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## NEPHROBLASTOMA IN A STRIPED BASS\*

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**Abstract:** A renal neoplasm with the pathologic characteristics of a nephroblastoma was found in a striped bass (*Morone saxatilis*) taken in Fisher's Island Sound, New York. The fish acted normally and seemed unaffected by the tumor.

### INTRODUCTION

Renal neoplasms in fish are rare, judging by the following reports. Schmeys<sup>1</sup> saw a 7 x 35 cm mass of the left kidney of a European eel (*Anguilla anguilla*) which was easily freed from the surrounding musculature, but was difficult to separate from renal tissue. Irregularly arranged tubuli and cystic structures gradually merged with normal renal tissue.

Schlumberger and Lucke<sup>2</sup> described a renal adenoma in a catfish (*Ameiurus nebulosus*). The right kidney contained a non-encapsulated 8 x 8 x 6 mm mass of acini of irregular shape and size. The epithelial cells varied from low cuboidal to tall columnar. Nuclei were large, vesicular, and had prominent nucleoli. Papilliform projections were noted.

Jahnel<sup>1</sup> described a cystic adenoma, according to Stolk,<sup>4,5</sup> who described two renal carcinomas. In *Thayeri obliqua* Eigenmann<sup>4</sup> he saw strands of neoplastic cells forming a solid tubular renal adenocarcinoma which resembled hypernephroma of man. Cysts were prominent. In *Barbus tetrazona*<sup>5</sup> he saw a carcinoma of both kidneys with many mitotic figures and numerous intranuclear inclusion bodies.

### Specimen

The fish was taken October 26, 1969 off Wicopesset Island in Fisher's Island Sound, a part of New York's coastal

waters. The fish struck a trolled plug and fought vigorously. Schools of this species were feeding on mackerel (*Scomber scombrus*). The animal was about 24 inches in length, well developed, and engorged with mackerel. Fillets were removed and it was then that the neoplasm was noted.

### Gross Pathology

The right kidney was entirely replaced by a firm white 12 x 6 cm cylindrical mass which was well encapsulated, although strands of connective tissue covered the surface of the tumor and the resulting cavity. Intercoastal muscles seemed involved but actual penetration could not be confirmed.

The mass was placed in 10% buffered formalin within one hour after the fish was taken. Processing was routine and although several stains were employed, hematoxylin-eosin and toluidine blue were helpful.

### Histopathology

The most striking feature was the amount of cartilage present in this tumor. Fully 90% of the fields viewed consisted of this tissue (Fig. 1). When hematoxylin-eosin stained slides were examined the cartilage seemed to stain with variable intensity, a fact well demonstrated by the toluidine blue technique. The meta-

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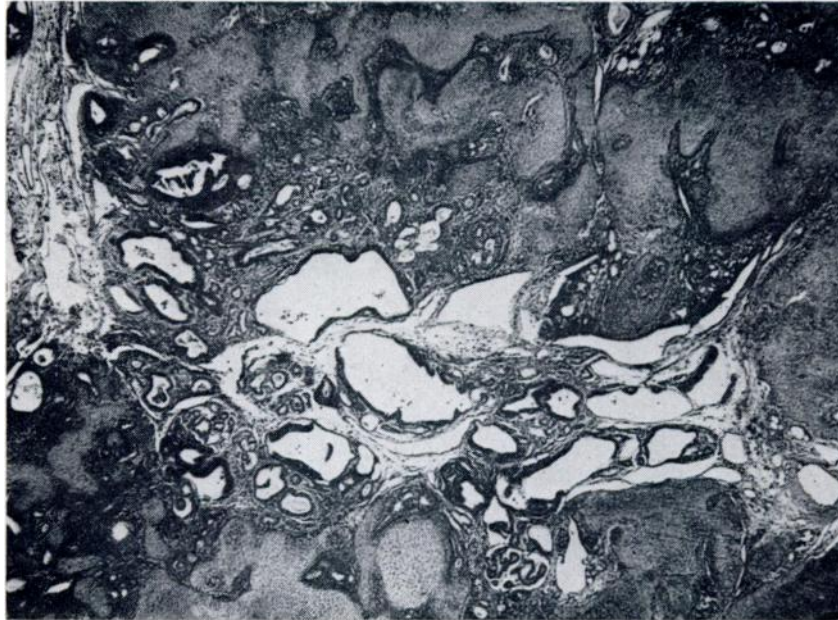


