

# Fish Oncology

## Diseases, Diagnostics, and Therapeutics



Claire Vergneau-Grosset, med vet, IPSAV, DACZM<sup>a,b,\*</sup>,  
Marie-Eve Nadeau, DVM, DACVIM (Oncology)<sup>a</sup>, Joseph M. Groff, VMD, PhD<sup>c</sup>

### KEYWORDS

• Fish • Oncology • Chemotherapy • Cancer • Neoplasm

### KEY POINTS

- Fish neoplasms have frequently been reported in fish.
- Advanced imaging is helpful to plan surgical interventions but requires knowledge of normal specific anatomy.
- Fish oncologic treatment plans should integrate water residue management to avoid exposure to conspecific fish and caretakers.
- Additional studies are required to establish the best course of action for the treatment of neoplasms in ornamental fish, especially when taking into consideration the decline of wild fish populations and the increasing educational and conservation value of captive fish in public aquaria.

### INTRODUCTION

Piscine species are the most numerous and diverse group among vertebrates, with more than 27,000 species.<sup>1,2</sup> The scientific literature contains a wealth of information concerning spontaneous fish tumors,<sup>1,3</sup> although ornamental fish oncology is still in its infancy. Certain neoplasms affecting fishes have been associated with oncogenic viruses, parasites, and environmental contaminants, whereas association between environmental contaminants and fish neoplasms can be used as sentinels for environmental degradation. In addition, because fish are often an important source of protein, especially for developing countries, an investigation of piscine neoplasms may have implication for human consumers.<sup>4</sup>

Malignant neoplasms<sup>5</sup> with or without metastasis are reported rarely in fish compared with mammals.<sup>1,3,6</sup> This could be due to a different antitumor immunity in

---

The authors have nothing to disclose.

<sup>a</sup> Centre Hospitalier Vétérinaire Universitaire, Faculté de médecine vétérinaire, Université de Montréal, 3200 rue Sicotte, Saint-Hyacinthe J2S 2M2, Quebec, Canada; <sup>b</sup> Aquarium du Québec, 1675 Avenue des Hôtels, Ville de Québec, QC G1W 4S3, Canada; <sup>c</sup> William R. Pritchard Veterinary Medical Teaching Hospital, School of Veterinary Medicine, University of California, Davis, Shields Avenue, Davis, CA 95616, USA

\* Corresponding author.

E-mail address: [claire.grosset@umontreal.ca](mailto:claire.grosset@umontreal.ca)

Vet Clin Exot Anim 20 (2017) 21–56  
<http://dx.doi.org/10.1016/j.cvex.2016.07.002>

[vetexotic.theclinics.com](http://vetexotic.theclinics.com)

1094-9194/17/© 2016 Elsevier Inc. All rights reserved.

fish versus mammals.<sup>7</sup> Malignant cells in nonmammalian vertebrates may also be more susceptible to apoptosis than in mammals.<sup>8</sup> Additional explanations for the rarity of metastasis in fishes include the absence of frequent metastatic sites that are present in mammals, including lung, lymph nodes, and bone marrow<sup>2,3,9</sup>; differences in the lymphatic system in fishes versus mammals<sup>3</sup>; lower body temperatures in fishes<sup>3</sup>; and the more common differentiation of neoplasms in fishes versus mammals.<sup>3</sup> In this context, the tumor, node, metastasis (TNM) staging system in mammals, which is a classic evaluation of the initial neoplastic lesion, lymph node involvement, and the occurrence of metastasis, is not applicable to fishes. Examples of malignant neoplasms have previously been reviewed,<sup>3,10,11</sup> and metastasis may be detected in fish hematopoietic organs, such as the spleen, kidney, and thymus.<sup>12</sup> Differential diagnoses for tumoral lesions in fish include non-neoplastic masses commonly encountered, such as xanthomas,<sup>13</sup> granulomas, and masses associated with parasites or fungi, such as microsporidia.<sup>14,15</sup>

## FISH NEOPLASMS

### *Commonly Encountered Neoplasms in Fish*

---

Spontaneous neoplasms have been commonly reported in fishes, but an average incidence is unknown,<sup>1</sup> although the incidence of neoplasms in fishes is considered less common than the incidence in higher vertebrates, for the reasons discussed previously.<sup>3,7,8</sup> On revision of a pathology database, including 883 fish necropsies from a public aquarium over a 5-year period, 6% of the cases presented with spontaneous neoplasms (Stéphane Lair, DVM, DACZM, personal communication, 2016). Captive display fish may have a longer life span than wild ones and, as a consequence, spontaneous neoplasms may be detected more commonly in this population. Various models of human cancers, however, have been developed in genetically modified fish,<sup>16,17</sup> including zebrafish (*Brachydanio rerio*) that are easily kept in captivity, because zebrafish develop tumors that resemble human tumors both histologically and at the genetic level of expression.<sup>18</sup> Studies using these fish have revealed a low propensity for spontaneous tumors; rather, they require exposure to carcinogens and mutagens to induce tumor formation.<sup>3,12,19–21</sup> Information concerning the etiologies of neoplasms in wild and production fishes may, therefore, provide information applicable or relevant to ornamental and hobby fish seen by the veterinary practitioner. For example, up to 10% of salmon (*Salmo salar*) from a commercial aquaculture facility fed commercial pellets without any known potential carcinogens in the feed developed intestinal adenocarcinomas and other types of tumors.<sup>12</sup> Carcinogenesis was attributed to chronic intestinal inflammation caused by the ingestion of omega-6 and other vegetable compounds in this carnivorous species.<sup>12</sup> Neoplasms in elasmobranchs have been reported as rare, although recent reports suggest that neoplasms in this taxonomic group may be more common than once believed.<sup>22–24</sup>

Examples of tumors reported in fish are included in **Table 1**. Generally, ectoderm-derived and endoderm-derived epithelial neoplasms are the most common neoplasms in fishes, whereas the integument is the most common organ for the manifestation of neoplasms in fishes.<sup>1,50,57–62</sup> Cutaneous neoplasms are generally benign with few exceptions, although recurrence is common in cases of incomplete surgical excision.<sup>1</sup> The histologic classification of cutaneous neoplasms in fishes, however, is often confused due to the common shared features of the lesions.

Papillomas are the most common cutaneous neoplasms in fishes,<sup>57</sup> especially because various raised, cutaneous lesions are often classified as papillomatous lesions regardless of size, appearance, and histogenesis. The distribution of papillomas

Download English Version:

<https://daneshyari.com/en/article/5537856>

Download Persian Version:

<https://daneshyari.com/article/5537856>

[Daneshyari.com](https://daneshyari.com)