parts of the same slide, exposed to the conjugate for 30 minutes, washed in saline and distilled water, and mounted in glycerol, individual Type III organisms could be seen with the fluorescence microscope, whereas the Type II organisms were invisible, although their presence was readily demonstrated at the same focus with visible light. Non-specific adsorption and mechanical occlusion of fluorescent molecules during agglutination would thus seem to be eliminated. Although the isocyanate undoubtedly reacts with other protein molecules in the antibody solution, it seems clear that the antibody molecules also have undergone conjugation without demonstrable impairment of specific function.

Mammalian connective tissue normally exhibits a blue fluorescence which is enhanced by formalin fixation. This particular antibody conjugate, therefore, is inadequate for the demonstration of antigen in tissues, although it might well have other uses. In progress is the preparation of conjugated antibodies in which it is expected fluorescence of a distinctive character will be secured.

Summary. A β-anthryl-carbamido derivative of antipneumococcus III rabbit antibody retains the original immunological properties while rendering Type III pneumococci specifically fluorescent in ultraviolet light.

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13085

Effect of Local Application of Sulfanilamide upon Wound Healing.*

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The efficacy of the sulfonamides in the systemic treatment of certain types of infection has been definitely established. During the past few years several communications[1-6] have described and recom-

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1 Jaeger, K. H., *Deutsche med. Wchnschr.*, 1936, **62**, 1831.

2 Jensen, N. K., Johnsrud, L. W., and Nelson, M. C., *Surgery*, 1939, **6**, 1.

mended the application of these drugs directly into raw wounds as a prophylactic or therapeutic measure against infection. Most of these reports based their contentions upon qualitative impressions gathered from the observation of a small series of patients rather than upon controlled studies. Before indiscriminately depositing these drugs into a raw wound it is essential to determine first of all whether they have any noxious effect upon the tissues involved in the healing of the wound. Bricker and Graham[7] reported that the systemic administration of sulfanilamide had an inhibitory effect upon the healing of stomach wounds in dogs during the first 7 postoperative days. Taffel and Harvey[8] found that sulfanilamide did not affect the healing of stomach wounds in rats during all of the normal phases of healing. The drug was given orally in doses sufficient to maintain an adequate and sustained "therapeutic" blood level.

This series of experiments was carried out to determine the effect of the local application of sulfanilamide upon the healing of a soft tissue wound. Adult white rats weighing about 250 g were used. The tensile strength of the wound served as an index of healing. In addition, histological studies were made of the wounds.

I. *Experimental Group.* 57 animals. This group was maintained throughout the duration of the experiment on a diet of Purina Dog Chow. On the 3rd day of the diet the stomach was delivered through an incision in the anterior abdominal wall and 0.2 cc of a 3% suspension of sulfanilamide in normal saline were injected through a fine needle into the wall of the cardia. This raised an edematous wheal which measured about 1.5 cm in diameter and which involved all the layers of the stomach wall. The finely powdered crystals of the drug were clearly visualized and appeared to be evenly distributed throughout the edematous zone. A wound was then made through one diameter of the wheal directly into the lumen of the stomach. The wound edges, finely stippled with drug particles, were immediately resutured in one layer with a running continuous Connell suture of No. 000 plain catgut, which, as has been previously shown, loses its tensile strength well within the 4th day. The abdominal wall was closed with 2 layers of fine No.

[3] Campbell, W. C., and Smith, H., *J. Bone and Joint Surg.*, 1940, **22**, 959.

[4] Herrell, W. E., and Brown, A. E., *Proc. Staff Meet., Mayo Clinic*, 1940, **15**, 611.

[5] Key, J. A., and Frankel, C. J., *Ann. Surg.*, 1941, **113**, 284.

[6] Rosenburg, S., and Wall, N. M., *Surg., Gynec. and Obst.*, 1941, **72**, 568.

[7] Bricker, E. M., and Graham, E. A., *J. A. M. A.*, 1939, **112**, 2593.

[8] Taffel, M., and Harvey, S. C., PROC. SOC. EXP. BIOL. AND MED., 1940, **45**, 647.

