

# WHAT'S YOUR DIAGNOSIS?

Edited by Steven H. Weisbroth, DVM

## Ol' Pink Eyes

By Howard Blatt, DVM

The Mexican axolotl (*Ambystoma mexicanum*) is an aquatic amphibian used for embryological research and investigations on limb and organ regeneration. The axolotl, unlike most amphibians, does not metamorphose to a terrestrial animal except when thyroid extract or iodine is added to the diet. These animals do not normally lose their external gills or tail-fin.<sup>1</sup>

In common with other amphibians, the axolotl is very sensitive to changes in the ambient environment — the water in its aquarium, for example. Certain colonies are kept under constant refrigeration to retard bacterial overgrowth. The small glass aquariums the animals are ordinarily kept in are shallow, with a large surface area for oxygen exchange.

A laboratory colony of axolotls was experiencing unexplained high mortality for several days. An albino adult 170 g male examined in its aquarium was noted to have petechial and ecchymotic hemorrhages on its back legs and feet. The other animals in the colony were carefully examined and none were found to have similar lesions. The water in this animal's tank had been a red color three days earlier.

The next day the animal developed subcutaneous swellings bilaterally, dorsal to the shoulder and caudal to the external gills. The swellings were domed, approximately 1½ cm in diameter and bulged 1 cm from the animal's body. The swelling on the back

extended from the crown of the head to approximately 3 cm along the spine. The swellings were translucent. (See Fig. 1. Hint — pay special attention to the eyes of this animal.) Water from the animal's tank was taken for microbiologic culture and the animal was submitted for diagnostic necropsy. In transit to the diagnostic laboratory, the axolotl died.

At necropsy, external examination revealed superficial and deep petechial hemorrhages on the back legs and feet, the abdomen, dorsal thorax, and ventral mandibular area. The masses were firm and when transected were observed to have translucent, gelatinous-like contents. The heart was noted to be bright yellow and to have a few in-

tramural hemorrhages. The internal organs were remarkably free of blood or clots. The little blood that was present appeared thin. Two masses were noted in the abdominal cavity; these have yet to be identified, but they were thought to be incidental and unrelated to the cause of illness and death. The microbiologic culture report indicated that the water environment of this axolotl was heavily contaminated with *Pseudomonas spp.* and *Acinetobacter spp.*

On the basis of the case history, observations, photograph, microbiologic and necropsy findings, identify the nature of the swellings and give a pathogenesis that explains the course of events. *What's your diagnosis?*

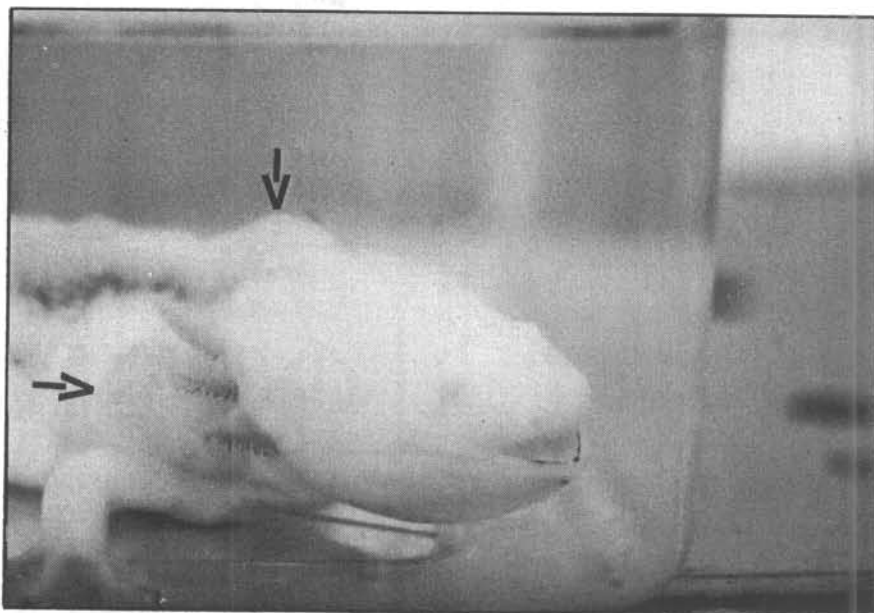


Fig. 1 Axolotl viewed through aquarium. Note the eyes. Swellings are seen dorsally and caudal to the external gills (arrows).

The contributor for this month's column is Howard Blatt, DVM. Dr. Blatt is associate director of the Animal Institute at the Albert Einstein College of Medicine of Yeshiva University. Reprint requests should be addressed to Dr. Blatt at the College, 1300 Morris Park Avenue, Bronx, NY 10461.

## Diagnosis: Edema consequent to anemic complications of gill injury.

Dorsal edema does not readily come to mind when the frame of reference is terrestrial animals. In these animals, edematous fluids gravitate to ventral locations. It was concluded that such fluids need not gravitate to the abdominal areas in water-living amphibians, accounting for the dorsal location of edema in the axolotl.

The pathogenesis of the condition was explained as follows: Microbiologic cultures indicated high bacterial counts in the tank water. It is recognized that the fine vasculature of the external gill can be damaged by bacteria or fungi, resulting in hemorrhage (recall the red aquarium water) and significant blood loss.<sup>2</sup>

In albino animals of all species there is an absence of iris and retinal pigments. When looking at the eyes of such animals, the red color one sees is actually the blood of orbital structures, especially the retinal vasculature. Pronounced anemic (and icteric) changes in the blood can therefore be detected by changes in eye color from the norm. The pale and low contrast color of the eyes of this animal (Fig. 1) suggest pronounced anemia as a consequence of hemorrhages from the gill. Blood loss anemia with loss of proteins and electrolytes was thought to result in escape of fluids from the blood vessels (edema) which then accumulated subcutaneously.

The petechiae were thought to be associated with a red-leg-like condition. Axolotls are susceptible to "red leg", the common name given to *Aeromonas hydrophila* septicemia. The classical lesion of red leg is subcutaneous capil-

lary hemorrhages in the extremities. It has been reported more frequently in frogs, toads, and fish, but has also been described in the axolotl.<sup>3</sup> □

### REFERENCES

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