Figure 1. This low power view (x 16) illustrates the predominant cartilaginous tissue. In addition to the dilated tubuli, smaller bizarre tubuli are seen. H and E stain.

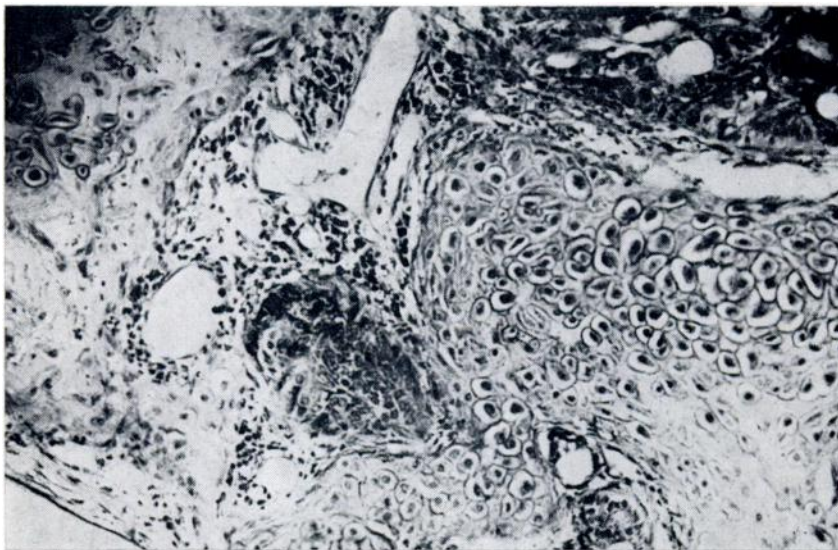


Figure 2. Cartilage surrounds a nest of parenchymal cells. The loose tissue is rich in heterophils, while the dark area in the center represents an aggregate of undifferentiated cells. H and E stain; x 250.



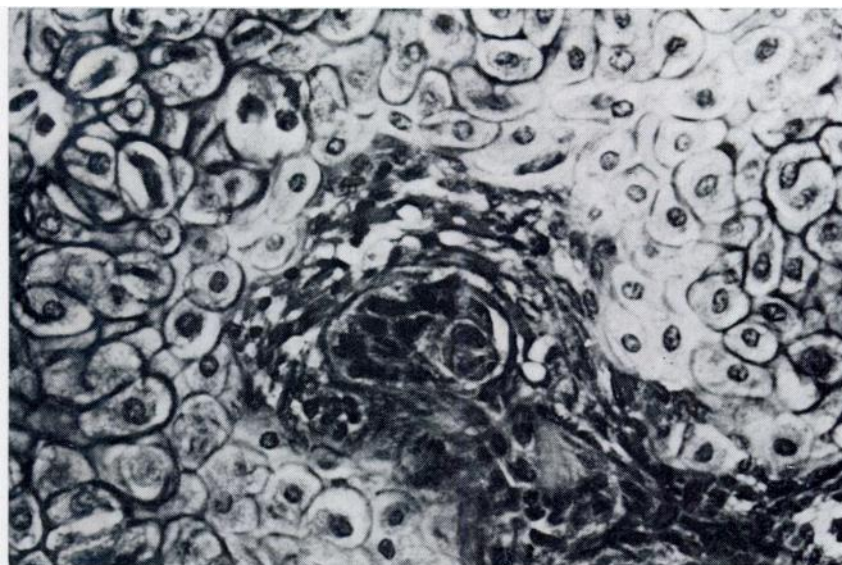


Figure 3. Two structures in this island of parenchymal cells suggest glomeruli. The upper one seems to have a Bowman's capsule. H and E stain; x 500.

