ing 15 gm. of glycine daily, 274 mg. of glycocyamine picrate was isolated from the urine over an 8-day period. In this case the urine was collected daily and extracted with Lloyd's reagent on the same day. The quantity of glycocyamine picrate isolated represents 23% of the original Sakaguchi reacting substances in the Lloyd's extract using glycocyamine as the standard for comparison.

In a control experiment 600 mg. of glycocyamine was added to a solution containing creatin, creatinine, glycine, urea and salts in concentrations approximating that found in the above 8-day urine collection. This mixture was treated by exactly the same procedure used above. Three hundred and ninety-six mg. of glycocyamine picrate was isolated which represents a recovery of approximately 33% of the glycocyamine extracted by Lloyd's reagent as determined by the Sakaguchi reaction. This suggests that probably the major part if not all of the Sakaguchi reacting substance in the Lloyd's extract from urine is glycocyamine.

Glycocyamine is not produced during the process of isolation, at least, from creatine, creatinine or glycine and urea. The addition of creatine, creatinine, glycine or urea together, or separately, to urine causes no increase in the Sakaguchi reaction of the Lloyd's extract.

The feeding of glycine to a patient with pseudohypertrophic muscular dystrophy results in an increase of approximately 60% in the Sakaguchi reacting substances in the urine.

7603 P

Relation of Cytoplasmic Structure to Growth and Respiration in Plasmodium.

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Recently I have shown that if a small piece of the plasmodium of *Physarum polycephalum* be forced through a gauze with sufficiently small pores (less than 0.25 mm. in diameter) subsequent growth of this material does not occur, whereas if the pores are larger, growth takes place when the material is put on the culture medium. The experiments were repeated and confirmed for *P. rigidum*. During the present summer I have confirmed in the

main the previous results and have extended the experiments to follow the respiratory changes in *P. polycephalum.* As gauze sieves I have used Latimer's "Old Anchor Brand" calibrated bolting cloth Nos. 00, 4, 6, 8, 10, 14, and 21 which have average pore sizes of 0.75, 0.32, 0.24, 0.20, 0.155, 0.10 and 0.07 respectively. When strained through the last 3 the plasmodium gave no growth; when the 0.20 sieve was used the strained plasmodium sometimes grew, sometimes not; with sieves of larger pores active plasmodium when forced through, grew on the culture medium. On the other hand, plasmodium if allowed to grow in gauze bags, passed through all the sieves as well as hard paper filters onto the culture medium. In 5 hours plasmodium made its way through hard filter S. & S. No. 575A which has an average pore size of 1 μ. These facts confirm the conclusions previously stated that essential to the life of the plasmodium are filaments or fibrils which may be 0.20 mm. in length but in diameter are below visibility with the microscope.

Since viability is so conspicuously reduced by comminuting the plasmodium it seemed important to determine whether metabolism as indicated by consumption of oxygen might not also be modified in this way. The determinations were carried out in the usual way with the Warburg apparatus. A quantity of plasmodium, approximately 20 mg., was spread in a thin layer on a piece of platinum foil and introduced into the respiration chamber which was then charged with oxygen. The temperature of the bath was kept at 21° C. One or 2 normal controls were run with the experimental charges. Half hourly readings were taken over a period of 3 hours. The samples were then removed, dried to constant weight over soda lime, and weighed to the nearest 0.1 mg. The experiments all showed that O_2 consumption was reduced as a result of forcing the plasmodium through sieves, and that the O_2 consumed decreased with lessening of the pore size of the sieve used. The average value of O_2 consumption for normal plasmodium (36 readings) was found to be 4.3 cu. mm. per mg. dry weight per hour. For material passed through 0.75 mm. pores the O_2 consumption was 73% of normal, while through 0.07 mm. pores the figure was 49% of normal. Thus a degree of comminution which always killed the plasmodium reduced the consumption of O_2 by about 50%. These facts suggest that structures in the cytoplasm of *P. polycephalum* are essential both to its life and to the greater part of its respiratory activity.

It was further found that deformation of the plasmodium without comminution caused a delay in growth and a reduction in O_2

consumption. The deformation was accomplished by centrifuging the samples with an air driven centrifuge (H. W. Morse's model of the Henri-Huguenard centrifuge) at approximately 75,000 x gravity for from 1 to 10 minutes. Centrifuging for 6 minutes caused a delay of about 12 hours in subsequent growth of the piece, and an immediate reduction in the consumption of oxygen to near 50%. These results indicate that growth and respiration depend upon an intimate association of elements of relatively low and high specific gravity in the plasmodium, that these can be separated by centrifuging to the impairment of growth and respiration. But unlike comminution, the effects of separation by centrifuging are reversible.

7604 P

Influence of Closed Intestinal Loop Strangulation on Volume of the Combined Digestive Secretions.*

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We have reported our findings[1] on the influence of simple duodenal obstruction upon the volume of the combined gastric, biliary, pancreatic, and duodenal secretions. In the present work we have studied the influence of closed intestinal loop strangulation upon these same secretions. Twenty-two fasting healthy dogs were used in the study. All had their salivary ducts ligated.

In the first group of animals the duodenum was divided below the entrance of the lower pancreatic duct, a Dragstedt type of intestinal cannula was placed in the proximal duodenum and the cut ends were inverted. A second cannula was placed in the jejunum about 6 to 8 cm. distal to Treitz' ligament. From the duodenal cannula the combined digestive secretions drained into a clean rubber bag. Collections were made every one to 4 hours day and night, measured, and returned by cannula into the jejunum. About 50 cc. of Ringer's

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1 Montgomery, M. L., and Swindt, J. M., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 915.