kina[1] have recently reported their success in using dye particles (carmine) for the adsorption of an antigen and of an antibody concerned in typhus fever.

Summary. By adsorption of equine serum (antigen) to suitable particles of carmine a suspension can be made which is specifically agglutinable in rabbit antihorse serum. With suitably prepared suspensions, the open slide method may be conveniently employed in making agglutination tests. Employing this technic it is possible to detect antibody in the fresh sera of immunized rabbits 2 to 6 days earlier than it is by the conventional precipitation test employing the antigen dilution method.

15003 P

Growth-Promoting and Growth-Inhibiting Factors in Rat Tumor Tissue.*

H. WERNER.† (Introduced by L. Halberstaedter).

From the Department of Experimental Pathology, The Hebrew University (Cancer Laboratories), Jerusalem, Palestine.

The evidence as it exists today supports the view that cell growth-promoting properties of various tissue extracts cannot be correlated with the state of proliferation of the tissues from which they are made.[1] The generally accepted opinion that extracts of actively growing tumors display growth-promoting power to an exceptionally high degree, has also been shown to be erroneous. Tumor extracts appear to affect the rate of cell multiplication *in vitro* to the same extent as extracts of the respective normal tissues. In those species in which normal tissue extracts stimulated growth, tumor extracts acted likewise (*i.e.*, chicken, dog); in the species in which extracts of normal tissues did not affect cell proliferation the tumor extracts are also without growth-promoting power.[2]

The rat is a striking example of a species whose tissues are devoid of cell growth-promoting properties. Apart from extracts of brain, all remaining rat organs and tissues tested are ineffective in activating cell growth *in vitro*.[3] Rat tumors also display no growth-activating effect and even inhibit the proliferation of cell colonies.[2] The lack of growth-promoting power in extracts of normal and neoplastic rat tissues can be explained by either of the following assumptions: (a) Growth-promoting principles are absent in tissues of rats. (b) They are present but their activity is counteracted by coexisting inhibitors. The experiments reported below show that the absence of growth-promoting ability in extracts of rat tumors can be explained in accordance with the second hypothesis.

Experimental. In this study the procedure previously reported for the partial purification of the active principle from growth-promoting tissue extracts was used.[4] The experiments were performed with a benzopyrene sarcoma of rats, extracts of which have a definitely inhibiting effect on the growth of fibroblast colonies *in vitro*.[2] Tumor tissue was finely minced in the Latapie apparatus and the pulp obtained was extracted with 4 volumes of Ringer's solution. The tissue extract was then

* Aided by a grant from the Dazian Foundation for Medical Research, New York.

† Working under the Cancer Laboratories Fellowship.

1 Towell, O. A., and Willmer, E. N., *J. Exp. Biol.*, 1939, **16**, 60; Doljanski, L., and Hoffman, R., *C. R. Soc. Biol.*, 1939, **130**, 1246; Hoffman, R., Tenenbaum, E., and Doljanski, L., *Nature*, 1939, **143**, 764; Hoffman, R., and Doljanski, L., *Growth*, 1939, **3**, 61; Hoffman, R., Tenenbaum, E., and Doljanski, L., *Growth*, 1940, **4**, 207.

2 Doljanski, L., Hoffman, R., and Tenenbaum, E., *Growth*, 1944, **8**, 13.

3 Hoffman, R., *Growth*, 1940, **4**, 361.

4 Werner, H., and Doljanski, L., *Nature*, 1942, **150**, 660.

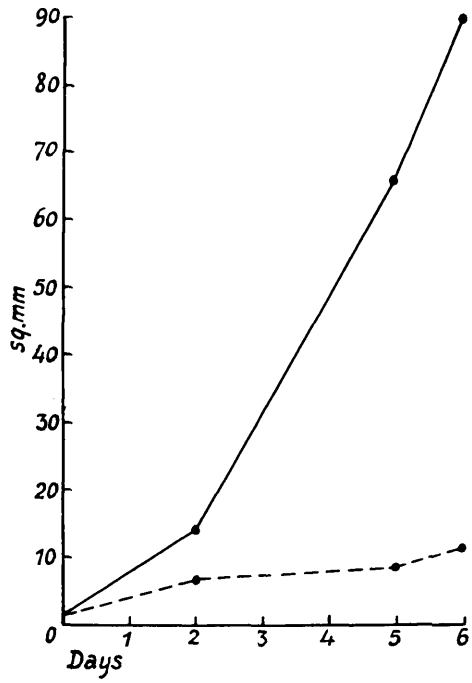

FIG. 1.
Experiment 11220/1 B—Growth curves of sister halves of fibroblast culture in protective medium and in medium containing solutions of alcohol precipitates treated with lipid solvents (acetone and petroleum ether).
———— Alcohol precipitates treated with lipid solvents.
..... Protective medium.

precipitated with 4 volumes of 96% alcohol. The precipitate obtained was treated successively for 3 hours in a Soxhlet apparatus with acetone and petroleum-ether. After drying *in vacuo* the extracted powder was suspended in Tyrode solution. The suspension was kept for 3 days in the refrigerator, centrifuged and the supernatant fluid was added to standardized cultures of chicken fibroblasts in Carrel flasks. The growth of the cell colonies in medium containing this solution as fluid phase was compared with the growth of controls (sister halves), growing in protective medium composed of plasma diluted with Tyrode in the proportions: 1:2. The growth of cultures was followed over a period of 6 days and recorded according to the method of Ebeling.

The curves of Fig. 1 show the growth of a culture stimulated with alcohol precipitate treated with lipid solvents (acetone and petroleum-ether), compared with that of a control in plasma-Tyrode medium. These curves illustrate the optimal activation obtained; the average stimulation amounted to 520% (13 experiments).

Summary. The experiments reported above indicate that in extracts of rat tumors the activity of the growth-stimulating principle is counteracted by an antagonistic factor. By precipitation with alcohol and subsequent treatment with lipid solvents (acetone and petroleum-ether) it is possible to remove the latter and to convert the originally inhibiting material into a definitely stimulating preparation.

15004 P

The Effect of X-Rays on the Mitotic Activity of Explanted Bone Marrow.*

M. RACHMILEWITZ, A. ROSIN,† G. GOLDHABER, AND L. DOLJANSKI. (Introduced by L. Halberstaedter.)

From the Department of Experimental Pathology, Department of Radiology, and Medical Department B, The Hebrew University, Jerusalem, Palestine.

The effect of X-rays on the mitotic activity of the bone-marrow has scarcely been studied. In his recent extensive review on the effect of X-rays on bone-marrow, Dunlap[1] mentions the findings of Mottram[2] who observed a

* This investigation was aided by a grant from the Lady Tata Memorial Trust, London.

† Working on a grant from Mrs. J. H. Stodel, Cape Town, South Africa.

1 Dunlap, C. E., *Arch. Path.*, 1942, **34**, 562.

2 Mottram, J. C., *Arch. Radiol. and Electroth.*, 1920, **25**, 197 (quoted by Dunlap[1]).