

TABLE I.
Experimental Results on Susceptibility of Diabetic Dogs to Tuberculosis.

No.	No. days surviving infection	Diabetic Animals Pancreatectomized and Infected					Control Animals Laparotomized and Infected								
		Aver. blood sugar: mg./100cc.	+	—	Organs involved	+	—	Organs involved	No.	Died or killed	No. days surviving infection	Macro. +	—	Micro. +	—
1	16	130	+	—	Liver	+	—	Lungs, liver, mesent. lym. nodes	1	D	9	Lung, liver and spleen†	—	—	—
2	29	292	+	—	Lungs, liver, spleen	+	—	Lungs,	2	D	13	—	—	—	—
3	31	312	+	—	Lungs, liv., spl., retroper. glands	+	—	Lungs, retroper. glands	3	D	21	Liver and kidney†	—	—	—
4	34	338	—	—	—	—	—	—	4	K	31	Liver†	—	—	—
5	42	349	+	—	Lungs, liver	+	—	Liver, retroper. glands	5	D	37	—	—	—	—
6	46	314	+	—	Lungs, liver, spleen	+	—	—	6	K	42	Kidney and liver†	—	—	—
7	47	365	+	—	Lungs, liver	+	—	Lungs, liver	7	K	46	—	—	—	—
8	95	399	+	—	Lungs, liv., spl., mes. and retro. gl.	+	—	Liver, retroper. glands	8	K	95	—	—	—	—

(All animals infected with H37, intraperitoneally, 1 mg. per lb. weight.)

particular human strain of tubercle bacillus (H37), but becomes definitely susceptible when rendered severely diabetic by pancreatectomy.

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II. Experiments on Immunization with Haptens.

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Experiments were previously reported¹ confirming the findings of Gonzalez and Armangué that the antigenic properties of alcoholic

¹ Landsteiner, K., and Jacobs, J., *PROC. SOC. EXP. BIOL. AND MED.*, 1932, **29**, 570.

organ extracts containing Forssman's substance are strikingly increased by adsorption to inorganic adsorbents such as kaolin. Additional evidence for this effect has been advanced by the above authors recently,² in particular by establishing that it can be observed with a variety of adsorbents.

To study further the phenomenon discovered by Gonzalez and Armangué, experiments similar to those referred to were carried out with Forssman preparations which had been freed from a large portion of inactive material originally present, by methods described previously.³ Of the two preparations used, one was easily soluble in water and the other was brought into water solution by the addition of phenol.

It appeared that with these substances practically no antigenicity could be induced by adsorption to kaolin whereas on injecting rabbits with the same preparations mixed with pig serum, all of the animals reacted and the majority produced sera of good titer.

These results suggest the possibility that substances other than the specifically reacting haptens have a part in the reactivation by non-antigenic adsorbents. In this connection it may be mentioned that alcoholic organ extracts (*e. g.*, extracts of horse kidney) prepared by heating, which may be supposed to have a higher content in proteins, are by themselves more apt to induce the production of hemolysins than those prepared at ordinary temperature.*

In experiments with adsorbed bacterial carbohydrates, also, the effect seems to vary with the degree of purity of the substances. Preparations of cholera carbohydrate giving little or no biuret reaction were inactive or only faintly antigenic upon adsorption to charcoal, while preparations giving a strong biuret reaction, though very slightly antigenic themselves (following treatment with alkali), were definitely active in inducing the formation of agglutinins and precipitins in rabbits, after adsorption to charcoal. With purified carbohydrates from Type I pneumococcus and an anthrax-like organism the results were essentially negative, as were those with a

² Gonzalez, P., and Armangué, M., and coworkers, *Ier Congres Int. de Microbiologie*, Paris, 1930, **2**, 42; *Comp. Rend. Soc. de Biol.*, 1931, **106**, 1006; 1932, **110**, 217, 220, 223, 216, 228; *Am. J. Hyg.*, 1933, **17**, 277.

³ Landsteiner, K., and Levene, P. A., *PROC. SOC. EXP. BIOL. AND MED.*, 1927, **24**, 693; *J. Immunol.*, 1927, **14**, 81.

* The occasional results concerning the stimulating effect of turpentine and trypan blue mentioned in our previous note were obtained with extracts prepared by heating.

nitrogen-free preparation of dextran kindly furnished by Prof. H. Hibbert of McGill University.⁴

That adsorption to inorganic particles may increase the activity of poor antigens was shown in immunization experiments with albumose preparations.⁵ Rabbits were injected with a fraction consisting largely of heteroalbumose resulting from peptic digestion of coagulated sheep serum and fractionation with alcohol. Three batches of 5 animals received repeated intraperitoneal injections of 25 mg. each of the preparation, one group receiving the substance without admixture, and the 2 others the same quantity mixed with charcoal and aluminum hydroxide respectively. Whereas in the first batch only one rabbit produced a weakly precipitating antiserum the injection of the material adsorbed either to charcoal or aluminum hydroxide was followed by the appearance of distinctly active precipitins in most of the animals.

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Enhanced Action of Morphine in Experimental Nephrosis after Oral Ingestion of Magnesium Sulphate.

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We have shown^{1, 2, 3} that the oral administration of magnesium sulphate raises the plasma magnesium of animals and men with damaged kidneys, but not that of normal individuals.

In view of the old-time clinical teaching that one should exercise caution in the administration of morphine to severe nephritics and to old persons, we have tested the effects of morphine sulphate injections on rabbits whose kidneys were injured by the subcutaneous administration of 10 mg. HgCl₂/K. The plasma magnesium of these animals ranged from 1.89 to 2.17 mg. Mg. per 100 cc. and rose

⁴ *c. f.* Zozaya, J., *J. Exp. Med.*, 1932, **55**, 325; 1933, **57**, 21.

⁵ Landsteiner, K., and van der Scheer, J., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **28**, 983.

¹ Hirschfelder, A. D., and Serles, E. R., *J. Clin. Invest.*, 1932, **11**, 841.

² Hirschfelder, A. D., and Serles, E. R., *J. Pharmacol. and Exp. Therap.*, 1932, **45**, 264.

³ Hirschfelder, A. D., (with the technical assistance of V. G. Haury), *PROC. SOC. EXP. BIOL. AND MED.*, 1933, **30**, 996.