Neoteny Encyclopedia Article

Neoteny

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Neoteny

Neoteny is a term that describes sexual reproduction by larval organisms. In theory, it could occur as the result of premature sexual maturation in larvae, or because of sexual maturity in an organism that retains larval characteristics. Neoteny occurs widely among tailed amphibians known as salamanders. Perhaps the best know example of neoteny is that of the Mexican axolotl, *Ambystoma mexicanum*, which was found near Mexico City (this salamander is rare now in natural populations). The axolotl retains a broad head, bushy external gills, teeth in both jaws and lacks eyelids. It has small legs and feet and it has a dorsal fin that runs from the back of the head to the tip of the tail. A ventral fin is found between its posterior limbs which extends to the tail tip. The axolotl is larger than average (up to 10 in [25 cm]) for salamanders. The retention of larval characters permits an aquatic life and reproduction in water.

It would be plausible to think of the axolotl as an fully mature aquatic species with no suspicion that they are in fact larval forms. However, in Paris in 1865, Mexican axolotls underwent spontaneous metamorphosis to the adult terrestrial form in an aquarium. Not long thereafter, it was discovered that thyroid extracts would routinely cause metamorphosis of axolotls. Metamorphosis caused loss of gills, tail fins, and other larval characteristics.

Axolotl is an Aztec word appropriate for *A. mexicanum*. However, the term can be used for any salamander that reproduces as a larva. All families of salamanders have some neotenic forms and they are relatively common in North America. For example, the blotched tiger salamander *Ambystoma tigrinum melanostictum*, occurs in Yellowstone and Grand Teton National Parks, and may reproduce either by neoteny or by reproduction as an adult. It is not known why some populations reproduce by neoteny and other populations do not.