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# Melanoma of the Choroid in a Dog

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# Melanoma of the Choroid in a Dog

## **Abstract**

Intraocular tumors are rare in the dog. Of the reported neoplasms, melanomas are the most common. These tumors characteristically arise in the anterior uvea and secondarily infiltrate posteriorly into the choroid and/or anteriorly into the corneoscleral region. Advanced tumors may extend extraocularly. In the dog, isolated choroidal melanomas are extremely uncommon; to the authors' knowledge, only two cases have been previously reported. This report describes a pigmented choroidal tumor in a dog with clinical and histopathologic features resembling a benign melanoma.

## **Disciplines**

Eye Diseases | Medicine and Health Sciences | Ophthalmology | Veterinary Medicine

# Melanoma of the Choroid in a Dog

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*Intraocular tumors are rare in the dog. Of the reported neoplasms, melanomas are the most common.<sup>1-5</sup> These tumors characteristically arise in the anterior uvea and secondarily infiltrate posteriorly into the choroid and/or anteriorly into the corneoscleral region. Advanced tumors may extend extraocularly. In the dog, isolated choroidal melanomas are extremely uncommon; to the authors' knowledge, only two cases have been previously reported.<sup>6,7</sup> This report describes a pigmented choroidal tumor in a dog with clinical and histopathologic features resembling a benign melanoma.*

## Case Report

A male lemon-colored beagle was initially examined at the age of four-and-one-half years as part of a routine ophthalmic screening examination. The dog was one of several hundred animals kenneled indoors and used for nutritional studies. Biomicroscopic and indirect ophthalmoscopic examination indicated no ocular abnormalities.

Ocular reexamination at eight years of age indicated the presence of a pigmented intraocular lesion in the right eye. A well-circumscribed black mass was present in the tapetal region superotemporal to the right optic disk [Figure 1A]. The lesion, which appeared to be located within the choroid, was approximately 1.5 disk diameters in size and produced a localized elevation of the retina. Small light-brown granular foci were observed over the surface of the tumor [Figure 1B] when examined with intense illumination.

Reexamination five weeks later showed that the lesion had enlarged in size. It was definitely more elevated and had grown in diameter to extend further beneath the retinal veins and to reach the optic nerve head [Figure 2].

Fluorescein angiography performed at that time showed slight but definitive leakage along the superotemporal border of the tumor and the multiple light-brown granular hyperfluorescent foci on the tumor surface [Figure 3]. Contact A- and B-scan ultrasonography confirmed the presence of an acoustically distinct lesion superotemporal to the optic disk; the lesion appeared to have a thickness of approximately 1.5 mm [Figures 4, 5]. The tumor was not thick enough to determine the degree of internal reflectivity.

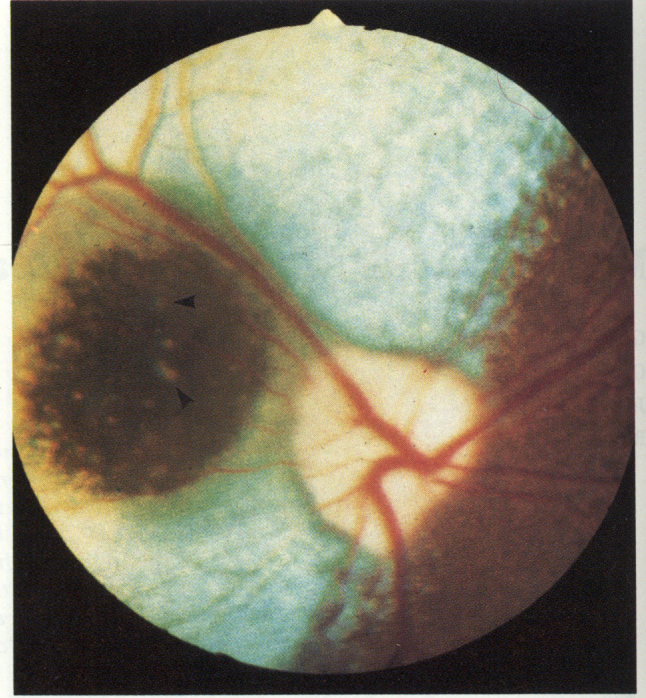
At the time the pigmented intraocular lesion was first noted, a complete physical examination, including thoracic and abdominal radiographs, showed no evidence of metastatic disease. An intravenous  $P^{32}$  uptake, used in man to aid in the diagnosis of choroidal melanomas,<sup>8</sup> was considered but not used because of difficulties in safely

