

the blood or closely related forms. In pneumonia induced in animals heavily stained with lithium carmine, no cells stained with carmine took part in the formation of the exudate. No plasma cells were seen.

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Technique of cultivating human tissues in vitro.

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Several difficulties have been encountered in the cultivation of human tissue in vitro.

In the first place human fibrin is readily liquefied by fresh tissue, so that when human plasma is used as a culture medium the cells find no framework on which to grow. Losee and Ebeling overcame this difficulty by transferring the tissue fragments at frequent intervals before liquefaction took place. We have solved the problem in another way which does not necessitate frequent transfers. The method consists in using as a culture medium chick plasma, the fibrin of which resists digestion, with the addition of an equal quantity or more of human serum. In this medium the cells grow much more actively than in pure chick plasma. Since there is no liquefaction it is not necessary to make subcultures oftener than every 5 to 7 days.

That fresh human tissue cannot always be obtained when wanted has appeared to be another difficulty in the study of human tissues in cultures. We have found, however, that human tissues, just as those of lower animals, may be preserved for 5 to 10 days before using, if cut into small pieces, covered with salt solution and put aside in a cool place. Serum and Ringer's solution possess no advantage over ordinary salt solution and a temperature of 15° C. appears to be as satisfactory as a lower temperature. Tissues obtained at autopsy may be used though often infected. We have obtained good growth of connective tissue from pieces of liver and testis taken from a body six hours after death.

The sterilization of infected tissues constitutes a problem which we have not yet solved satisfactorily. Skin, which is

practically always infected superficially, may be partially sterilized with little injury to the tissue by rinsing the surface quickly with weak alcohol (60 per cent.). In a large number of preparations from a piece of skin treated in this way, a fair percentage will show no bacterial contamination, and some of the remainder will show only occasional colonies. We have obtained a good growth of epithelium from pieces of circumcision tissue thus treated.

A large number of antiseptics and disinfectants—toluol, chlorotone, tricresol, phenol, silver nitrate, hypochlorites (Dakin's solution), argyrol, iodine, potassium cyanide, and bichloride of mercury, have been tested on tissues more diffusely infected. For nearly all of these the strength of solution necessary to kill bacteria (*staphylococcus aureus*) also injures the cells.

Experiments carried out so far, however, indicate that potassium cyanide and probably also bichloride of mercury are exceptions to this rule. For example, potassium cyanide in 1-2,000 dilution is a very good disinfectant but injures cells very slightly. More complete reports of these experiments will be presented in a subsequent communication.

57 (1121)

Development of immune reactions in serum disease.

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The occurrence of immune reactions to horse serum and their relationship to the development of serum disease in man, we have studied by two methods: first, the sensitiveness of the skin to intravenous injections of 0.02 c.c. of horse serum, undiluted or diluted ten times or one hundred times with 0.85 per cent. NaCl; and secondly, by determining the presence of anaphylactic antibody in the blood serum of the patient by transference to guinea-pigs through passive sensitization.

Eleven patients have been studied, who have received for therapeutic purposes from 4 c.c. to 350 c.c. of horse serum, in the