The Structure of the Renal Glomerulus

J. F. A. McManus
University Of Alabama

The summer was spent principally on two fundamental problems: 1) The correlation of the light microscopic structure of the glomerulus, which seemed to show an intercapillary space, with the electron microscope appearances and, 2) A very limited number of applications of histochemical staining procedures to the structure of the glomerulus of the dogfish, seal, etc.

The light microscope can study stained preparations at magnifications up to 1500 diameter. The electron microscope studies of B. Vincent Hall, which I was privileged to study, begin at magnifications of around 4500 diameter. It was felt that between stained and unstained preparations on one hand and the fact of magnifications on the other, it was difficult to interpret a glomerular structure satisfactorily. The combination of staining and electron microscope studies seems to be highly indicated. It seems quite probable that staining may form bridges between the pedicels of the "visceral epithelium" and what is being seen with the light microscope in stained preparations is probably these pedicels.

The preliminary histochemical studies seem to make it quite probable that, at least in the dogfish, the "visceral epithelium" is actually of smooth muscle origin. It is pointed out that this is quite in keeping with the demonstration of the enzyme, 5-nucleotidase, found in high quantities in smooth muscle in several types of glomerular obsolescence as reported by McManus, Lupton, and Hardin (Laboratory Investigation, 1953).

Cleavage and Cell Movement in the Early Development of Gammarus.

Raymond Rappaport*
with the technical assistance of Daniel L. Wachtel
Union College

Utilizing the techniques of vital staining and selective destruction of blastomeres, cleavage and cell movement in the early embryology of *Gammarus duebeni* were studied. Cleavage is holoblastic, unequal and determinate. The first two cleavages are meridional and the third latitudinal. The eight cell stage consists of four unequal micromeres and four unequal macromeres. The fourth cleavage is meridional and the fifth latitudinal. At approximately 32 cells, ingression of certain micromeres and macromeres occurs. Ten or eleven of the cells on the surface at the

* Ulrich Dahlgren Memorial Fellow.

32 cell stage are beneath the surface at the completion of ingression. The subsequent role of these cells in development of the embryo is unknown. The yolk-free cells which eventually form the ventral shield aggregate on the macromere side of the egg. Destruction of the macromeres at the eight cell stage results in absence of cells characteristic of the ventral shield. However, following destruction of the micromeres at the same stage, the appearance and aggregation of ventral shield cells takes place at the same time as in unoperated embryos indicating that the majority of the cells of the ventral shield are the progeny of macromeres.

Plasma Volumne, Cardiac Output and Circulation Time Studies on the Seal (Phoca vitulina) During the Dive Reflex

Karlman Wasserman and Allen H. McKenzie
Tulane University

During the dive reflex of the seal, when the heart rate drops from 150 beats/minute to 10 - 15 beats/minute, the femoral vein-to-right heart and the right heart-to-femoral artery circulation times are markedly increased, cardiac output is reduced to 1/3 to 1/4 of the control and circulatory mixing is slowed. The dive reflex also results in a hemoconcentration and loss of plasma, during the dive, which persists for at least an hour after the dive. Resting plasma volumes are a constant percentage of the body weight in the same seal determined over a month's time and in the face of a simultaneously decreasing hematocrit. The blood volume of seals (200 ml/KBW) is approximately twice that of man and his total blood oxygen can be calculated to be about four times that of man.

Characteristics of the Blood-Brain and Blood-Spinal Fluid Barriers in Squalus acanthias

Charles G. Zubrod
National Cancer Institute

A study has been made of the capacity of several substances to pass from the blood into the central nervous system and cerebro-spinal fluid (CSF) of S. *acanthias*. Previous work on the dog had shown that sulfanilamide appears in the CSF and brain of the dog in roughly the same concentration as in plasma water; that sulfanilic acid is almost completely excluded from the CSF and brain and that endogenous ascorbic acid is present in much higher concentrations in brain and CSF than in plasma Observations were made during the summer of 1953, on the distribution