UNIVERSITY OF FLORIDA
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Management of Hexamita in Ornamental Cichlids[1]

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Hexamita is a flagellated protozoan found in the gastrointestinal tracts of a variety of cold and warm water fish, including several species of Cichlids which are popular aquarium pets. It can be a serious health problem in angel fish and discus. Occasionally hexamita is found in healthy fish. Stress from malnutrition, shipping, over-crowding, or poor water quality may lead to rapid reproduction of the protozoan, resulting in disease. The genus hexamita was formerly called "Octomitus" because of eight hair-like flagella which project from the organism (Figure 1). Three species of hexamita have been associated with disease in fish, *Hexamita salmonis*, *Hexamita truttae* and *Hexamita intestinalis*. It is unknown whether these species or new species which have not yet been identified are responsible for disease in ornamental fish.

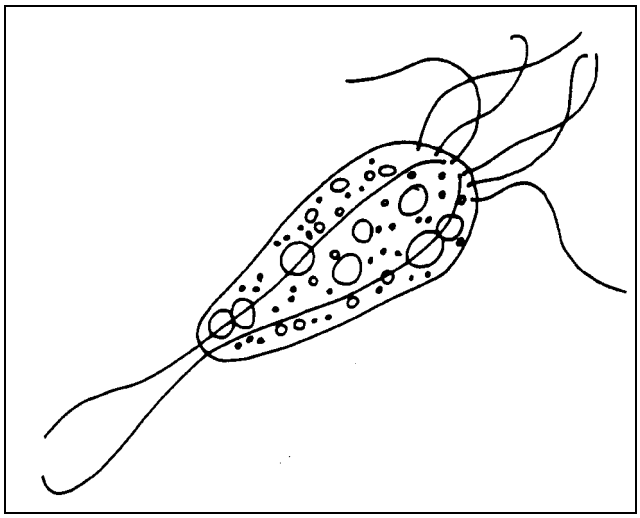

Figure 1. Hexamita from the intestine of an angel fish.

Transmission of hexamita

Hexamita is probably transmitted through the water from contaminated fecal material. The flagellated stage makes its way to the lumen of the upper intestine. There it swims freely in the intestinal and cecal fluids. The organism may be present in small numbers under normal circumstances; however, for disease to develop the organism must reproduce rapidly resulting in a massive infestation. Generation time for the flagellated form is thought to be 24 hours.

Signs of hexamitiasis

Weak or stressed fishes seem to be most susceptible to heavy infestation. Physical signs of hexamitiasis include weight loss, decreased activity and refusal of food. Angel fish which are severely infected with hexamita may lie horizontally on the surface of the water with the abdomen visibly distended. Angel fish may remain in this condition for several days. These severely infested fish often recover following treatment with metronidazole. Infestations in adult breeding angel fish may be associated with decreased hatchability of eggs or death of young fry.

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Management of hexamita

Confirmation of hexamita infection is easily done by making a squash preparation of the intestine and examining it with a light microscope at 200 and 400x. The flagellates move rapidly and erratically. They are most easily seen in areas where the mucosa is broken. If the infestation is severe they are numerous and easily found.

The recommended treatment for hexamita is metronidazole (Flagyl) administered in a medicated food or, if the fish are not eating, in a bath treatment. Metronidazole can be administered orally at a dosage of 50 mg/kg body weight (or 10 mg/gm food) for 5 consecutive days. A recipe for a gelatinized food is shown in Table 1. The medication can also be mixed with dry food using fish oil as a binding agent. One teaspoon of metronidazole weighs approximately 2.25 gm; therefore 2 tsp. should be added to each pound of food. The drug should be added when the gelatinized mixture has cooled, but has not yet set. The medicated food can then be frozen for storage. During the 5 day treatment regime feed only the medicated food to the fish. If fish are not accustomed to a gelatinized food they can be trained to accept the mixture by preparing the food without medication and feeding it occasionally. Training should be done when fish are healthy rather than waiting until they are sick. Sick fish do not eat well and may completely refuse unfamiliar food.

If fish are already sick and off-feed metronidazole can be administered in a bath at a concentration of 5 mg/l (18.9 mg/gallon) every other day for three treatments. This treatment is effective but may not clear the organism from the fishes' intestinal tract as well as the medicated food.

Since hexamita can be kept alive in laboratory media, it is assumed that it is an inhabitant of aquaria where organic material has been allowed to accumulate. Cleaning of gravel and filter materials will assist in eliminating the organism from the environment. It may be advisable to periodically check broodstock for subclinical hexamita infections. Even though the fish may not be sick, low levels of the parasite may have an adverse effect on reproductive performance or may flare up under conditions of stress. These subclinical infections can be easily treated with a medicated feed before real problems develop.

Summary

Hexamita is a flagellated protozoan that can be found in the intestine of healthy and sick fish. It is of particular importance in angel fish and discus. It can also cause problems in oscars and African cichlids, and other fish. Stress, particularly caused by poor water quality or inadequate nutrition, seems to be associated with increases in the number of flagellates in the gut and development of clinical disease. Elimination of stress and correction of husbandry will help correct an outbreak of hexamitiasis. Metronidazole provided as a medicated feed or a bath is an effective treatment and even severely affected fish often respond to therapy. Commercial producers of ornamental cichlids should periodically check fish for hexamita infections and treat any infected fish.

Table 1. Recipe for gelatinized food which can be used to deliver oral medication to ornamental fish.

Ingredients:	
6 oz	Can of shrimp
2 oz	Frozen spinach
1 oz	Grated carrots
3 tbsp	Baby cereal (dry)
2 tbsp	Brewer's yeast
2 oz	Unflavored gelatin
15 oz	Water
Optional ingredient:	
1 tsp	Liquid vitamins
Procedure:	
1.	Blend 5 oz of water with shrimp, spinach, carrots, baby cereal, brewer's yeast and vitamins.
2.	Boil remaining 10 oz of water.
3.	Add boiling water to gelatin in a bowl.
4.	Cool until gelatin mixture is hot but doesn't burn.
5.	Add contents of blender to partially cooled gelatin mixture, mix thoroughly.
6.	Add medication to cooled mixture.
7.	Pour into flat pan and refrigerate.
8.	Cut gelatinized mixture into cubes for feeding and store in freezer.