

The organisms described by Mooser were found in large numbers in smears made from the tunica exudate of these animals.

The question of whether live tissue is necessary for the growth of typhus organisms, as it is supposed to be in the case of filterable viruses (*cf.* Rivers), is being studied by using tissues killed in various ways; *e. g.*, by heating, by repeated freezing and thawing, by anaerobiosis, etc.

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### The Excretion of Xylose by Glomerular and Agglomerular Kidneys.

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Marshall<sup>1</sup> in a comparative study of the function of the glomerular and agglomerular kidney found that glycosuria is easily produced in fish with glomerular kidneys, but only a trace of glucose ever appears in the urine from an agglomerular kidney, even when the blood sugar is high and phlorhizin is given. This observation with those of Corley<sup>2</sup> and Fishberg<sup>3</sup> on the rate of disappearance of xylose from the blood suggested that a foreign sugar such as xylose might serve as a basis for measuring the extent of filtration and reabsorption by the kidney. First it was necessary to establish that xylose is not excreted by the agglomerular kidney except in the very faintest traces. That is the object of this paper.

Four species of fish were selected. The cod fish (*Gadus callarias*) and the puffer (*Spherooides maculatus*), fish with glomerular kidneys; the toadfish (*Opsanus tau*) and the goosfish (*Lophius piscatorus*), fish with agglomerular kidneys, were studied. The experiments on the goosfish were performed by Dr. E. K. Marshall, Jr., at Salisbury Cove, Maine. The other fish were obtained at the New York Aquarium. The urinary papilla was tied off and xylose in aqueous solution was injected into the posterior dorsal muscles in all experiments except those on the goosfish in which the xylose was injected intravenously.<sup>4</sup> At the conclusion of the experiment, 1 to

<sup>1</sup> Marshall, E. K., Jr., *Am. J. Phys.*, 1930, **84**, 1.

<sup>2</sup> Corley, R. C., *J. Biol. Chem.*, 1926, **70**, 521.

<sup>3</sup> Fishberg, E. H., *J. Biol. Chem.*, 1930, **86**, 665.

<sup>4</sup> Marshall, E. K., Jr., and Graffin, A. L., *Bull. Johns Hopkins Hosp.*, 1928, **43**, 203.

23 hrs. later, the fish were sacrificed and the urine in the bladder obtained by dissection. A filtrate, using 1 cc. of urine (1 cc. of a 1-50 dilution in the puffer series), was prepared by Somogyi's method.<sup>5</sup> Total sugar was determined on aliquot portions of this filtrate by the Hagedorn-Jensen Micro method. The rest of the filtrate was treated with washed baker's yeast as recommended by Van Slyke and Hawkins<sup>6</sup> and the non-fermentable reducing substances determined on aliquot portions.

The injections of xylose in the glomerular cod fish increased the non-fermentable reducing substances in the urine three fold (see table). In the glomerular puffer this increase was thirty-five fold.

TABLE I.

Species	Average Weight	Amt. of Xylose Injected	Non-fermentable reducing substances in the urine in mg. %	
			Before Injection of Xylose	After Injection of Xylose
<i>Glomerular</i> Cod fish	2 K.	gm. 1.0	34—53 Av. (3 fish) 41	84—185 Av. (4 fish) 123
Puffer	200 gm.	0.5	17—25 Av. (6 fish) 20	294—1176 Av. (6 fish) 705
<i>Agglomerular</i> Toad fish	300 "	0.5	22—77 Av. (3 fish) 42	39—82 Av. (6 fish) 56
Goosefish	12.7 K.	10.0	32	1st hr.....40 2-18 hr.....41

In the agglomerular toadfish and goosefish the increase in non-fermentable reducing substances was hardly beyond the range of normal variation.

*Conclusions.* In fish with agglomerular kidneys only the faintest traces of xylose appear in the urine following intramuscular or intravenous injection of xylose. In fish with glomerular kidneys injected xylose is readily recovered in the urine.

<sup>5</sup> Somogyi, M., *J. Biol. Chem.*, 1930, **86**, 655.

<sup>6</sup> Van Slyke, D. D., and Hawkins, J. A., *J. Biol. Chem.*, 1929, **83**, 51.