

**Studies of bile pigment metabolism in the dogfish
(*Squalus acanthia*) and the goosefish
(*Lophius piscatorius*) (*)**

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In mammalian liver, bilirubin must be conjugated to be excreted in the bile. The biosynthesis of bilirubin glucuronide, the major conjugate, involves the transfer of glucuronic acid from uridine diphosphate glucuronic acid (UDPGA) to bilirubin in a reaction catalyzed by a microsomal enzyme, glucuronyl transferase. UDPGA pyrophosphatase hydrolyzes UDPGA in broken cell suspensions to glucuronic acid-1-phosphate and UMP and is inhibited by EDTA. Beta glucuronidase hydrolyzes ester and etheral glucuronides and is inhibited by saccharate. These enzymatic activities were estimated in homogenates of liver obtained from dogfish pups and adults. Beta glucuronidase and glucuronyl transferase activities were similar in homogenates of liver from dogfish pups and adults. UDPGA pyrophosphatase activity was considerably greater in homogenates of liver from dogfish pups as compared with adults. These observations are in contrast with the delayed development of glucuronyl transferase activity which has been described in newborns of several mammalian species including man.

Gallbladder bile was obtained from adult dogfish and goosfish. Following the addition of diazotized sulphanilic acid, the resulting dipyrrolazopigments were characterized by paper chromatography in methyl ethyl ketone: propionic acid: water (75:25:30). Whereas bile obtained from mammals contains only conjugated bilirubin, the fish bile was demonstrated to contain unconjugated bilirubin as well as bilirubin glucuronide and large amounts of a yellow pigment which does not react with diazotized sulphanilic acid and demonstrates different spectral characteristics from bilirubin or biliverdin.

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**The Obligate Ciliate Commensals of the Sea Urchin
(*Strongylocentrotus dröbachiensis*): Infection and
Division in Relation to the Age of the Host**

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Of the 7 species of intestinal ciliates which are known from *S. dröbachiensis* at Mt. Desert Island, 3 are obligate commensals, viz., *Biggaria gracilis*, *Entodiscus borealis* and *Madsenia indomita*. Whereas *B. gracilis* divides continually, dividing individuals of *Entodiscus* and *Madsenia* are uncommon, since long periods of trophic life alternate with brief intervals of division (Beers, Biol. Bull. 94:99, 1948).