DISEASES IN FISH: Pathophysiology, Diagnosis & Therapeutants….

The Fish Vet

It's extremely important to detect disease at the earliest possible opportunity, since prompt treatment may be able to save your fish and equally important, prevent the disease spreading to other fish. However, most clinical signs are non-specific. The ability to recognise signs of illness depends upon regular observation of your fish – to be familiar with the normal physical appearance and behaviour.

In freshwater, the internal tissues of fish are hyper-osmotic, whereas in saltwater they are hypo-osmotic. Surface injuries to the skin make osmoregulation more difficult and may be of serious consequence due to loss of fluid balance and circulatory collapse. What this basically means is that if you get a break in the skin of a freshwater fish, it will act like a sponge and swell up with water. And if it is a marine fish, the opposite will happen, it will dehydrate.

The gill has three primary functions - respiration, excretion (monovalent ions and nitrogenous excretions) and fluid balance. The very large surface area afforded by gills allows these functions to occur. However, injuries to gills may be particularly serious due to its delicate structure and large surface area. Thus, it is very important to seek professional advice immediately. Delaying treatment or giving the wrong treatment can be very detrimental to the health and life of the fish. Any fish in a tank that gets sick, regardless of its monetary value, need medical attention immediately. This is because they act as indicators to the health of your entire aquarium and all

the fish in it. Any delays or improper medication often exacerbates the condition and predisposes the rest of its tank mates to stress and may even succumb to the disease. I am a strong believer that prevention is better than cure. An example of a case to illustrate the point that clinical signs of fish disease are very non-specific is given below.

History

A tank has been set up for about 3 weeks. A little goldfish had profuse hyperaemia (redness) around the ventrum and gill covers, was lethargic and appeared depressed. Not eating and much less active than normal. No gross signs of excessive mucus production and breathing normally. Not "flashing".

Possible diagnoses include:

Dirty water, parasites (fluke, protozoa), bacterial infection, fungal infection, heavy metals…..

Which of these would you pick at the problem? Can you be sure? Each one of these requires a different course of treatment to work. How would you go about treating this fish?

The right answer that time was Septicaemia, and I treated the fish successfully with some prescription antibiotics.

…..but 2 weeks later……another fish in the same tank fell sick.

Clinical signs:

Not eating because he couldn't open his mouth and it looked like he couldn't see because he had some sort of tufty growth over his eyes. The owners isolated him and put him in some aquarium salts and tried to use the left over antibiotics on him, but unfortunately it died.

A few things can be learnt from this exercise,

· The right diagnosis means you need specialised equipment and experience;
· Different diseases require different treatment regimens;
· If you get the diagnosis wrong, and use the wrong medication, you will end up killing your fish - wasting time and money.

Quite a few fish books and internet sites have a "DIY diagnosis chart". While I think that it's a good way to start an aquarist thinking, there is no sure way of identifying the disease without having the proper equipment and experience. Some have simplified the process to a dichotomous key. One wrong step in the process can give you no result, or worse still, give you bizarre diagnoses causing you to do more harm than good for your fish. Also, a word of warning about internet sites. Most sites are full of information, however, some information may not be entirely accurate and may be misleading. Any old Tom, Dick or Harry can upload sites on the internet. How can you be so sure that the information you have gathered is reliable?

Many diseases come about as a result of several factors such as environment, nutrition and care. To solve these sorts of problems requires a multidisciplinary approach. Veterinarians have the right training for making an accurate diagnosis and prescribing a specific treatment for each problem. Veterinarians possess relevant background in microbiology, parasitology, anaesthesia, surgery, physiology, anatomy, pathology, pharmacology and toxicology to carry out a wide variety of diagnostic services for a pet owner. Couple this with years of experience with keeping a wide range of fish, TheFishVet can also offer the same full service for the pet fish owner.

I want to re-iterate the point that clinical signs of disease in fish are often nonspecific. Two fish that present with the same clinical signs may be down with two completely different diseases. And what hope have you in treating a fish with medication if you haven't made the correct diagnosis? Right? Another fish I had seen that was

presenting with the exact same clinical signs was actually a totally different disease. In the first case, bacteria were the cause, but in the second, it was due to a flat worm. So, the clinical signs may be similar but the causative agent and hence treatment options will vary.

