

## TREATMENT OF DERMAL ULCERS IN SALAMANDERS

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Salamanders are sometimes prone to suffer from skin ulcers which, if left untreated, grow into the deeper tissues including the bone, resulting in the death of the animal. The animals I have treated respond very rapidly to a bath of 50mg per litre oxytetracycline — this would suggest that the causative pathogen is a bacterium or actinomycete rather than a fungus (as in the case described by Lambiris — unless he is classifying the actinomycetes with the fungi).

Any part of the body can be affected, but the digits are particularly prone (and can be quickly eaten away by the disease) as well as other parts of the limbs and the lower jaw and snout. The ulcer is surrounded by a black ring which grows out as the ulcer grows. The pathogen survives in the soil and is picked up from there when the salamander crawls over it or when the salamander rubs its snout on it when feeding on worms and other prey.

Because amphibians breathe through the skin the skin is heavily supplied with blood vessels close to the surface. Because of this, antibiotics and other chemicals which can pass through cell membranes are rapidly taken up and distributed throughout the body. This often makes injections or dosage by stomach tube completely unnecessary. Oxytetracycline radically alters the bowel flora, and within a few hours of putting the animal in the bath the bowel will be emptied as diarrhoea. This is nothing to worry about — wait a few hours for the gut to be emptied and replace the bath with fresh oxytetracycline and then change the antibiotic solution every day for a week. Use a small container (eg a 2 or 4 litre ice-cream tub) for the treatment bath and leave the animal in it for the whole treatment period. Put in about  $\frac{1}{4}$ " depth of the solution of oxytetracycline.

The original tank where the animal was kept should be emptied and sterilised with household disinfectant or bleach and then the substrate changed for inert  $\frac{1}{4}$ " gravel, but hiding places eg slates and readily accessible water should still be provided. It is advantageous if part of the tank can become quite dry — this will be the case if several inches of  $\frac{1}{4}$ " gravel is used and the bottom of the tank is not filled with much water.

Making the substrate acid will also control the disease. This can be done in the case of an ordinary soil substrate by mixing in 20-40g of flowers of sulphur per square foot of substrate or watering with sulphuric or hydrochloric acid. The pH should be lowered to 5 but no lower. Altering the soil pH radically alters the soil flora. Actinomycetes are effectively destroyed at pH below 5, bacterial activity is modified at pH below 5 so that acid-specialising bacteria take over from those species active at higher pH. Fungi can survive at all pH values but are out-competed to some degree at higher pH values by bacteria and actinomycetes. Thus reducing the soil pH will often eliminate many bacterial and actinomycete diseases, while increasing it will help control fungal diseases.

### REFERENCES

- Lambiris, A.J.L. (1979). Surgery on a Captive Salamander. *British Journal of Herpetology* 5: 843-4.
- Reichenbach-Klinke, H. & Elkan, E. (1965). *The Principal Diseases of Lower Vertebrates. Book 2. Diseases of Amphibians*. T.F.H. Publications, Inc. Hong Kong.