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Experiments on the Morphogenesis of Regenerating Fins In Fundulus Heteroclitus

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The fins of Fundulus heteroclitus regenerate by the terminal accumulation of undifferentiated cells derived from the connective tissue immediately proximal to the level of amputation. Osteoblasts which normally line the surfaces of the dermal fin rays, also migrate into the blastema where they are responsible for giving rise to the regenerated rays. The latter develop as a result of the initial deposition of bone in intimate association with the epidermal basement membrane.

The complete extirpation of ventral halves of fin rays from amputated fins results in the regeneration of correspondingly deficient structures. When parts of fin rays are removed for short distances behind the level of amputation, ray regeneration proceeds nomally from the more proximal level. Additional fin rays transported to the interradial regions of subsequently amputated fins bring about the formation of corresponding extra rays in the regenerate. When parts of fin rays are extirpated from otherwise intact fins, the missing portions are replaced by distally directed growth from the proximal ray stumps.

Totally denervated fins cannot regenerate after amputation, nor can individual fin rays repair injuries in the absence of nerves. It is concluded, therefore, that ray regenerates are formed only under the influence of osteoblasts derived from pre-existing ray stumps, and that this process is dependent upon the presence of adequate innervation.

Execretion of Sodium Bicarbonate by the Freshwater Catfish (Ameiurus nebulosus)

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It was reported previously (Am. J. Phys. 183:155, 1955) that in contrast to the marine dogfish, a carbonic anhydrase sensitive to inhibition by Diamox® does exist in the kidney of the freshwater catfish. In the latter species, intraperitoneal administration of sodium bicarbonate leads to alkalinization of the urine and increased renal excretion of sodium and