

## BRANCHIAL CHONDROMA FROM FARMED ATLANTIC SALMON, *SALMO SALAR* L.

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Tumours involving the branchial cartilage of fish are uncommon and only a few papers have been published over the last 60 years. Single and locally invasive chondromas, chondrosarcoma, osteochondromas and epithelio-chondromas have been recorded from several unrelated fish species in both marine and fresh water environments (Thomas, 1932; Nigrelli and Gordon, 1946; Hatcher and Varella, 1980; Bean-Knudsen *et al.*, 1987).

The present paper reports on the gross and histological structure of a tumour of the gill cartilage recorded during a routine visit to a fish farm in Scotland rearing Atlantic salmon, *Salmo salar* L., in sea net pens. A firm, white, ovoid, smooth growth (18 x 10 x 5 mm) was observed on the outer right gill arch (Fig. 1) of a single adult female fish weighing 1.8 kg. No other gross pathology was recorded.

The gill arch was removed and prepared for light microscopy by fixation in 8% phosphate buffered formalin. Wax sections

were cut at the point where the mass joined to the gill arch. These were subsequently stained with Harris's haematoxylin and eosin (H&E), Lillies allochrome and Gram's stain. Re-embedding the tissue allowed both longitudinal and transverse sections to be examined. Kidney tissue was taken for virus testing.

The surface of the mass was covered with normal squamous, sometimes hyperplastic epithelium. This was similar to normal epidermis, apart from occasional invaginations into the underlying stroma and increased mucous cell activity. Dermal hypertrophy and some hyperplasia were also recorded. Underlying the epidermis were layers of cystic spaces surrounded by a loose fibrous matrix of adipose connective tissue containing strands of immature cartilage. This formed the major part of the neoplasm (Fig. 2). Chondrocytes were infrequent with no mitotic figures. Melanin granules were evenly spread throughout the epidermis and dermis. There was no evidence of inflammation, infiltrative growth or distant metastasis.

No parasites or bacteria were identified and

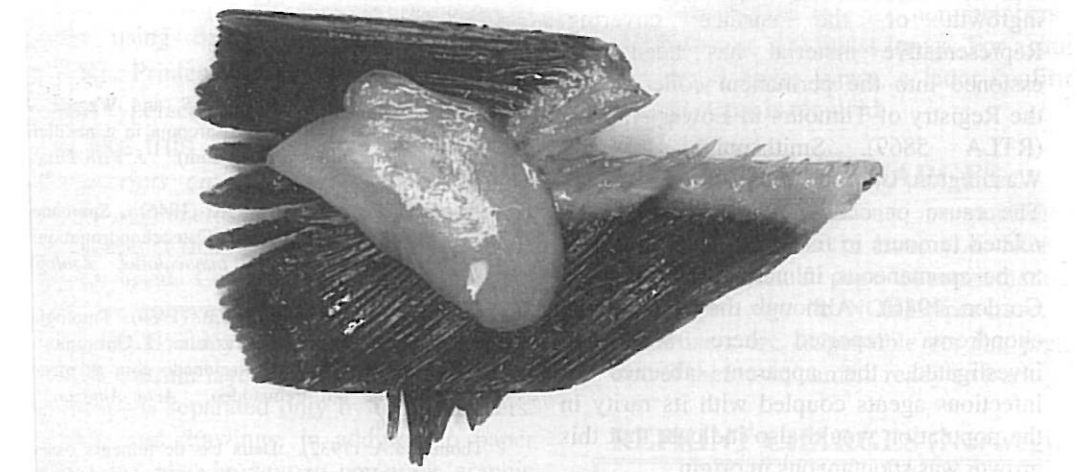


Fig. 1. Chondroma arising from the branchial gill arch cartilage of a farmed Atlantic salmon.

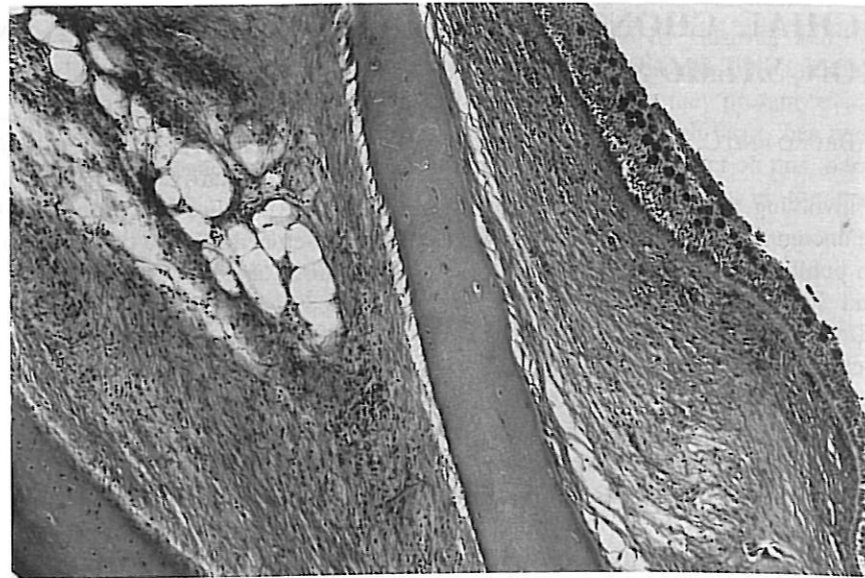


Figure 2. Transverse section of the chondroma showing dermal hypertrophy and hyperplasia. The cystic spaces are surrounded by a loose fibrous tissue and adipose cells with strands of immature cartilage (Lillies allochrome, x490).

the fish tested negative for infectious pancreatic necrosis virus (IPNV) by tissue culture.

From the gross observations and examination of stained tissue sections the growth was interpreted as a benign branchial chondroma which originated from the filament cartilage, possibly as an ingrowth of the surface covering. Representative material has been accessioned into the permanent collection of the Registry of Tumours in Lower Animals (RTLA 5869), Smithsonian Institute, Washington, USA.

The cause or causes of chondromas and related tumours in fish are often considered to be spontaneous in nature (Nigrelli and Gordon, 1946). Although the cause of the chondroma reported here was not investigated, the apparent absence of infectious agents coupled with its rarity in the population would also indicate that this growth was spontaneous in origin.

#### Summary

A gross and histological description of a benign branchial chondroma is described from a farmed Atlantic salmon. The growth was considered to be spontaneous in origin.

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