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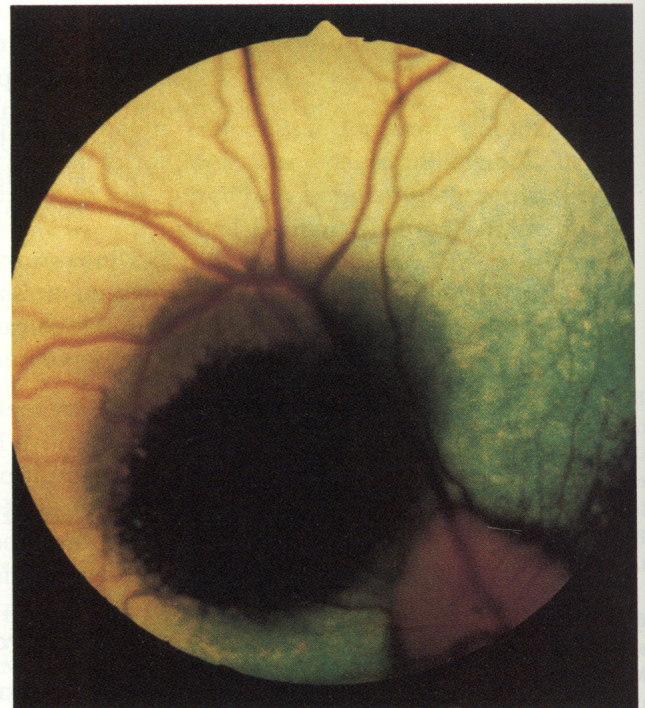
**Figures 1A, 1B—** Fundus photographs of the right eye taken at the time the intraocular tumor was first observed. (A—Left) Photograph using conventional light intensity to demonstrate the black appearance of the intraocular lesion. (B—Right) Photograph using more intense illumination demonstrates the presence of small light-brown granular foci (arrowheads) on the surface of the tumor.

housing the dog following the radioisotope administration. Because of the increase in size of the tumor over a five-week period and its close proximity to the optic nerve head, the right eye was enucleated and fixed in Bouin's solution. The dog recovered uneventfully from the enucleation but was euthanized 10 months later at the owner's request. A complete autopsy performed at the time showed no evidence of metastatic disease.

