Research Reports: 1954

Preliminary Investigations on the Venous System Associated with the Mesonephros and Metanephros during Chick Development*

Ethel Sue Lumb Vassar College with the technical assistance of Daniel L. Wachtel Union College

Observations were made on the anatomical relations between the chick excretory and circulatory systems during the period of coexistence of the mesonephros and metanephros. Animals ranging in age from eight days of incubation (Hamburger-Hamilton Stage 34) to one week post-hatching were studied by observation in the living animal and by dissections of animals injected with an India ink and gelatin mixture.

Although the study is incomplete, the general pattern of venous supply to the mesonephric and metanephric kidneys was determined. In both kidneys the afferent vessels are formed by branches of the posterior cardinal. In both there is extensive venous sinus development in close association with the tubules. The efferent vessels, the subcardinals of the mesonephros and the great renal veins of the metanephros, develop from longitudinal fusions of ventromedial sinuses and join the inferior vena cava near the anterior margins of both kidneys. Between aproximately the 8th and 20th days there are two alternate circuits for blood returning to the heart from the posterior part of the body, via the mesonephric or metanephric portal system. As the metanephros increases in size there is a shift from a dominate mesonephric to a metanephric system. Correlated with the increase in metanephric blood flow there is a regression of mesonephric vessels and tubules, except for those parts associated with the reproductive system.

An interesting feature of the afferent renal portal system in the late embryo and adult is its connection with the hepatic portal system by the coccygeo-mesenteric vein. This large vessel, running in the mesentery dorsal to the large intestine, connects posteriorly with the afferent renal veins, the fused internal iliacs, and anteriorly with the hepatic portal vein. The embryonic vitelline vein (adult superior mesenteric) also joins the hepatic portal at this point, forming a T-junction. Observations of blood flow at this T-junction showed that the afferent stream in the vitelline divides so that approximately half flows anteriorly in the hepatic portal and half posteriorly in the coccygeo-mesenteric.

* This research was aided by a Grant from the Sigma-Xi-RESA Research Fund.