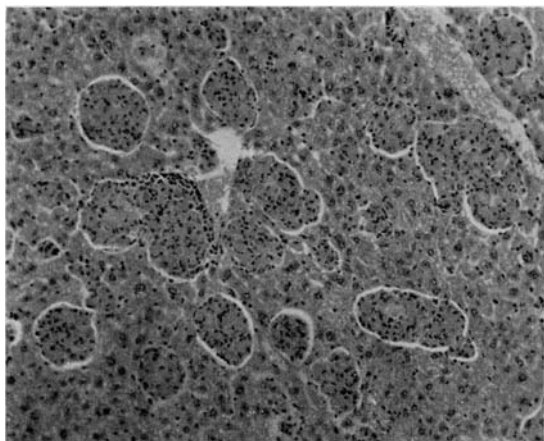


FIG. 1

Liver of mouse inoculated with Stefansky bacilli. Control group. Notice multiple granulomata. (H & H 105X.)

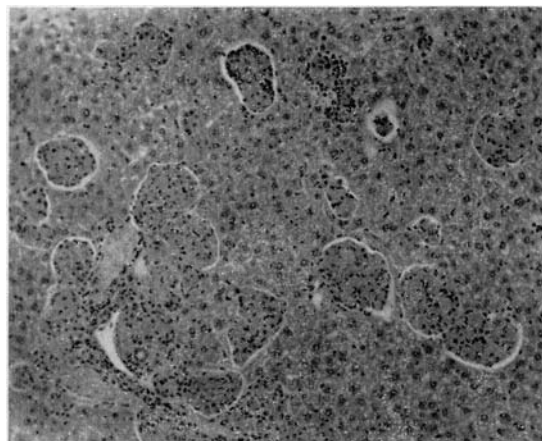


FIG. 2

Liver of mouse that received Methimazole and was inoculated with Stefansky bacilli. There is a close similarity with the control. (H & E 105X.)

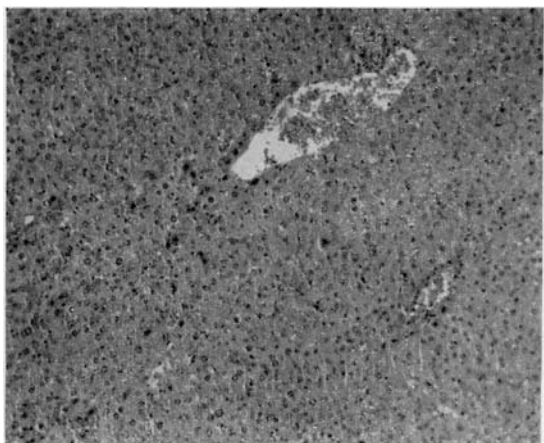


FIG. 3

Liver of mouse that received I<sup>131</sup> and was inoculated with Stefansky bacilli. Notice absence of granulomata. (H & E 105X.)

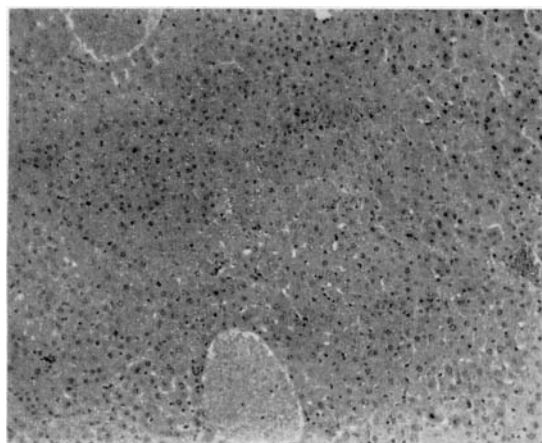


FIG. 4

Liver of mouse treated with L-Triiodotyronine and inoculated with Stefansky bacilli. Notice the absence of granulomata and the similarity with Fig. 3. (H & E 105X.)

## DISCUSSION

Mice treated with Methimazole (Fig. 2) did not show significant differences in the number of granulomata when compared with the control group (Fig. 1).

To our surprise, mice treated with radioactive Iodine<sup>131</sup> (Fig. 3) had less granulomata in the liver and other organs than the controls. Apparently, even greater differences were found in the animals treated with L-Triiodotyronine (Fig. 4). In this group all of the mice had less than 28 granulomata per square mm. of liver tissue. The higher mortality in this group is probably explained by the use of excessive doses in the beginning of the experiment (400 microgm./100 gm. of food); after the reduction to the definitive dose, there were no more deaths. Further experiments are under way to examine the possible effects of the high mortality on the results of this group. The magnitude of the differences found between the L-Triiodotyronine and the control groups, however, is so great that it does not seem to be the result of mortality selection. Our results are similar to the findings of Lurie in experimental tuberculosis and seem to indicate the necessity of further investigation of this interesting phenomenon.

## CONCLUSION

Our preliminary data seems to point to some 'protective action' of Iodine<sup>131</sup> and of L-Triiodotyronine on experimental infection with the Stefansky bacillus.

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