### Pathologic Findings

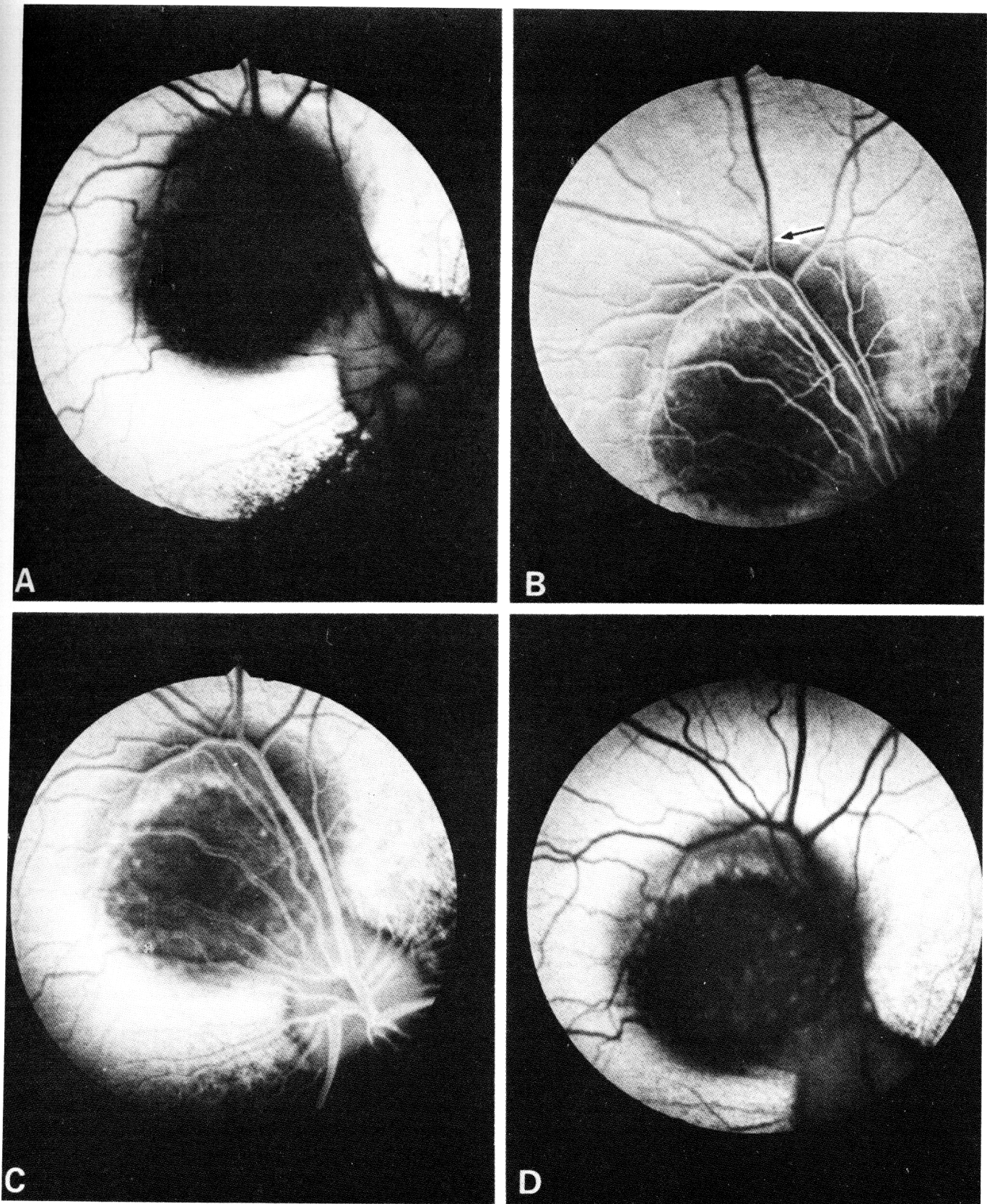
The lesion was limited to the posterior segment of the right eye. The darkly pigmented mass, thickest in the middle and tapering at the edges, grew in the choroid with no infiltration of the sclera [Figures 6, 7]. The lesion consisted of large, heavily pigmented, plump elongated cells whose small round nuclei were evident following bleaching. The cells were arranged in an interwoven pattern similar to that of normal choroidal melanocytes [Figure 8]. Mitotic figures and other cytologic features of anaplasia were not found.

The retina immediately underlying the lesion was slightly detached and macrophages containing pigment granules were present in the subretinal



**Figure 2—** Fundus photograph taken five weeks after Figure 1. The tumor, including a surrounding subretinal fluid ring, has extended under the retinal veins that originally defined its nasal and superior borders.





**Figure 3—** Angiograms of the right eye following the intravenous injection of 2 cc of 10% sodium fluorescein: (A) pre-injection. A pigmented subretinal mass is evident superotemporal to the optic nerve head. (B) early venous phase. Note laminar flow in large vein (arrow). The tumor is relatively hypofluorescent with the exception of a hyperfluorescent rim along its superotemporal border. (C) late venous phase. Several small hyperfluorescent foci are apparent on the tumor surface. (D) late phase. Fluorescein dye has been cleared from most of the retinal vascular system. The superotemporal border of the lesion remains hyperfluorescent and the multiple hyperfluorescent foci over the tumor are more readily visible.

