Unquestionably some of the irritating properties of the tuberculolipoids are largely due to the presence of free fatty acids.

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Tetanus Toxoid in Prophylaxis against Tetanus.

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Ramon[1, 2, 3] and his colleagues have applied their method of detoxifying diphtheria toxin with formaldehyde to the detoxification of tetanus toxin. The addition of 0.3 to 0.4% of commercial formaldehyde to tetanus toxin causes detoxification at incubator temperature in about 2 weeks. A tetanus toxin containing 5,000 to 10,000 MLD per cc., for guinea pigs, when detoxified can be injected subcutaneously into guinea pigs weighing 300 to 350 gm., in doses of 5 cc. without giving rise to symptoms of intoxication.

Ramon and his colleagues state that 3 doses of 1 cc. of toxoid injected subcutaneously into guinea pigs at 14 day intervals induce a high degree of immunity.

The purpose of this study was to ascertain the protective power and immunity afforded to guinea pigs by 3 doses of tetanus toxoid. The degree of protection obtained was determined by measuring the neutralizing power of the serum of the immunized guinea pigs when administered to normal guinea pigs combined with 0.1 L+ dose of standard tetanus toxin.

We studied the immunizing effects of 2 toxoids, one No. 6 prepared from a toxin containing 3,000 MLD per cc., and the other, prepared from a toxin containing 10,000 MLD per cc. Titration of the sera of 3 guinea pigs immunized with toxoid No. 6 indicated the presence of 0.2 of a unit of antitoxin per cc. of blood-serum, while titration of the sera of 5 guinea pigs immunized with toxoid No. 7 indicated the presence of 0.5 of a unit of antitoxin per cc. of blood serum.

On the basis of the titrations of the antitoxic content of the sera of the guinea pigs treated with toxoids No. 6 and No. 7, the animals received the following doses of tetanus toxin:

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[1] Ramon, G., *Airn. d., Inst. Pasteur.*, 1924, **38**; *C. R. Acad. Sci.*, 1924, **78**, 436.

[2] Descombey, F., *C. R. Soc. Biol.*, 1924, **91**, 239.

[3] Zoeller, Chr., and Ramon, G., *Presse Med.*, 1926, **164**, 485.

TABLE I. Toxoid No. 6.

No.	Wt. approx. gm. × 100	MLD of Toxin × 1000	Results
1	5	6	Survived
2	5	10	"
3	5	15	"

TABLE II. Toxoid No. 7.

No.	Wt. approx. gm. × 100	MLD of Toxin × 1000	Results
1	5	9	Survived
2	5	15	"
3	5	15	"
4	5	20	D. Tetanus
5	5	20	" "

The experiments which form the basis of this report confirm the claims of Ramon and his associates that tetanus toxin can be detoxified with commercial formaldehyde as shown by the absence of symptoms from injections into guinea pigs of 5 cc. amounts of a toxoid prepared from toxins containing 3,000 to 10,000 MLD per cc.; that 3 doses of 1 cc. of such toxoid when injected subcutaneously into guinea pigs at 14 day intervals stimulate the production of from 0.2 to 0.5 unit of antitoxin per cc. of serum; and that the antitoxin content of the blood of the animals protects them against 10,000 to 15,000 MLD 2 to 6 months subsequent to the administration of the toxoid.

Ramon and Zoeller[4] tested the antitoxin titer of the sera of 12 individuals, 4 to 5 years subsequent to the injection of 2 or 3 doses of tetanus toxoid, and found the titer to range from 1/500 to 1/6 of an American unit (1/250 to 1/3 international unit). In another individual who received a fourth dose, sometime after the usual course of immunization, the antitoxin titer was 1.5 units per cc. of serum.

In the titration of the antitoxin content of the serum of the immunized guinea pigs an average of 1/5 unit per cc. of serum was found in the animals immunized with the weaker toxoid, and 1/2 unit per cc. of serum in the animals immunized with the stronger toxoid. One cc. of the serum of each group of guinea pigs neutralized as much as 750 MLD of tetanus toxin.

[4] Ramon, G., and Zoeller, Chr., *C. R. Soc. Biol.*, 1933, **112**, 347.