



Fish Tumors

EDITED BY

Ankures Bhattacharya
West Bengal University of
Animal and Fishery Sciences

REVIEWED BY

Pasenjit Mali
West Bengal University of
Animal and Fishery Sciences

Supratim Chowdhury
West Bengal University of
Animal and Fishery Sciences

*CORRESPONDENCE

Keezia Khurshid
[keeziakhurshid.kk@skuastkashmi.
.ac.in](mailto:keeziakhurshid.kk@skuastkashmi.ac.in)

RECEIVED 12 May 2023

ACCEPTED 05 June 2023

PUBLISHED 30 June 2023

CITATION

Khurshid and Shah (2023)
Fish Tumors. Chronicle of
Aquatic Science 1(1): 45-48

COPYRIGHT

This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Keezia Khurshid¹ and Feroz Ahmad Shah¹

¹Division of Aquatic Animal Health Management, Faculty of Fisheries, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K), Rangil-190006, Ganderbal, India

Fish are mostly contaminated by the food they eat, and fish higher up the food chain that eat other bottom-dwelling species have greater amounts of bio-accumulative pollutants. Wild fish cannot be controlled in their diet, but farmed fish may have their levels of pollutants and some nutrients changed by changing the feed they are given. All swells are not tumours, by extension. Numerous enlargements, such as cold abscesses, haematocysts (haematomas), chronic inflammation, parasite nodules, and masses of intra-abdominal fat necrosis, may resemble tumours. In determining the health of an ecosystem, neoplasms with chemicals as part of their aetiology (either as initiators or promoters) might be helpful. The optimal course of action for treating neoplasms in ornamental fish must be determined by more research, especially in light of the declining wild fish population and the rising educational and conservation importance of captive fish in public aquariums.

Keywords

Neoplasm, Contamination, Histogenesis, Tumor cells, Oncogenes.

Introduction

The term Tumour refers to the Latin word “tumor” meaning a lump or a swelling. A cell forms abnormally an excessive number of copies itself through uncontrollable proliferation that continues after the stimulus in turn formation of new growth. Hence, also known as Neoplasia (Greek word Neo= new+ plasma= a thing formed). Increased mitotic rate and less intense differentiation of the component cells are often linked to tumor development. The primary relevance of fish neoplasms would seem to be their use as a potential indication of food or environmental contamination (Overstreet, 1988; Hawkins *et al.*, 1988). Large-scale neoplasia in fish populations has been studied extensively (Smith *et al.*, 1989), but it can be challenging to link the phenomenon to direct environmental toxicity. Viruses, chemical or biological poisons, physical agents, hormones, as well as the host's age, sex, genetic propensity, and immunological capacity, are some of the known and speculated variables that contribute to cancer growth in fish. Geographical

can generate the same mutation.

According to the cell or tissue of origin, tumors are categorized histo-pathologically. This process is called the tumor's "histogenesis". Since the categorization nomenclature is based on that of human cancers, the labels "benign" (Latin= mild) and "malignant" (Latin= evil in nature) are still employed to describe certain cell patterns. In most cases, a benign tumour develops slowly and does not spread to other organs, and it typically does not kill the patient. As opposed to a benign tumour, a malignant tumour gradually kills the sufferer by a combination of increasing local invasion and metastatic spread to other organs. Both benign and malignant tumours have two fundamental elements: (1) the parenchyma, the altered or cancerous cells make up this element, (2) the supportive, non-neoplastic stroma, obtained from the host, which is made up of connective tissue and blood vessels, The neoplasm's biological behavior is controlled by the parenchyma. The stroma transports the blood supply and supports the parenchymal cell proliferation. The detailed classification of tumors is penned down in Table 1.

| Tumours of Mesenchymal Origin | | |
|-------------------------------|--|---|
| Non haemopoietic | Fibroma (fibrous connective tissue) Leiomyoma (smooth muscle) Rhabdomyoma (straited muscle) Lipoma (fat) Chondroma (cartilage) Osteoma (bone) | Sarcoma (undifferentiated) Fibrosarcoma Leiomyosarcoma Rhabdomyosarcoma Liposarcoma Chondrosarcoma Osteosarcoma |
| Haemopoietic | Lymphoma | Malignant lymphoma Lymphosarcoma |
| Neural (Nerve cell) | Neuroma • Neurilemmoma • Ganglioneuroma | |
| Pigment | Melanoma | Malignant melanoma |
| Embryonal | Teratoma Chromatoblastoma Nephroblastoma | |

