Neoplasia (Tumors)

I. Causative Agent and Disease

Tumors or neoplasms are tissue growths of abnormal cells that proliferate uncontrollably. In bony fishes, neoplasms of the connective tissues, such as fibroma and fibrosarcoma, are most common. Fish develop neoplasia or cancer in much the same way as do higher animals. Known and suspected factors contributing to neoplasia in fish include viruses, environmental chemicals (carcinogens), repeated physical trauma, hormones, age, sex, genetic predisposition and immunological competence of the host.

II. Host Species

All teleost fishes in any part of the world could potentially develop neoplasia. For unknown reasons cancer has been rare in cartilaginous fishes such as sharks and rays.

III. Clinical Signs

Neoplasms usually become apparent by gross observation of an external or internal swelling, lump, or formation of an abnormal tissue growth.

IV. Transmission

Except for neoplasia caused by infectious viruses, horizontal fish to fish transmission does not occur. Generally, neoplastic growths are spontaneous within an individual due to congenital malformation, age or genetic predisposition but could also be caused by environmental conditions.

V. Diagnosis/Classification

Definitive diagnosis is made by observing the abnormal cells using histopathological methods. Neoplasms are classified according to the cell or tissue of origin and are further grouped based on benign or malignant characteristics. Benign tumors are often well-differentiated, grow slowly, are well circumscribed without invading surrounding normal tissue and do not metastasize. Most benign neoplasms are not usually life threatening and often end in the suffix “oma”. Exceptions are benign neoplasms of the brain and some endocrine organs that can be life threatening due to their location and deleterious physiological effects on the host. Malignant tumors are often not well differentiated, may grow rapidly, infiltrate normal tissues and tend to metastasize. The names of these neoplasms are often preceded by the word “malignant” or with the suffixes “sarcoma” or “carcinoma”. Types of cancer in fish include the following:

TISSUE TYPE	BENIGN TUMORS	MALIGNANT TUMORS
epithelial	papilloma	epithelial carcinoma
	adenoma	adenocarcinoma
mesenchymal	fibroma – connective tissue	fibrosarcoma
	leiomyoma – smooth muscle	leiomyosarcoma
	rhabdomyoma – striated muscle	rhabdomyosarcoma
	lipoma – fat	liposarcoma
	chondroma – cartilage	chondrosarcoma
	osteoma – bone	osteosarcoma
hematopoietic	lymphoma	lymphosarcoma
blood vessels	hemangioma	hemangiosarcoma
neural – nerve cell	schwannoma	glioma, astrocytoma
pigment	erythrophoroma	malignant melanoma
embryonal	nephroblastoma	-

VI. Prognosis for Host

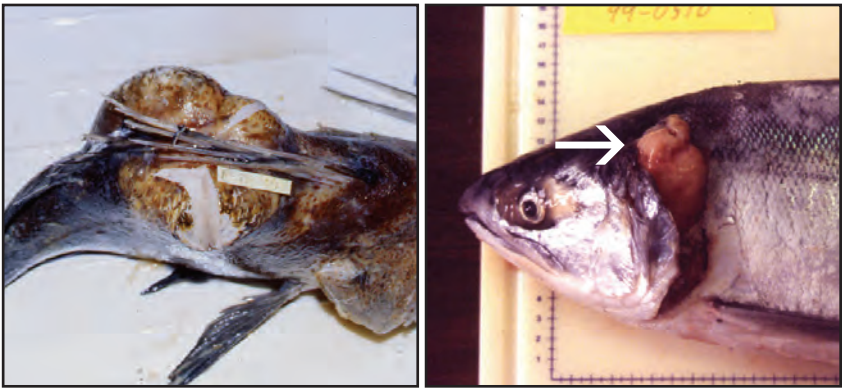
Prognosis for fish having neoplasms depends on the type of tumor and whether the lesion is benign or malignant. Benign tumors are usually not life threatening. Malignant tumors can cause mortality if growth is rapid and interferes with normal organ functions.

VII. Human Health Significance

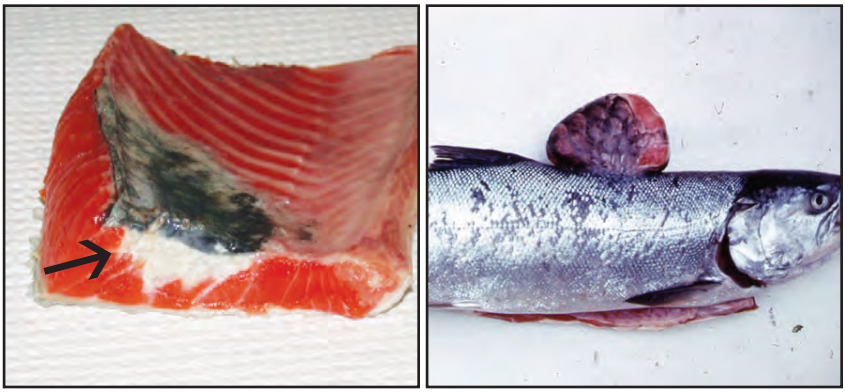
Although aesthetically disturbing, there are no direct human health concerns associated with neoplasia in fish. Neoplasia is generally a rare event affecting one fish in several thousand. Should tumors occur more frequently in a population of fish, an indirect human health concern would be whether the cause is linked to environmental contamination.

