

The Relation Between Pigmentation and Injury in the Conjunctiva of the Frog Tadpole.

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It has been shown¹ that following the removal or extensive injury of the conjunctiva of frog tadpoles (*Rana catesbeiana* and *R. clamitans*) the regenerated conjunctiva becomes heavily pigmented by epidermal melanophores, and that the pigmentation persists for several months.

Experiments have been made to discover relationships that might exist between the extent of injury and the amount of pigmentation, as well as between the locus of injury and distribution of the pigment. The conjunctivas of tadpoles of *R. catesbeiana*, 1 and 2 years old, have been injured by incisions approximately 1, 2 and 3 mm. long, in different places. In some cases small pieces of the conjunctiva were cut out entirely. The results were as follows: When incisions were made in places about equally distant from the edge of the conjunctiva, the resulting pigmentation was proportional to the length of the cuts. In the case of the minimum injuries, the distance from the surrounding pigmented skin was a determining factor. The minimum wound that caused pigmentation was an incision about 1 mm. long, located not more than 1 mm. from the edge of the conjunctiva. When cuts 2 or 3 mm. long were made near the center of the conjunctiva pigmentation appeared, but not if the cuts were less than 2 mm. long. Small cuts or wounds near the edge of the conjunctiva were followed by pigmentation only of the tissues surrounding the wounds and between the latter and the edge of the conjunctiva. Melanophores were never seen on the side of the small cuts proximal to the center of the conjunctiva. The pigmentation thus produced by injury persisted for 4 months, when the experiments were discontinued. Within a few days after the injury the melanophores lost their typical spindle shape with dendritic processes, and became rounded contracted cells. This change in shape appeared to be independent of the state of the melanophores in the rest of the body, and led to the idea that the contraction was due to some local cause, different from that which controlled the skin melanophores.

It was concluded that the amount of pigmentation by epidermal melanophores in the regenerating conjunctiva is directly propor-

tional to the extent of injury, and inversely proportional to the distance of the wound from the edge of the conjunctiva; that in tadpoles which are just approaching metamorphosis, the pigment cells persist for at least 4 months; and that the initial expanded phase of the melanophores is followed by contraction, which appears to be permanent.

¹ Cole, W. H., *J. Exp. Zool.*, 1922, xxxv, 353.