(Roberts, 2001)

proximity and genetic relationships may make it easier for an infectious agent to spread or for a carcinogenic chemical to have its effects. Carcinogens trigger mutations in particular genes

that develop into oncogenes that are exclusively active in specific mutant forms; several carcinogens Benign epithelial neoplasms of surfaces like the integument or the digestive system spread out unrestrainedly into the

surrounding media. They are referred to as Papilloma, and their verrucose surface is sometimes described to resemble the surface of a cauliflower head. They are the most prevalent cutaneous tumour in fishes (Harshbarger et al., 1993). Papilloma's have an erratic and frequently multicentric distribution. (Wildgoose, 1992).

Adenomas are comparable lesions that develop inside of a compact epithelial tissue, such as the liver, kidney, or exocrine or endocrine glands. Hepatocyte-derived tumours of the liver include adenoma, hepatoma, carcinoma, and hepatocellular carcinoma, as well as tumours originating from the bile duct epithelium (cholangioma, cholangiosarcoma). The most frequent visceral tumours in fish are hepatobiliary tumours. Adenomas and adenocarcinomas of the thyroid have primarily been recorded in freshwater species; however, some do occur in marine fish. It is quite challenging to distinguish between thyroid hyperplasia (goitre) and genuine neoplasia in fish due to the non-encapsulated nature of the thyroid follicles and the presence of ectopic thyroid tissue in several organs. While osteoma and osteosarcoma are referred for benign and malignant neoplasms produced from osteoblasts, respectively. The most prevalent mesenchymal tumours are fibroblastic (tumours of fibrous connective tissue). The typical fibroma's cells are long, spindle-shaped, intensely stained, and have little cytoplasm. 80% of known instances of fish neoplasms with lymphoid cell origin are lymphoblastic lymphomas, which are formed from the lymphoid cell series (Harada et al. 1990).

As pigment cells are formed from the neural crest, pigment cell tumours, also known as chromatophoromas, are more properly categorized in fishes as erythrophoromas, melanophoromas, xanthophoromas, guanophoromas, and iridophoromas depending on the origin of the tumor's pigment cells. However, pigment cell neoplasms are prevalent in fishes and may represent the main neoplastic disease type in several fishes.

Conclusion

Neoplasia results from a genetic mutation that may be acquired as an inherited trait and/or may happen as a result of exposure to an environmental agent, such as different chemicals, radiation, or infectious agents, especially oncogenic viruses, although the cause of the majority of neoplasms in fish has not been identified with

certainty. Certain fish tumours' oncogenesis has been found to be influenced by UV light. Because UV light is attenuated by water depth and dissolved organic matter, many fish species have evolved in environments with extremely little UV exposure.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

Conflict of interest

The authors declare that the manuscript was formulated in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Harada, T., Hatanaka, J., Kubota, S.S. and Enamoto, M. (1990). Lymphoblastic lymphoma in medaka, *Oryzias latipes* (Tenimick & Schlegel). *Journal of Fish. Diseases*, 13, 169-73.
- Harshbarger, J., Spero, P. and Wolcott, N. (1993). Neoplasms in wild fish from marine ecosystems emphasizing environmental interactions. In: Couch, J., Fournie, J., editor. *Pathobiology of marine and estuarine organisms*. Boca Raton (FL): CRC Press; p. 157-76.
- Hawkins, W.E., Overstreet, R.M. and Walker, W.W. (1988). Carcinogenicity tests with small fish species. *Aquatic Toxicology*, 11, 113-28.
- Overstreet, R. (1988). Aquatic pollution problems, Southern U.S. coasts: Histopathological indicators. *Aquatic Toxicology*, 11, 213-39.
- Roberts, R. (2001). Neoplasia of teleosts. In: RJ, R., editor. *Fish pathology*. London: WB Saunders; p. 151-68.
- Smith, I.R., Ferguson, H.W. and Hayes, M.A. (1989). Histopathology and prevalence of epidermal papillomas epidemic in brown bullhead, *Ictalurus nebulosus* (Lesueur) and white sucker,

Catostomus commersoni (Lac é p è de) populations from Ontario, Canada. *Journal of Fish Diseases*, 12, 373-88.

Wildgoose, W. (1992). Papilloma and squamous cell carcinoma in koi carp (*Cyprinus carpio*). *Veterinary Record*, 130, 153-7