sentially normal. The spleens were reduced in size and the capsule was thickened by fibrous tissue growth.

These observations indicated that the liver was extensively damaged by the substances injected but regenerated more or less completely by the end of 2 weeks. Actinorubin also caused tubular damage in the kidneys and largely destroyed the lymphoid elements of the thymus. Lymphoid tissues of the spleen did not appear to have been damaged. Fibrosis of the splenic capsule may be attributed to the intraperitoneal injection of the material. Although the mice which received actinorubin showed the more extensive pathological changes, it must be borne in mind that, on a weight basis, these mice received three times more drug than the mice which received lavendulin.

Summary. The toxic doses (LD_{100}) of actinorubin and lavendulin have been determined for white mice by intraperitoneal injection. In the case of lavendulin it was 0.5 mg, while in the case of actinorubin it was 1.37 mg. The ability of the antibiotics to protect mice from death following the intraperitoneal injection of 100 to 1000 M.L.D. of *K. pneumoniae* was determined. In the case of lavendulin this therapeutic dose was 25 μg and in the case of actinorubin it was found to be 13.7 μg in one experiment. In a second experiment 0.68 mg of actinorubin killed 50% of the mice while 30 μg protected 50% of the mice against 100 lethal doses of *K. pneumoniae*. Further testing of the 2 antibiotics has not been possible due to the limited supplies of the substances.

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Production of Increased Capillary Fragility in Rats Following Irradiation.*

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In the course of a clinical study of increased capillary fragility, it became desirable to develop a corresponding study in an experimental animal. A method for measuring the increase in fragility was needed as well as a means for producing increased fragility. Hundreds of unsuccessful experiments were conducted in rats and guinea pigs before the problem was satisfactorily solved. Only the successful method, however, will be described.

Method for measuring capillary fragility in rats. Under general anesthesia the peritoneal cavity is opened by a long midline longitudinal incision, care being taken to exert no traction on the peritoneum. The abdominal wall is carefully folded back until an artery and vein are disclosed. Then, under a good light, the peritoneum is grasped on each side of the vessels and stretched between the fingers so that the lumen of the vein is obliterated but the artery can still be seen pulsating. The tension is maintained for 2 minutes after which it is relaxed. The peritoneal area supplied by the vessels is carefully inspected and, if the fragility is increased, one or more petechia will appear distal to the point of venous obstruction, usually entirely separate from any visible vessel. Actually, in a positive case, 6 or 8 such hemorrhages usually occur. If desired, the process can be repeated in the same animal, using other vessels. No petechial hemorrhages occur in the normal animal.

* The work described in this paper was done in part under a contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the Trustees of the University of Pennsylvania. More recently it has been continued as a project of the Army Research and Development Board.

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Method for producing increased capillary fragility in rats. A substance capable of emitting alpha radiation is introduced into the peritoneal cavity of normal rats. The substance used was commercial radon ointment, 500 E.S.U., (200 microcuries 1 cc)‡ prepared in either lanolin (15 animals) or olive oil (5 animals). Radon ointment contains small amounts of radon gas. Ninety per cent of the radiation is composed of alpha particles while the remainder consists of beta and gamma particles. Amounts used were 0.5 cc (2 animals). 1.0 cc (16 animals) and 1.5 cc (2 animals). When the olive oil preparation was used, the material was simply injected through a needle, while with the lanolin a small incision had to be made. No attempt was made to remove any of the material subsequently. Fragility was tested 1 to 8 weeks after the peritoneal injection. In every animal fragility was markedly increased.

Controls consisted of 5 animals injected with lanolin, 5 injected with olive oil, and 10 entirely untreated animals. None showed any petechia during the test.

Conclusion. Exposure of the peritoneal cavity of the rat to irradiation in excessive amount will produce an increase in capillary fragility.

‡ Dosage as estimated by manufacturer.

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Effect of Rutin on Recovery Time from Radiation Injury in Rats.*

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Rutin, a flavonol glucoside derived from various plants including buckwheat, has been shown by Griffith, Lindauer and Couch[1] to decrease capillary fragility in man, when that fragility was originally increased. One of the effects of excessive radiation appears to be an increase in capillary fragility.[2] Therefore, an experiment was planned to discover whether rutin might have a favorable effect on radiation reaction.

Method. All animals were given radiation to one leg, 2385 r, in a single dose, using 200 KV, 15 ma., ½ mm cu. + 1 mm al filter, 26 cm skin target distance. At the same time half the animals were given a pellet containing 20 mg of rutin, implanted along the lateral aspect of the abdominal wall, and this was repeated thereafter every third day, for a period of 36 days. The remaining animals were not given rutin. At the end of the experimental period 23 rutin-treated animals and 26 untreated controls survived. Animals were examined every fourth day and the extent of the reaction noted. The observed reaction consisted of an erythema, a moderate swelling and, in some cases, ulceration.

Results. The extent of the initial reaction is not charted, as there was no significant

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1 Griffith, J. Q., Jr., Couch, J. F., and Lindauer, M. A., PROC. SOC. EXP. BIOL. AND MED., 1944, **55**, 228.

2 Griffith, J. Q., Jr., Anthony, E. M., Pendergrass, E. P., and Perryman, R., PROC. SOC. EXP. BIOL. AND MED., 1947, **64**, 331.