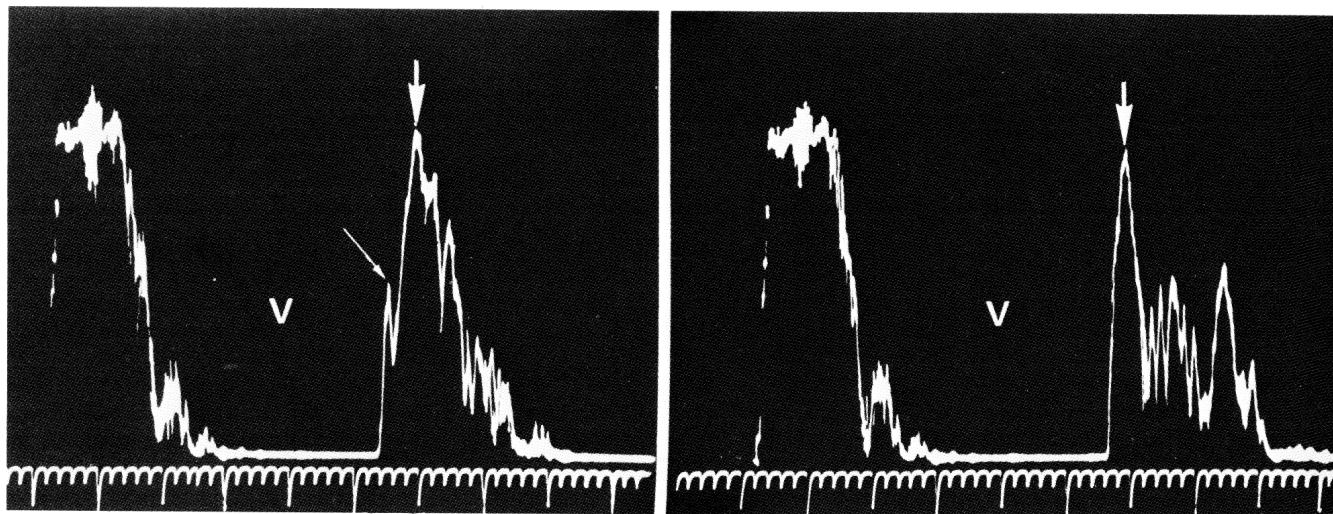


Figure 4— A-scan ultrasonograms of the right eye of the eight-year-old beagle with a choroidal melanoma. Each ultrasonogram shows the acoustically empty vitreous cavity (V). (Left)—transducer aimed superotemporal to optic disk. The ultrasonogram shows a small isolated spike (small white arrow) anterior to the eyewall. This acoustical echo represents a localized choroidal solid tissue mass with a thickness of approximately 1.5 ml. The large arrow indicates the spike corresponding to the sclera. (Right)—Normal echogram with transducer aimed inferonasal to optic nerve. The large arrow designates the interface between the vitreous cavity and the retinal, choroidal, and scleral tissues of the posterior eyewall. (Kretz A-scan ultrasound unit, 74 Db setting).

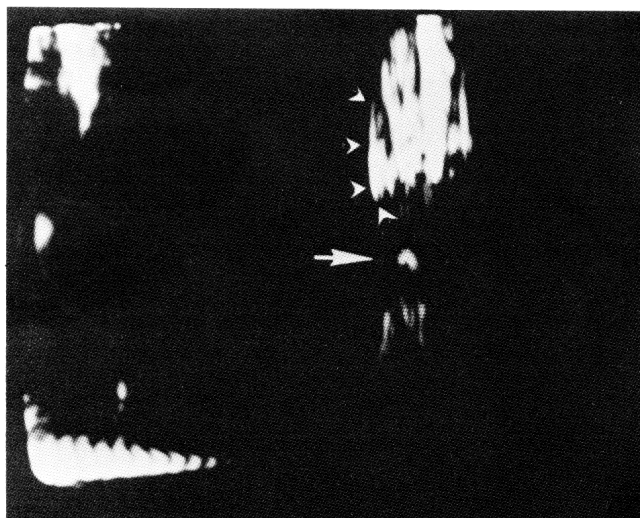


Figure 5— Contact B-scan ultrasonogram of the right eye of the eight-year-old beagle with a choroidal melanoma. The ultrasonogram was taken with transducer centered on the optic nerve head and scanning the superotemporal-inferonasal axis. Large white arrow points to the acoustically empty scleral zone occupied by the optic nerve head. Small arrowheads indicate an area of the choroidal thickening, representing the choroidal melanoma (Bronson Turner B-scan ultrasound unit, 80 Db).

space. The retinal pigment epithelium adjacent to the choroidal tumor was hypertrophied, vacuolated, and contained brown, autofluorescent, PAS-positive pigment suggestive of lipofuscin<sup>9</sup> [Figure 9].

### Discussion

Only two other prior cases of isolated choroidal melanomas have been described in the dog.

