

Chronic granulomatous types disease

General characteristics:-

One of the most familiar aspects of health maintenance in cultured fish species is that of chronic disease characterized by the presence of white or tan nodules in one or many organs. Such nodules are due to chronic inflammation in tissue in which macrophages, a type of white blood cell, gather into populations known as granulomas. Granulomas having infectious and non-infectious causes can vary in appearance and have a natural history that is intimately involved with immune function. In short, they are a means by which a body isolates and eliminates undesirable materials, but the degree to which granulomas are present is in part determined by the body's success in controlling offending agents.

Granulomatous inflammation:-

It is common for healthy fish to have one to several 1-2 mm wide granulomas in their internal organs. These granulomas are often due to parasite or non-infectious material. However, numerous granulomas in diseased fish are characteristic of infections by bacteria such as mycobacteria, nocardiae and francisellae.

Mycobacteriosis

- Mycobacteriosis is a chronic or acute, systematic, granulomatous disease that occurs in aquarium and culture food fish, particularly those reared under intensive conditions. Mycobacteriosis results from infection by several species of mycobacterium, aerobic, gram positive, pleomorphic rods.
- Mycobacteria are widely spread in the environment, particularly in aquatic reservoirs. The most important species causing mycobacteriosis in fish is *Mycobacterium marinum*. *M. marinum* was first recognized in 1926 from the liver, spleen and kidney of tropical coral fish kept in the Philadelphia aquarium.
- *M. marinum* can grow prolifically within fibroblast, epithelial cells and macrophages.
- Diagnosis of mycobacteriosis depends on clinical and histological signs and identification of the bacterial pathogen.
- Smears from scrapings of the cut surface of the spleen, kidney, or skin lesions should be made and stained with Kinyoun modification of the Ziehl-Neelsen stain. Use of fluorescing dyes are also recommended.
- Gross and histologic lesions of necrogranulomas containing acid fast bacilli give strong clues towards the involvement of mycobacterium.

- Isolation of the pathogen can provide definitive diagnosis. Attempts can be difficult due to the fastidiousness of the pathogen.
- Cultures should be incubated for 2-30 days at 20-30°C, *M. marinum* is a slow grower. Visible growth will require seven or more days of incubation.
- The cell and colony morphology is not distinctive. Identification may occur on the basis of biochemical characteristics, however these tests are cumbersome and time consuming.
- PCR based methods may be an alternative for diagnosis. Enzyme linked immunosorbent assays have not been developed for fish.

Treatment:-

- Drug therapy in fish is of limited value for this disease and vary in their degree of success. Treatment will not eliminate mycobacterium from affected fish colonies.
- Parenteral and oral administration of sulphadoxazole with doxycycline or minocycline, bath treatment or intraperitoneal injections of canamycin or streptomycin or incorporation of isoniazid or rifampin in the feed may be possible treatment.
- Infection is only completely controlled by culling the affected fish population and disinfecting tanks and equipments associated with these animals.

Prevention:-

- Prevention measures involve sanitation, disinfection and destruction of carrier fishes. Fish should be obtained from farms known to be free of diseases.
- Imported fish should require a period of quarantine. If trash fish or dead fish carcasses are used as a source of protein in the feed for fish, it should be heated at 760 C for 30minutes to kill any pathogenic mycobacteria.
- Dead fish should be destroyed by burning or burying in quick lime.
- There are no vaccines for fish mycobacteriosis.