10 *A. microstomum* averaged a 104.2 per cent higher rate than 10 *A. punctatum.*

17 *A. tigrinum* (Axolotl) averaged a 3 per cent higher rate than 12 normal *A. tigrinum.*

It is apparent, therefore, that considerable differences in metabolic rate do exist between the four species of Amblystoma larvae tested, the order in point of highest rate being: *A. microstomum, A. punctatum, A. jeffersonianum, A. tigrinum.* Such marked differences, substantiated by biometrical analysis, lead one to the general conclusion that the abnormal acceleration of heteroplastic grafts is due partially, at least, to the influence of a higher metabolic rate than the graft was accustomed to. Conversely, a lower metabolic rate on the part of the host, as compared with that of the donor, would tend to retard the growth of the graft.

The apparent difference of 3 per cent between *A. tigrinum* (Axolotl) and normal *A. tigrinum* larvae is of no significance when the probable error is considered, and the two strains of *A. tigrinum* can therefore be said to possess approximately the same metabolic rate. This fact is of interest, in that the neotonous condition of the Axolotl cannot be explained on the basis of a supposed lower metabolic rate.

This is a preliminary report.

[1] Harrison, R. G., *Proc. Nat. Acad. Sci.*, 1924, x, 69.

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## Effect of Some Capillary Active Substances on the Permeability of Collodion Membranes.

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Brinkman and Szent-Györgyi[1] report that various capillary active substances, alkaloids[2] and purine bases (sodium oleate, sodium linoleate, sodium glycocholate, digitonin, Witte's peptone, atropine, pilocarpine, caffeine, strychnine, quinine and morphine) cause permeability of collodion membranes to hemoglobin. Rosenthal[3] states that sodium taurocholate possesses the property of increasing the degree of permeability of semi-permeable collodion membranes to dyestuffs. Clausen has shown the presence of some capillary active substance in blood serum[4] and urine of patients suffering from parenchymatous nephritis (nephrosis) which greatly lowers the surface

tension, and reports that the addition of blood serum, urine, or, a water solution of the alcohol soluble portion of the colloidal residue from evaporated urine of these patients, will cause collodion membrane to become permeable to proteins.[5] Grollman[6] finds that the collodion sacs used in his investigation were not rendered permeable to hemoglobin by use of bile salts, sodium oleate, lanthanum chloride, acid or alkali.

The permeability of collodion membranes may be varied by many factors in their preparation and subsequent treatment. It has been shown to depend upon the thickness and the ratio of wet to dry weight of the finished membrane, or, according to Brown,[7] upon the alcoholic index of the membrane.

Membranes were prepared in 2 x 17 cm. test-tubes, using 5 cc. of a solution of 2 gr. nitro cellulose in 100 cc. of alcohol-ether mixture. After drying, the membranes were graded according to the method of Brown. Solutions of various substances were placed in the membranes and the membranes then placed in distilled water, the rate of diffusion of the substance across the membrane being taken as an index of the permeability of the membrane, when calculated as the ratio of the concentration outside divided by the concentration inside the membrane at various times. Using the rate of diffusion of $CaCl_2$ across the membrane as an index of permeability the following results were obtained before and after adding a few capillary active substances.

TABLE 1.

*Effect of Various Capillary Active Substances on the Permeability of Collodion Membranes.*

| No. | | Time of dialysis | Ratio $\frac{\text{Conc. Outside}}{\text{Conc. Inside}}$ for $CaCl_2$ After dialysis | |
|---|---|---|---|---|
| | | | Before addition | After addition |
| 1. | Saponine, 0.001 per cent | 2 hrs. | 0.775 | 0.755 |
| 2. | Saponine, 0.01 per cent | 2 hrs. | 0.818 | 0.820 |
| 3. | Saponine, 0.1 per cent | 2 hrs. | 0.750 | 0.382 |
| 4. | Control (nothing added) | 2 hrs. | 0.755 | 0.750 |
| 5. | Peptone (Witte's) | 6 hrs. | 0.166 | 0.120 |
| 6. | Water solution of alcoholic extract of residue from evaporated nephrosis urine | 6 hrs. | 0.106 | 0.100 |
| 7. | Ditto, twice the concentration of 6 | 6 hrs. | 0.105 | 0.103 |
| 8. | Pleural fluid from nephrosis, P. M. | 6 hrs. | 0.109 | 0.102 |
| 9. | Control (nothing added) | 6 hrs. | 0.411 | 0.410 |
| 10. | Control (nothing added) | 6 hrs. | 0.129 | 0.110 |

The above results do not show an increase in permeability due to the addition of capillary active substances. The membranes were unaffected by the substance added except for a marked decrease in measured permeability in the case of 0.1 per cent saponine.

Membranes of the thickness used in this work and having an alcoholic index (Brown) of 98 were found to be very permeable to hemoglobin, those of 94 somewhat permeable and 90 impermeable to this substance. We did not succeed in increasing the permeability of a 94 membrane, or in rendering a 90 membrane permeable to hemoglobin by the use of sodium oleate, bile salts, saponine, peptone, or the blood plasma, pleural fluid, or water solution of the alcoholic extract of the residue from evaporated urine of nephrosis cases.

This is a preliminary report.

[1] Brinkman, R., and Szent-Györgyi, A. V., *Biochem. Z.*, 1923, cxxxix, 261.
[2] Brinkman, R., and Szent-Györgyi, A. V., *Ibid.*, 270.
[3] Rosenthal, S. M., *J. Pharmacol.*, 1925, xxv, 449.
[4] Clausen, S. W., *Am. J. Dis. Child.*, 1925, xxix, 594.
[5] Clausen, S. W., *J. Biol. Chem.*, 1924, lix, Proc. p. xlv.
[6] Grollman, A., *J. Gen. Physiol.*, 1926, ix, 813.
[7] Brown, W., *Biochem. J.*, 1915, ix, 591; 1917, xi, 40.

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## Cough as a Factor in Chronicity of Experimental Lung Abscess.

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In a study of the nature of lung abscess produced experimentally in dogs by various means[1] two characteristics of the disease were found in contrast to that in man. In the first place, the animals did not cough appreciably, even at the height of the infection, and, secondly, the abscess cavities, although in some instances of very large size, healed spontaneously and rapidly. It was felt that the absence of cough had direct bearing upon the obliteration of the cavities, and experiments were planned to test this relationship. Preliminary report of these is given, comparing the course of lung abscess in dogs as it occurred without cough, with that of cases in which cough was stimulated. Here the pulmonary lesions were induced by infected emboli, according to the method of Cutler.[2, 3]

In each of 16 dogs a 1.0 cm. segment of femoral vein was resected