

the refractive index, the percentage of total proteins and the relative amount of globulins of the sera showed little or no tendency to drop below their original values. When the Wassermann reaction, on the other hand, became very readily negative the curves fell progressively and fairly rapidly during the course of injections.

The writer is indebted to Dr. John A. Kolmer and Dr. Jay F. Schamberg for the laboratory and clinical facilities of the Dermatological Research Laboratories and the Polyclinic Hospital which they kindly placed at his disposal. Special acknowledgement is due to Dr. Charles Weiss of the D. R. Laboratories who compiled and interpreted the data and prepared this manuscript for publication.

74 (1656)

The analysis of factors which determine the life and growth of transplanted tissues.

By LEO LOEB.

[From the Department of Comparative Pathology, Washington University School of Medicine, St. Louis.]

1. We may distinguish between two sets of factors determining the fate of transplants: (a) primary or constitutional; (b) secondary or extraneous factors. The former comprise the individuality and species differentials, and possibly organ specific factors; the latter include such factors as age, sex, pregnancy, infection and immunity. There are in addition general factors as oxygen supply, character of circulation and temperature; the latter we shall at present leave out of consideration.

If we take the subcutaneous transplantation of the thyroid gland as type, we find the following variables which may be influenced by the two sets of conditions: (a) the amount of surviving parenchyma and its growth energy; (b) the behavior of the connective tissue cells; (c) of blood and lymph vessels, and (d) of the lymphocytes of the host towards the transplant.

2. In a series of earlier papers we have analysed the effect of the individuality and species differentials on these four variables

and we found a gradation in the effects observed which was in accordance with the relationship between host and graft.

3. Tyzzer and others, and especially Murphy and his collaborators, have shown that the appearance of lymphocytes in the case of transplanted tumors is an index of immunity against these tumors. Murphy and Rous showed that such an immunity cannot be produced in chick embryos, even in the case of hetero tumors, and Bullock and Rohdenburg found the same in newly born rats.

An analysis which we undertook recently of the results of transplantation carried out by numerous investigators in various classes of animals very strongly suggests the conclusion that the individuality (homoio) reaction is usually absent in embryonic and adult invertebrates and in embryonic forms of vertebrates. The species or class reaction (heteroreaction) is present, but less pronounced than in higher forms. In lower adult vertebrates the individuality (homoio) reaction is definitely found; but there are some indications that it is as yet not so pronounced as in higher vertebrates. As far as we can judge from experiments carried out for other purposes, we may therefore conclude that an ontogenetic and phylogenetic evolution of the individuality reaction has taken place and that the immunity reaction is probably dependent upon a special application of this evolution of the species and individuality differentials.

4. We have previously stated that in guinea pigs the individuality reaction is found in animals of various age, sex, and in pregnant animals.

For some time past we have been carrying on more extensive studies on the influence of these secondary factors in guinea pigs. We varied the age of the host as well as of the donor in order to study the effect of age on the four variables mentioned above. Thus far we can state that the lymphocytic reaction may be very marked not only if the tissue is transplanted into adults, but even if it is transplanted into guinea pigs a few days old.

The individuality reaction exists in pregnant as well as in non-pregnant guinea pigs. Autotransplantation of the thyroid gland in pregnant animals led in some cases to abortion. This did not noticeably influence the individuality reaction. Pregnancy did not improve the growth of the transplanted thyroid; on the contrary in

some cases it seemed to diminish it. This was perhaps due to secondary factors (pressure of the distended skin which injures the graft or makes its sterile introduction into the wound more difficult); in a number of cases the growth of the transplant was equally good in pregnant and non-pregnant animals.

Localized infection of the graft with ordinary bacteria does not call forth a lymphocytic reaction in case of autotransplantation and it does not prevent its appearance in the case of homoio-transplantation. It may, however, interfere with the other variable factors and call forth a greater production of fibrous tissue. This may be associated with retardation in the organization of the necrotic center and with partial destruction of the parenchyma. Sex does not influence the four variables in the case of thyroid transplantation in the guinea pig. Whether the inferiority in results obtained after transplantation from child to mother which we found previously, is due to the action of a constitutional or of an extraneous factor remains still to be determined.

75 (1657)

The vasomotor response in anemia of the medulla oblongata:

- (1) **The splanchnic vaso-constrictor fibers.**
- (2) **The relation of the splanchnic constrictor fibers to the secretion of adrenalin.**

By CORA S. WINKIN.

[From the Department of Physiology of Columbia University.]

The experiments here reported deal with a series of studies on the analysis of the vasomotor response in asphyxia. The first of this series had particular reference to the part played by the splanchnic constrictor fibers in the response. The second series was concerned with the relation of the activity of these fibers to the secretion of adrenalin. The procedure throughout was the infliction of a complete but temporary anemia on the entire brain, according to the technique of Stewart et al.,¹ by clamping off

¹ Stewart, Guthrie, Burns and Pike, *Journ. Exp. Med.*, 1906, viii, 289.