All animals at autopsy showed the typical picture of *Cl. welchii* infection. Microscopic studies of the adrenal cortex of the dead animals showed hemorrhages into this area.

The results are shown in Table I.

Summary and Conclusions. Under the conditions of this experiment, it would appear that the adrenal cortical hormone extract has a protective value in delaying death in experimental *Cl. welchii* infections in guinea pigs.

We are indebted to Miss Irene Zucker of this department for her assistance in this work.

14009 P

Immunologic Studies on Experimental *Trypanosoma cruzi* Infections: I. Lysins in Blood of Infected Rats.*

NADENE DENISON. (Introduced by E. C. Faust.)

From the Department of Tropical Medicine, Tulane University of Louisiana, New Orleans, La.

These observations were made while comparing the effects of experimental *Trypanosoma cruzi* infection in normal rats with those obtained in animals subjected to blocking of the reticulo-endothelial system with an inert substance, trypan blue. It has been shown that mechanical blockade of the reticulo-endothelial system in bacterial infection reduces antibody formation.[1] Leishmania forms of *Trypanosoma cruzi* are frequently found in cells of the reticulo-endothelial system[2] and a related organism, *Leishmania donovani,* has been used as a biological block for these cells during certain immunological studies.[3] Production of antibodies in *Trypanosoma cruzi* infections has been previously demonstrated,[4] and further studies have since been made on various immunological aspects of the infection. When rats recover from this infection they are insusceptible to reinfection and their serum is capable of protecting others against infection.[5] Some very high titers of serum have been obtained from animals immunized against this organism[6] and agglutination and precipitation tests demonstrate a degree of species-specificity.

During the course of this work simple hanging-drop preparations were made to determine the action of blood serum from the experimental animals upon cultured *Trypanosoma cruzi* of the same strain with which the animals had originally been infected. A lot of 20 rats was separated into 3 main groups: those which were infected to serve as controls; those in which the trypanosome infection had been superimposed upon a mechanically blocked reticulo-endothelial system; those which had been previously blocked with trypan blue. The animals were all of the same age and stock and the infection produced was uniformly light.[7] Equal parts of test serum and physiologic saline suspension of washed organisms from culture were mixed on a coverslip and inverted on a depression slide. Except for one set of slides the observations were made at room temperature, and a physiological saline control was kept in all cases. Five sets of observations were made to determine the effects of (1) full strength fresh serum, (2) inactivated

* Aided by a research grant to the Department of Tropical Medicine, Tulane University, by Eli Lilly and Co.

1 Tuft, L., *J. Immunol.*, 1934, **27**, 63.

2 Dias, E., *Compt. rend. Soc. Biol.*, 1932, **110**, 206.

3 Kurotchkin, J. T., and Chung, H. L., *National Med. J. China*, 1930, **26**, 43.

4 Chagas, E., *Nov. Reun. de la Soc. Argentina*, 1936, 1-19.

5 Culbertson, J. T., and Kolodny, M. H., *J. Parasit.*, 1938, **24**, 83.

6 Packchanian, A., *Pub. Health Repts.*, 1940, **55**, 2116.

7 Kolodny, M. H., *Am. J. Hyg.*, 1940, **32**, 21.

serum, (3) incubation at body temperature, (4) various dilutions of the sera and (5) comparative effect of these sera on culture forms of *Leishmania tropica* and *Trypanosoma lewisi.*

Fresh serum from infected animals caused lysis of *Trypanosoma cruzi* taken from culture. When used in full strength, serum from blocked and infected animals caused lysis in a mean time of 88 min; while serum of control animals (which were infected only), caused lysis in 61.3 min, and the serum from uninfected animals which were blocked only, produced lysis in 153.6 min. Lysis never occurred in the physiologic saline controls, in which the organisms were mildly active even after 18 hr of observation. The serum of the animals subjected to mechanical block appeared to react more slowly. When serum had been inactivated at 56°C the organisms were immobilized by it, but lysis did not occur within the period of observation. When the preparations were kept at 37°C there was no significant change in reaction time from that at room temperature, although the reaction of the sera of the 2 infected groups of animals was slightly faster. No change at all was observed with serum from blocked uninfected animals or the physiologic saline control.

On the whole the concentration of the lysin in the sera was very low. A 1:1 dilution of the serum from animals which had been infected only caused lysis within 30 min to 1½ hr; serum from animals which had been blocked and infected, within 5 to 7 hr. A 1:1 dilution of the serum from animals which had been blocked only caused no lysis of the organism within the period of observation. A 1:5 dilution of serum produced lysis within 3 to 5 hr when taken from animals which were infected only, but required 7 or more hr when taken from those which were both infected and blocked. Serum of all 3 classes failed to produce lysis within 7 hr when a 1:10 dilution was used.

In a short series of tests using *Trypanosoma lewisi* and *Leishmania tropica* as test organisms, lysis did not occur but the motility of the organisms was rapidly impaired. The physiologic saline (control) as well as serum from all 3 groups of animals caused loss of motility of *L. tropica;* for *T. lewisi* only serum from infected and infected and blocked animals caused loss of motility of the organism.

Summary. Blood serum of animals infected with *Trypanosoma cruzi* caused lysis of this organism from cultures in less than 2 hr and, when diluted 1:5, in 3 to 5 hr. When the animals were blocked as well, the time required for lysis was increased and the lytic titer of the serum was reduced.

14010

Nature of the Activity of Sulfonamides for the Tubercle Bacillus.

ROBERT J. FITZGERALD AND W. HARRY FEINSTONE. (Introduced by G. W. Clark.)

From the Research Laboratories of the American Cyanamid Company, Stamford, Conn.

The failure of the sulfonamides to meet with any marked clinical success in the treatment of tuberculosis gives rise to speculation regarding the mode of action of the sulfonamides against the tubercle bacillus. A comparison of the *in vitro* effects of a number of sulfonamides against *Mycobacterium tuberculosis* and *Escherichia coli* indicates that the mode of action is probably identical in both cases.

Experimental. The bacteriostatic properties of a number of sulfonamides were tested against a laboratory strain of *E. coli* and a rapidly growing, non-pathogenic strain of *M. tuberculosis var. hominis* (American Type Culture Collection No. 607). For the *E. coli* tests, the compounds were serially diluted starting with 10 mg % and decreasing by half, *i.e.*, 10, 5, 2.5, etc. Each tube contained a final volume of 10 cc of syn-