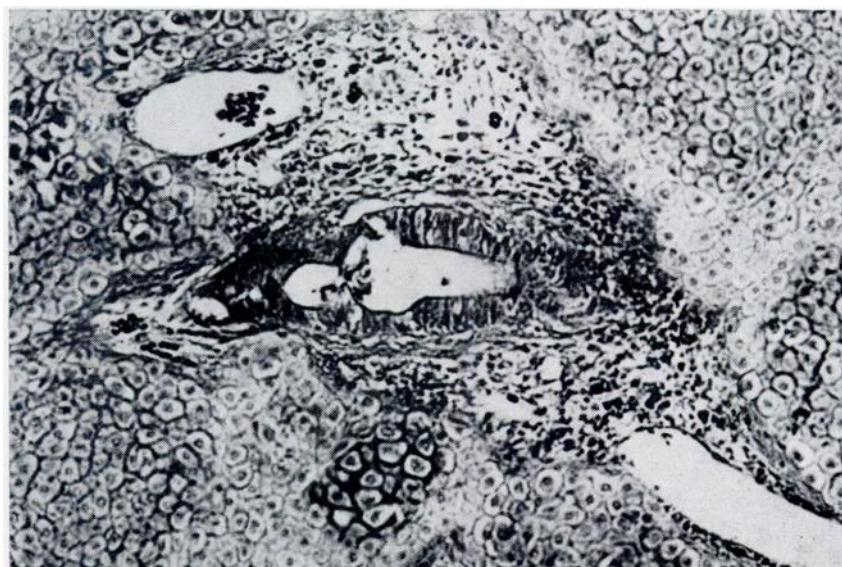


Figure 4. In this area there is a misshapen tubule surrounded by loose connective tissue rich in heterophils. H and E stain; x 250.

chromatic properties revealed some areas almost red, contrasting with the deep violet blue of others. Morphologically the cells did not seem in any way different from normal cartilage.

All through the neoplasm were sharply defined islands of renal tissue. The tissue was a bizarre assortment of tubuli (Fig. 2) and a few abortive glomeruli. Some of the tubuli were dilated, in others the epithelium seemed to be piling up. Glomeruli were largely unrecognized (Fig. 3), the few seen were distorted and certainly non-functional. The parenchyma was in a background of loosely arranged connective tissue which was rich in eosinophils and smaller round cells, probably lymphocytes (Fig. 4). The renal tissue was hyperchromatic.

#### DISCUSSION

This tumor fills the criteria generally assigned to Wilms' tumor of man. These are: 1) primitive glomeruli, 2) unusual tubuli as to formation, size, and shape, 3) cartilage, bone, muscle, etc., and 4) a fibrous stroma. Were the cartilage present in a far lesser degree it would have been an exact image of the nephroblastoma of the domestic fowl which also mirrors that of man.

The tumor might well be designated a carcinochondroma, but we believe that if this tumor follows the pattern seen in the fowl that no justification exists for assigning such a limiting name. Certainly in the chicken no two are alike yet all resemble each other in basic criteria.

Comparison of this tumor with renal carcinomas previously described convinced us that it was not similar to any of them. Admittedly such a comparison was difficult, as for example, Stolk<sup>4,5</sup> employed free-hand drawings and not photomicrographs to illustrate his point. Some authors simply omitted photographs. However, even though morphologically different, it is recognized that those tumors already recorded also differed from each other. The nagging thought that these tumors are all variations on a theme and may be viral induced (the inclusion bodies described by Stolk<sup>5</sup> strongly resembled those of renal adenocarcinoma<sup>2</sup>) cannot be completely dismissed.

Obviously the fish was not handicapped by the lesion. It fought well (in the opinion of C.F.H., an ardent and experienced angler), and this after overtaking a fast moving artificial lure.

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