Influence of Nerves on the Regeneration and Regression of Limbs in Amphibia

Dr. Charles Thornton
Kenyon College, Gambier, Ohio
Project Number 68

Two problems were investigated, both involving the use of Amblystoma tigrinum larvae collected in a pond near Pacific Creek.

I. In order to investigate further the influence of nerves on the formation of the apical epidermal cap in limb regeneration, limbs of larval tiger salamanders, along with 5 mm. sections of spinal cord, were transplanted to the back fin of host larvae. After establishment the grafted limbs were amputated. The intracentral nerve fibers of the spinal cord deplants grew into the limb deplants, induced formation of apical caps and thus supported regeneration. It is concluded that foreign nerve fibers not normally associated with muscles and skin can thus stimulate regeneration. Control limb deplants with no spinal cord deplant failed to regenerate except for 6 (out of 38) which showed indications of small pointed blastemata when local nerves succeeded in innervationg the limb deplant.

II. The influence of the apical epidermal cap on limb regeneration was tested by mechanically removing the cap daily as it formed on the limb stump. Regeneration was inhibited. Similar amounts of epidermis removed daily from the lateral surface of the limb stump tip did not inhibit regeneration.

(Grant from National Science Foundation.)