A-silk, and 0.2 cc of normal saline were injected into the subcutaneous tissues of the groin. On each of the 4th, 6th, 8th, 10th, 12th, and 14th postoperative days 5 to 9 animals were sacrificed, and the strength of the wound immediately determined by distending the stomach with air and noting its bursting point. At each time interval the stomachs of 2 or more animals were reserved intact for histological examination of the wounds. No studies were made during the first 4 postoperative days, since it has been shown that during this interval the wound has only the strength contributed by the holding power of the suture.

II. *Control Group.* 54 animals. This group was similarly maintained upon a diet of Purina Dog Chow. On the 3rd day 0.2 cc of normal saline were injected into the wall of the cardiac end of the stomach, and wounds similar to those of the experimental group were made. At the close of the operation 0.2 cc of a 3% suspension of sulfanilamide in normal saline were injected into the subcutaneous tissues of the groin. Tensile strength and histological studies were carried out from the 4th through the 14th postoperative day.

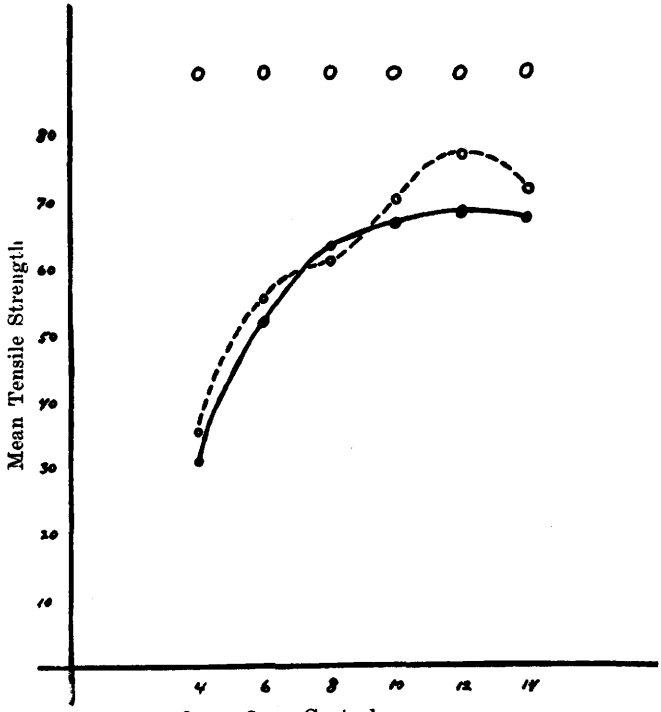

FIG. 1.

The stomach wounds all healed *per primam.* In each group the averages of the breaking strength and the standard deviation for every postoperative interval were computed. Fisher's[9] formula for small samples was applied to determine whether the differences in the means of the two groups were statistically significant.

Results. The local application of sulfanilamide crystals in the edges and in the immediate vicinity of stomach wounds in rats did not affect the healing of these wounds. (Fig. 1.) Histological studies of the wounds in the experimental group revealed the rare presence of the sulfanilamide crystals. These were engulfed within multinucleated giant cells which were located only in the serous and submucous coats at the margins of the wound, but not in the zone of actively proliferating fibroblasts. Except for this mild foreign body reaction the microscopic picture was essentially the same as that in the control group.

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Functional Localization Within the Anterior Cerebellum.

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The anterior cerebellar lobe is that portion of the corpus cerebelli lying anterior to the primary fissure. It includes 3 major subdivisions, the culmen, centralis and lingula; the first 2 of these areas possess definite hemispheral expansions. In a previous communication[1] a short description was given of the postural deviations which follow removal of the entire anterior cerebellar lobe. The present report deals with the results of further studies in the dog, cat and monkey, designed to investigate the problem of localization of function within this region.

The ablations were made from above through the tentorium. The series included 53 dogs, 18 cats and 23 monkeys. The animals were observed postoperatively for periods ranging from 5 days to 1½ years, were sacrificed under anesthesia, the brains removed and studied grossly. Detailed histological studies were obtained in 42 animals; appropriate serial sections of the brain stem and cerebel-

[9] Fisher, R. A., *Statistical Methods for Research Workers,* Edinburgh, 1934.

[1] Fulton, J. F., and Connor, G. J., *Trans. Am. Neurol. Soc.,* 1939, 53.