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EPITHELIOCYSTIS INFECTION IN COMMON CARP *CYPRINUS CARPIO* L. : HISTOPATHOLOGY AND PATHOGENICITY

V.N.VORONIN AND N.B.CHERNYSHEVA
State Research Institute for Lake and River Fisheries, Embankment of Makarova 26, Saint Petersburg 199053, RUSSIA

Abstract

An acute epitheliocystis infection in the gills of cultured common carp (*Cyprinus carpio*) from Russia is described. Histologically the lining epithelial cells were only occasionally infected and the epitheliocystis agent appeared to develop primarily in undifferentiated epithelial cells as well as in chloride and, possibly, mucus cells. In spite of the acute infection, there was only a limited host cellular response observed in normal and necrotic gill tissue. It was speculated that the compromised condition of the fish may have been responsible for the acute epitheliocystis infection.

Introduction

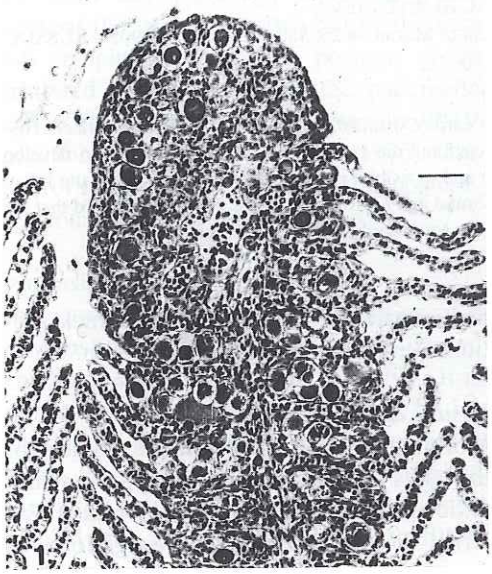
A branchial epitheliocystis infection has been described in many freshwater and marine fish species (Turnbull, 1993; Groff *et al.*, 1996). In cultured common carp (*Cyprinus carpio*) epitheliocystis has been reported in Hungary (Molnar and Boros, 1981), Israel, Portugal (Paperna and Alves de Matos, 1984), Japan (Miyazaki *et al.*, 1986) and Russia (Voronin, 1995). Past reports have generally described ultrastructural characteristics, the life cycle and taxonomy of the epitheliocystis agent without a thorough description of the pathology. An objective of this study was to describe, in depth, the host-parasitic relationship of an epitheliocystis infection in carp.

Materials and Methods

An increase in mortalities occurred in carp grow-out tanks during May, 1996 at a fish farm in the Upper Volga River. The fish were approximately 20 g in weight and although mortalities were relatively low (10-20 fish/day in holding tanks of 5000 fish) they were chronic. An external and microscopic investigation of these fish was conducted. For histological examination, one gill arch from 5 acutely infected fish and from 5 apparently healthy fish were fixed in 10% formalin, routinely processed, embedded in paraffin wax and 4-6 µm thick sections were stained with haematoxylin.

Results and Discussion

Morbid fish congregated in the corners of the tanks near the surface and appeared anorexic with a darkened body coloration. External and microscopic investigations of these fish revealed local necrotic lesions and an acute epitheliocystis infection in the gills. Epitheliocystis cysts in affected fish appeared similar to previous description and different stages of development were found in various areas of the gill filament, but were confined to epithelial tissue (Fig. 1). The largest cysts were 40-50 mm in diameter. It is interesting to note that the lining epithelial cells were only occasionally infected. It appeared as though the epitheliocystis agent in carp developed mainly in undifferentiated epithelial cells as well as in chloride and, possibly, mucus cells. In spite of the acute infection, there was only a limited host cellular response observed in normal (Fig. 1) and necrotic gill tissue. Externally, apparently normal appearing carp from the same affected groups exhibited no signs of gill necrosis and displayed only a few epitheliocystis cysts. The presence of sporadic cysts in the gill epithelium did not appear to elicit any proliferative cell response and there was no lamellar fusion.



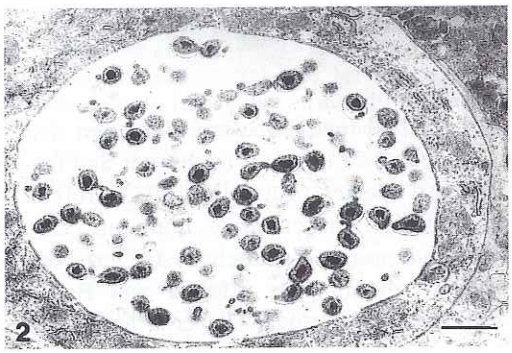


Figure 1. Longitudinal section of the gill lamellae showing numerous epitheliocystis cysts (Bar = 50μm).

Figure 2. Ultrastructure of epitheliocystis cyst with numerous epitheliocystis units (Bar = 1μm).

One month after this carp population was transferred to outdoor ponds the mortality ceased. All further attempts to find epitheliocystis in these fish were unsuccessful. In July a new generation of carp fry was placed in the same tanks and after two weeks an increase in carp mortality was observed. The diseased fish displayed acute gill necrosis but the epitheliocystis agent was not observed. We speculated that the epitheliocystis infection previously observed in association with gill necrosis and fish mortalities may not have been the primary pathogen and that bacterial infection or other factors were involved. Similar situations have been described for epitheliocystis in cultured red sea bream (Pagrus major) (Miyazaki et al.,1986) and white sturgeon (*Acipenser transmontanus*) (Groff *et al.*,1996). In our case the occurrence of acute epitheliocystis infection of carp may have occurred as a secondary infection among already compromised fish. In our first report (Voronin, 1995) epitheliocystis (Fig. 2) was observed in May, 1994, but the prevalence was low and fish mortality was negligible. In Israel benign epitheliocystis infection of the gills of cultured carp are common and widespread, although proliferative gill conditions apparently caused by epitheliocystis were diagnosed in some carp fry epizootics (Paperna and Sabnai, 1980). Further studies are required to obtain information on the pathogenicity of epitheliocystis and to clarify factors responsible for acute epitheliocystis infections and mortality of carp and other fish species.

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