



Fig. 2. Amount of solids, cholesterol and phospholipids in the 3 ml. bile compared with the amounts found in the high molecular fractions of the same quantities of bile after gel filtration on 'Sephadex' G-25 and G-75. Double hatching, cholesterol; single hatching, phospholipids; white, other components

> 40,000–50,000 are presumed to be found. The bile lipids, cholesterol and phospholipids comprise more than 2/3 of the solids, in this phase. The rest probably consists of the bile pigment, biliverdin and protein.

The bile lipids, cholesterol and phospholipids, may be present in some form of macromolecular water-soluble complex which can be separated from native bile with the large components such as proteins. Some of the bile pigment (biliverdin) accompanies these substances.

ERIK THUREBORN

Department of Surgery II,
University of Gothenburg,
Sweden.

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Accumulation of Hæmatins by Polychætes

MANY polychæte annelids appear to darken with age; the lugworm *Arenicola marina* does so, and the terebellid *Amphitrite johnstoni* is also brown when old. In terebellids the heart-body becomes bulkier and in lugworms dark tissue around the intestinal vessels increases with age. This darkening is partly due to an accumulation of hæmatin; in *Amphitrite johnstoni* the dark colour is wholly due to hæmatin, the pigment accumulating in the cœlomic cells as well as in the heart-body. In *Arenicola marina* the hæmatin in the skin and that in the tissue surrounding the intestinal vessels both show pyridine hæmachromogen bands at 547.5 and 517 m μ . In *Amphitrite johnstoni* the hæmatin in the cœlomic cells to which, owing to the transparency of the body wall, the hue of the worm is due shows pyridine hæmachromogen bands at 554 and 520 m μ ; that from the heart-body at 547 and 516 m μ , reminiscent of meso- rather than proto-porphyrin and similar to the malarial pigment. The hæmoglobin in the blood of both worms, and the hæmoglobin in the cœlomic cells of *Amphitrite johnstoni* show pyridine hæmachromogen bands at 557 and 525 m μ characteristic of hæms with protoporphyrin nuclei.

The accumulation of hæmatin with age in tissues which are known to be also hæmatopoietic¹ suggests that hæmatin may be a normal product of hæmoglobin breakdown in these worms. It may be that the reason why bilins of chlorocruorin have not been identified is that normal breakdown of chlorocruorin also leads to equivalent hæmatins. The accumulation of bilins in some other polychætes²⁻⁴ suggests that there may be some variety in the ways in which hæmoglobin is catabolized in these worms, but following the work of hEocha *et al.*⁵ it is not clear whether these are always derived from the worms' own hæms or from algal pigments in the food.

An investigation of these problems is in progress.

R. PHILLIPS DALES

Department of Zoology,
Bedford College,
London, N.W.1.

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ANATOMY

Effect of Total Thyroidectomy in the Rabbit Fœtus on Fœtal Cholesterol Metabolism

IN earlier communications^{1,2} it was shown that the fœtal thyroid gland influenced the cholesterol metabolism of the rabbit fœtus. Total thyroidectomy in the 22–23 day fetus was found to result in a highly significant increase in blood cholesterol and the results are shown in Table I.

Table 1. SERUM CHOLESTEROL IN THYROIDECTOMIZED AND CONTROL RABBIT FETUSES

Fetuses	Age at investigation	No.	Mean serum cholesterol (mg/100 ml. \pm S.E.)
Thyroidectomized (at 22–23 days)	29–30 days	7	129* \pm 7.7
Litter-mate controls	29–30 days	32	86* \pm 3.5

* These differences are significant. $P < 0.001$.

The method used for fœtal thyroidectomy was similar to that described by Jost³ and involves the removal of the lower half of the larynx and the upper rings of the trachea together with the thyroid gland. It was noted that the fœtuses which had undergone this operation were unable to swallow during intra-uterine life, the stomach of each operated fœtus containing a negligible amount of fluid whereas the control fœtuses all had full stomachs, presumably from intra-uterine swallowing of amniotic fluid. This raises the possibility that the mechanical interference to the neck of the fœtus, by preventing swallowing, may have been responsible for raising the cholesterol-level in the fœtal blood.

In order to investigate this point further a new technique has been developed for removing the thyroid of the rabbit fœtus. The strap muscles overlying the thyroid are divided, exposing the gland, which is then divided into two parts by a verticle incision through the isthmus. Each lobe is dissected off the trachea and larynx under a dissecting microscope, the laryngeal nerves being left intact. The skin incision is closed with 3–4 fine sutures of Barraquer silk on a 4-mm corneal needle. When examined 6 days later just before term, these fœtuses had well-healed operation wounds, the trachea and œsophagus were free, but the stomach was filled with fluid as in the litter-mate control fœtuses. This new technique did not interfere in any way with fœtal swallowing.

Using this technique, ten fœtuses were subjected to thyroidectomy on the 23rd day of intra-uterine life, and then allowed to continue developing within the uterine cavity until just before term. The fœtuses were recovered