

12 times, although the total glomerular count shows no significant increase. During the same period representative tubules increase their volume approximately 16 times. The most striking feature, however, is the inequalities of growth manifested by different parts of the mesonephric tubule. Thus, while the renal corpuscle is increasing its volume approximately 3 times, and that of the collecting portion of the tubule about 10 times, the secretory tubule increases its volume about 33 times.

As a check on the growth of the renal corpuscle 6 glomeruli from each embryo were separately modelled and their volumes ascertained. These figures show that although the glomerular knot, as contrasted with the whole renal corpuscle, is becoming more lobulated, it increases in volume only $2\frac{1}{2}$ times during the period from 5 to 14.2 days of incubation. Incidentally it is of interest to note that the mesonephric glomerulus of the 14.2 day chick is about 50 times the size of a glomerulus from the metanephros of the same embryo. (The tubular portions were too small to model.)

Similarly, linear measurements of the mesonephric tubules indicate that the secretory portion of the tubule is the part that is elongating most rapidly. Thus, from 5 to 14.2 days of incubation—when the whole mesonephric tubule (including the glomerulus) is increasing in length approximately $6\frac{1}{2}$ times, and its collecting portion about $3\frac{1}{2}$ times—the secretory portion increases 9 times in length.

From a preliminary analysis of this data, therefore, it is apparent that during the period when uric acid is being increasingly excreted, the secreting portion of the mesonephric tubule is the part that is growing the fastest.

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Developmental Potencies of Explanted Quadrants of Hensen's Node.

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This article is part of a series of studies designed to test the potencies of the embryonic chick blastoderm, particularly that part of the primitive streak designated as Hensen's node. When this node, in stages prior to the formation of the head-process, is transplanted to the chorio-allantoic membrane of 9-day chicks, the grafts

that develop contain organs and tissues that are found in the normal embryo as far back as the mesonephros, including tubules (and glomeruli) from that organ. From these observations previously reported¹ it was concluded that Hensen's node at this stage is essentially totipotent. It was also shown that other parts of the blastoderm have a limited capacity, as indicated by the fact that grafts of the area pellucida anterior to the node, or the primitive streak posterior to it, form generalized structures only, such as gut, cartilage, muscle and skin with feather germs.

The present experiments were undertaken to ascertain the potencies of different parts of the node. As before, donor blastoderms were used in which there was a definitive primitive streak but no head-process. A median longitudinal cut was made through the primitive streak and a transverse cut through the primitive pit, as a consequence of which the node and area pellucida were divided into 2 equal anterior parts and 2 equal posterior parts. As it was easier to handle large pieces and as regions outside of the node have limited capacities, the area pellucida in the majority of transplants was not excluded. In the remaining experiments only that part of the area pellucida immediately surrounding the node was included with the nodal tissue. As both types of experiment yielded the same results they are considered together.

Of the grafts obtained, 68 have been studied and form the basis of this preliminary report. Twenty of these were obtained from the left anterior, 22 from the right anterior, 14 from the left posterior and 12 from the right posterior, quadrant. No experiment was considered valid unless grafts were obtained from at least 2 adjoining quadrants of the node. Out of 28 experiments thus retained, 19 gave grafts from 2 quadrants, 6 from 3 quadrants and 3 from all 4 quadrants.

An inventory of the tissues found in these grafts indicates that the right and left anterior quadrants are equipotent. In such grafts from adjoining portions of the same donor, vesicles of the fore-, mid- and hind-brain were clearly differentiated. In many cases these were comparable in size and histological appearance to portions of the brain derived from grafts of the entire node. Closely associated with the brain, in 78% of the cases, was notochordal tissue. Besides brain and notochord the following organs developed in grafts from the anterior quadrants of the same donor; eye, ear, epiphysis, hypophysis, heart, liver and gut. In addition to these

¹ Hunt, T. E., *PROC. SOC. EXP. BIOL. AND MED.*, 1929, **27**, 84, 86; *J. Exp. Zool.*, 1931, **59**, No. 3 (in press).

there were such common tissues as cartilage, skeletal muscle, dermis, epidermis and feather germs. Thyroid occurred in grafts from either the right or left quadrant but not as yet from both quadrants of the same donor.

Similarly, right and left posterior quadrants appear to be essentially equipotent. The parts of the neural tube found in grafts from these regions were hind-brain and spinal cord. A well-formed tube or vesicle occurred less frequently than in the anterior halves and the nervous tissue was often disorganized. Notochord was associated with the nervous tissue in 53% of the cases. Heart, liver, mesonephros and the common tissues mentioned above were also found. Occasionally suprarenal gland occurred in grafts of one quadrant or the other.

In contrast to the equipotency of the right and left sides, there is a dissimilarity in the potencies of the anterior and posterior halves of Hensen's node. When either the 2 right or the 2 left quadrants were grafted on the chorio-allantoic membrane, it was found that the anterior quadrants had the capacity to form such structures as brain, eye, epiphysis and hypophysis; whereas the posterior ones gave rise to spinal cord (and possibly hind-brain), mesonephros and suprarenal gland. All 4 quadrants produced notochord and the usual tissues. It is believed that heart and liver may also be formed in all 4 areas but thus far they have been found in only 3 of the quadrants from the same donor.

In conclusion, it is evident that right and left anterior quadrants are equipotent, that the same holds true for right and left posterior quadrants but that the anterior and posterior halves of Hensen's node differ in their capacities.

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Changes in the Composition of the Red Blood Corpuscle During Fat Absorption.

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The composition of the red blood corpuscle may be altered physiologically by the simple expedient of feeding a fat, such as olive oil. The changes thus produced have been studied by Bloor,¹

¹ Bloor, W. R., *Physiol. Rev.*, 1922, **2**, 92.