Fibroma, on right dorsal anterior flank of a sockeye salmon.

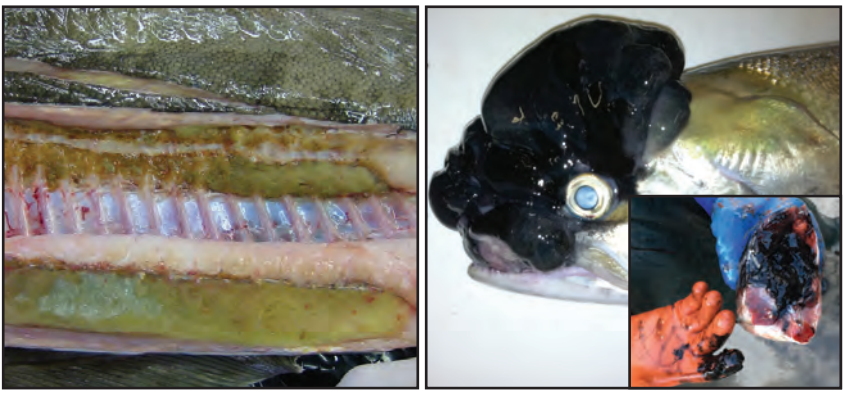
Liposarcoma on the abdomen of a whitefish.



Left: Cut surface of a liposarcoma on the back of a quillback rockfish; **Right:** Thymic lymphosarcoma (arrow) in branchial cavity of a sockeye salmon.

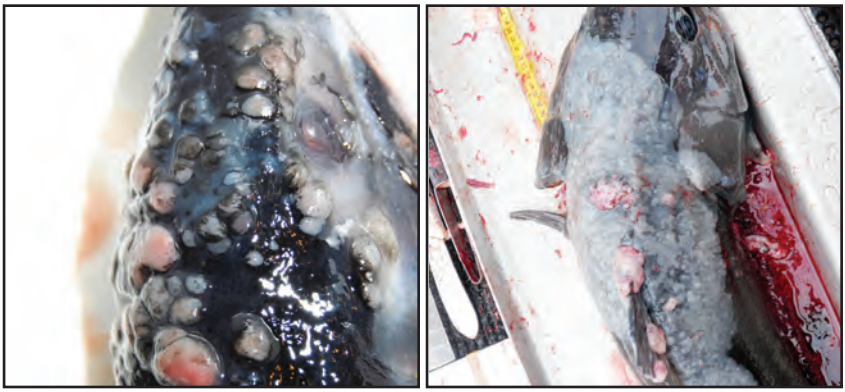


Left: Fibrosarcoma (arrow) infiltrating the muscle tissue from the body wall in a salmon; **Right:** Pedunculated papilloma on the back of a coho salmon.

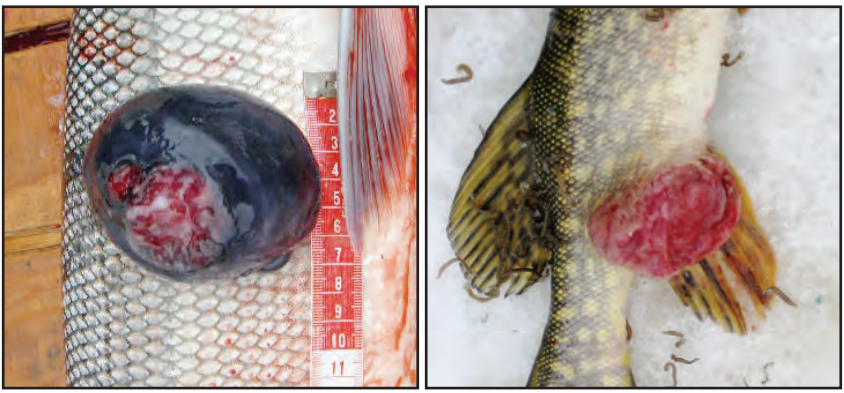


Left: Rhabdomyosarcoma (green) in the musculature of a Pacific halibut; **Right:** Black melanoma on the head of a chum salmon; **Inset:** Sockeye: when cut, melanomas can exude a black tarry fluid containing melanin pigment that stains surfaces, (photo: Scott Albert).

Left: Ameloblastoma from odontogenic epithelium of teeth in king salmon causing thickened maxillaries (arrow); **Right:** Fibrosarcoma in left posterior body wall of sockeye salmon.



Left: Multifocal dermal fibrosarcoma in skin of pink salmon; **Right:** Prickle cell carcinoma of the epidermis in a sablefish.



Left: Fibrosarcoma of the skin in a sheefish; **Right:** Unidentified reddish neoplasm in anal area of a northern pike heavily infested with leeches.