There is no time to waste. Treat them right the first time otherwise they will die. Most medications act on the basis that they are more toxic to the bug than they are to the fish (i.e. killing the bug before it kills the fish). From personal experience, I have found that more pet fish die as a result of aquarists administering wrong treatments. There are a number of reasons why this is so:

1. Wrong drug à bugs live, but fish die.
2. Right drug, too low a dose à bugs live and kill the fish.
3. Right drug, too high dose à kill bug, but also kill fish (more is not better).

There are many side-effects and toxicity problems and only a person trained in pharmacology and toxicology can tell what they are. Which brings me to my next point. Drugs used to treat fish can be divided into 2 categories: non-selective and selective. NON-SELECTIVE = kills virtually anything that is living. These treatments work on the idea that the concentrations needed to kill the bugs are slightly less than what would kill a fish. Since it does not differentiate between fish and bugs, it is VERY IMPORTANT TO FOLLOW THE DOSE RATES prescribed on the label. NEVER OVER-DOSE. More is NOT better. E.g. formalin. SELECTIVE drugs are much safer for use, however, dose rates should still be followed because, although they are selectively toxic to the bug, they may have toxic side effects often relating to liver or kidney function. Also, few long term studies have been done on how certain drugs affect fish.

I would be even more hesitant about the unrestricted use of drugs. E.g. antibiotics. Another issue regarding the responsible use of drugs is bugs developing resistance to the drugs. I'm sure you've all heard of the "Golden Staph" or "Multi-drug resistant

Staphs". Chemotherapeutics should NOT be used as prophylaxis, but rather, reserved for treatment purposes. Otherwise, you will run into drug resistance problems. Just imagine how unfortunate it would be if one day one of your fish gets sick and there are no more drugs that are effective left. What is of greater concern (especially with regard to antibiotics) is if these resistant bacteria pass on their resistance genes to bugs that can cause disease in humans? How can we treat ourselves? We need to take responsibility and consider the long term implications.

Drugs vary in efficacy and toxicity in different conditions and may even be toxic on certain species. E.g. MALACHITE GREEN. It is more toxic in acid conditions and at higher temperatures. Malachite green is toxic to scaleless fish, certain catfish and clown loaches. And for this reason, I am a little weary of using multi-drug remedies usually marketed as a "Cure-All". Quite a few medications on sale do not state what chemicals are in the bottle and you could run into problems.

Sometimes topical or bath treatments are ineffective. If the fish is still eating, we can get drugs into him by medicated feed (which I can make up) or by intramuscular injection if your fish has gone off food. A final note about medications and fish. Fish are classified in the pharmaceutical world as 'MINOR SPECIES'. This means that they are not a significant part of the drug market and so there are not that many drugs available that are registered for use in fish.
Non-registered products can still be very effective and safe for use in many animals but drug companies tend not to register them mainly because of the extra costs involved. Veterinarians are permitted to use and prescribe drugs 'OFF-LABEL' since there are no suitable alternatives.

So, to summarise the main points:

1. You need the correct diagnosis in order to prescribe the right medication, if not you will kill the fish;
2. You cannot simply throw drugs at your fish because you will end up killing them and contribute to bugs becoming resistant to drugs - wasting your time and money;
3. The right diagnosis means you need specialised equipment and a trained diagnostician with experience and knowledge of fish.

This information sheet has been adapted from the talk given by Dr Richmond Loh at **TheFishClub meeting on 4 March 2003.*

http://www.geocities.com/thefishvet

For more detailed information contact **The Fish Vet**

Dr Richmond Loh
DipProjMgt, BSc, BVMS, MPhil (Pathology) Murdoch,
MANZCVS (Aquatics & Pathobiology), CertAqV, NATA Sig.
Aquatic Veterinarian & Veterinary Pathologist
Perth, Western Australia, AUSTRALIA