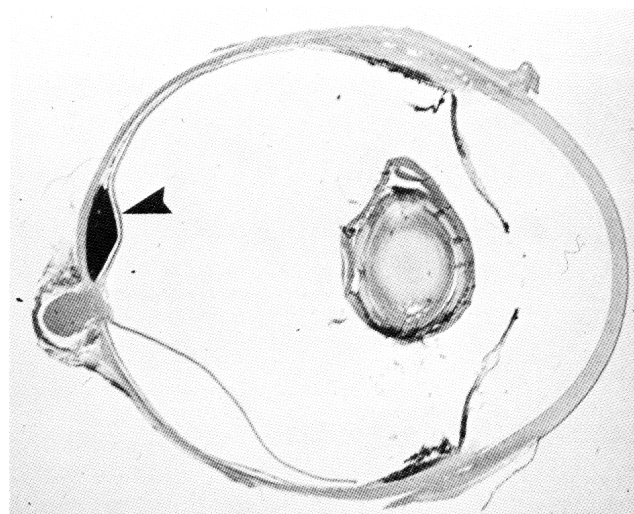
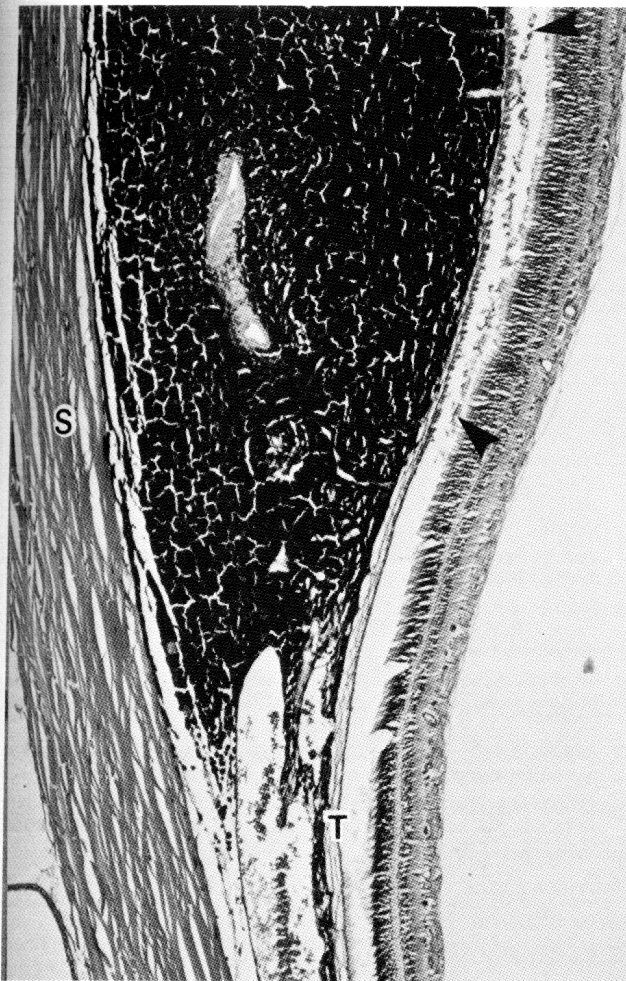


Figure 6— Photograph of histologic sections showing the localization of the tumor (arrowhead) in the juxtapapillary choroid. Retinal detachment inferiorly is a sectioning artefact.

Interestingly, all three cases have occurred in beagles and have arisen in the choroid underlying the tapetum. The report by Taylor *et al*<sup>6</sup> provides a description of the neoplasm; however, clinical and histologic features were not presented. They attribute this tumor to the single intravenous administration of Radium<sup>226</sup> since several of the dogs in that study developed anterior uveal melanomas.

In the case reported by Weisse and Stotzer,<sup>7</sup> the pigmented tumor was clinically similar to this

