

between the epithelial masses and form a network of embryonic connective tissue, penetrating the epithelial network, and serving as a source of lymphocytes and histiocytes.

The regeneration of the stump of the remaining part of the thymus duplicates in all essential features the regenerative process in the transplants.

The lympho-epithelial nature of the thymus and the presence of a perivascular mesenchymal reticulum in this organ are decisively shown by these experiments with tissue cultures, autotransplantations and regeneration. No evidence of the development of the small thymus cells from the epithelium was found.

¹ Hammar, A., *Arch. mikroskop. Anat.*, 1909, lxxiii, 1.

² Maximow, A., *Arch. mikroskop. Anat.*, 1912, lxxx, 39.

³ Maximow, A., *Arch. mikroskop. Anat.*, 1911-1912, xxxix, 560.

⁴ Stöhr, Ph., *Anatom. Hefte*, 1906, xxxi, 409.

⁵ Schridde, H., *Cent. alg. Path.*, 1923, xxxiii, N. II, 284.

⁶ Dustin, A., *Arch. Biol.*, 1920, xxx, 601.

⁷ Winiwarter, H., *Bull. Histol. appliquee.*, 1924, N. I.

⁸ Jaffe, H., Gottesman, J., *J. Exp. Med.*, 1926, xliii, 403.

⁹ Jaffe, H., *J. Exp. Med.*, 1926, xliv, 523.

3271

An Immune Reaction in Tissue Culture.*

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The method of tissue culture has not been extensively used for immunological purposes. Carrel and Ingelbritsten¹ and Przygode² have shown that lymph node, bone marrow and spleen react in tissue culture to the presence of antigens by the formation of specific antibodies.

This report is the first on a series of experiments in which we have cultivated various tissues from normal and immunized animals and have watched the effect of the addition of antigens to the cultures.

In one set of experiments we cultured the lungs of 8 normal rabbits and those of 5 rabbits immunized against pigeon erythrocytes.

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After allowing the cultures to develop for several days, they were washed in Ringer's solution. Each culture then received a drop of pigeon erythrocytes suspended in bone marrow or embryonic extract. The cultures were carefully observed in the living condition and after fixation at various periods were sectioned and stained. Cultures of rabbit lung are characterized by great numbers of phagocytes; these we consider to be of mesenchymal origin. They are identical with the alveolar phagocytes of the adult lung.

Pigeon erythrocytes when added to cultures of lungs from normal rabbits attach themselves to the phagocytes of the cultures but are rarely taken up by these cells in periods as long as twelve days. The phagocytes in cultures of lungs from immunized rabbits, however, take up great numbers of the erythrocytes in a few hours. No difference was noted in the reactions of the lungs from those rabbits which had previously received one injection, and those which had received two injections of pigeon erythrocytes in the process of immunization.

When inactivated, anti-pigeon-erythrocyte rabbit serum was added to cultures of normal rabbit lung plus erythrocytes in which there had been no phagocytosis, a widespread phagocytosis of the foreign red cells appeared in 25 minutes. This process can be watched under the microscope; it is quite dramatic to see the periphagocytic erythrocytes suddenly pass into the interior of the phagocytes.

Cultures of lungs from normal rabbits reacted quite differently from cultures of lymph node to the presence of pigeon red cells. In the latter the large pigment containing histiocytes, on reaching the surface of the explant, ingest great numbers of the pigeon erythrocytes. The rate of phagocytosis in the lymph node cultures is, however, much slower than in the lung cultures from immunized rabbits. As a result of our experiments we believe the phagocytosis which takes place in the immunized culture to be due to the presence of an immune body in the serum. In none of our cultures have we found any evidence of the pulmonary capillary endothelium being mobilized into either granulocytes or phagocytes.

¹ Carrel, A., and Ingebritsten, R., *J. Exp. Med.*, 1912, xv, 287.

² Przygode, P., *Wien. klin. Wochsch.*, 1913, xxvi, 841; 1914, xxvii, 201.