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Further observations on the structure of anastomosed blood vessels.

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In this series of experiments the theoretical optimum conditions were fulfilled, *i. e.*, very rapid auto-grafts were made and the use of salt or other foreign solution avoided. A segment of common carotid artery interposed between the ends of a divided common carotid artery for twenty-eight days shows very slight or no alteration excepting at the lines of anastomosis where a moderate thickening occurred, due no doubt to trauma. A segment of external jugular vein similarly engrafted on common carotid artery for twenty-eight days shows a moderate and somewhat irregular thickening of the wall, but the thickening is not nearly so great as in another such experiment previously reported.[1] The intima is smooth and glistening but yellowish, particularly in the more thickened areas. The latter are very richly supplied with apparently newly formed blood vessels. Muscle fibers are almost or entirely absent. Elastic fibers are fairly abundant in the middle coats. The remainder of the tissue is more or less hyaline in appearance. The adventitial coat is the most thickened and dense, perivascular fibrosis apparently having occurred.

A very different picture is presented by an internal jugular vein and its branches in which the circulation was changed to arterial and reversed by anastomosis of the peripheral end of the vein to the central end of the common carotid artery after division of the vessels. On opening the vessel, ten months and twenty-seven days after the operation, it does not collapse as an ordinary vein. The wall is *more rigid*, thicker and more transparent. The intima is smooth and glistening. Muscular and elastic fibrous tissues are present. The plain fibrous tissue is greatly increased in amount and density, particularly in the middle and outer coats. Nutrient blood vessels are present but they are not nearly so conspicuous as in the venous segment.

[1] *Surg., Gynec., and Obs.*, 1906, ii, 266.

Without going into a detailed discussion of these structural alterations, I may say that these findings support my former view, namely, that nutritional disturbances in such vascular tissues are of fundamental importance in interpreting the results.[1] And furthermore, with our present knowledge such observations do not help to explain the nature of pathological processes such as arteriosclerosis, which result in structural alterations in blood vessels.

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Modification of tissue oxidations in vitro.

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The purpose of this investigation was to determine the influence of certain substances upon oxidations by tissues *in vitro*, with a view of casting some light on the relation between such substances and tissue respiration after the administration of these substances to animals. The general method of investigation was similar to that practiced by Yeo.[2] Tissues and solutions of oxyhemoglobin of amphibians, reptiles, birds and mammals were employed. The tissues were placed in freshly prepared oxyhemoglobin solution made from fresh blood obtained from the same animal. The mixtures were made in test-tubes and for the most part air was not entirely excluded. The darkening of the hemoglobin solution as observed directly and the appearance of reduced hemoglobin as shown spectroscopically were taken as indicating the amount of reduction.

Preliminary experiments with mammalian tissues gave a value for different tissues somewhat different from that obtained by Bert,[3] who employed a different method. Also the results showed that tissues of warm blooded animals reduce such oxyhemoglobin solutions more actively than those of cold blooded animals; this observation agrees with the results of Battelli and Stern.[4] For the

[1] *Jour. of the Amer. Med. Assoc.*, 1908, l, 1035.

[2] *Jour. of Physiol.*, 1885, vi, 93.

[3] Leçons sur la physiologie comparée de la respiration, Paris, 1870, p. 46.

[4] *Jour. de physiol. et de path. gén.*, 1907, ix, 1.