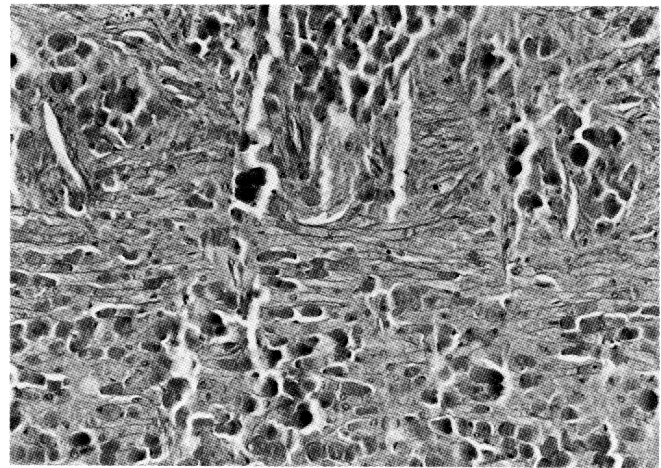




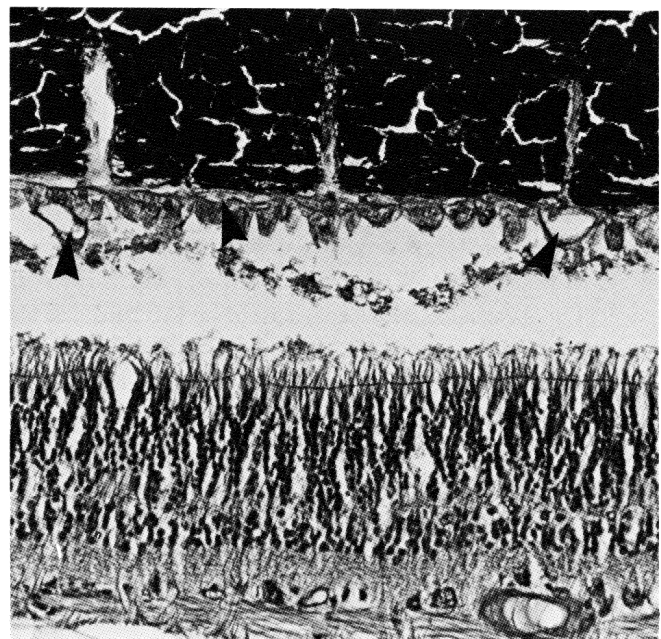
**Figure 7—** Photomicrograph of the unbleached section showing the tapering edge of the choroidal melanoma. There is no infiltration of the sclera (S). The area of the retinal detachment, characterized by columnar-appearing retinal pigment epithelia, is shown (arrows). Tapetum (T) (H&E stain).

case. The lesion appeared to invade through the tapetum to reach the subretinal space. The histologic features of both cases are also similar.

In a recent review of 35 ocular melanomas in the dog, choroidal involvement was uncommon.<sup>5</sup> When present, it was always secondary to posterior extension from a primary site in the anterior uvea. The histologic features of canine ocular melanomas vary. Although spindle A, spindle B, epithelioid and mixed-cell types occur, the great majority are of the spindle-cell type.<sup>5</sup> Most pigmented ocular melanomas have, in addition, a large pigment laden cell with an eccentrically located round nucleus. This cell, which resembles a macrophage, is believed to be also a tumor cell since the melanin it contains results from *de novo* synthesis rather than phagocytosis.<sup>5</sup>



**Figure 8—** Photomicrograph of bleached section showing the elongate, plump cells with small round nuclei characteristic of the tumor. The perpendicular crossing pattern is reminiscent of the normal pattern of choroidal pigment cells (H&E stain).



**Figure 9—** Photomicrograph showing the pigment epithelium and detached retina underlying the tumor. The retinal pigment epithelium is swollen and vacuolated (lateral arrowheads). Tumor is limited by Bruch's membrane (middle arrowhead) (H&E stain).

The histologic appearance of the pigmented tumor in this dog was different from that usually found in canine anterior uveal melanomas. The predominant cell type was plump but elongated and had a crossing interwoven pattern similar to the arrangement of normal choroidal cells. It was classified as a melanoma because of the standard

nomenclature used for melanocytic tumors in animals. In veterinary medicine, the term melanoma does not imply a benign or malignant neoplasm. Because of short follow-up intervals in this animal and the low incidence of this type of pigmented choroidal tumor in dogs, it is not possible at this time to adequately characterize its biologic behavior.

The cytologic features of this tumor resemble, to some extent, those of melanocytoma in humans. Although such tumors are characteristically located over the optic disk in humans,<sup>10</sup> they have been recognized in the iris,<sup>11</sup> ciliary body,<sup>12</sup> and choroid<sup>13</sup> as well. Melanocytomas in man are benign tumors thought to be a variant of a nevus.

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