A 5-DAY-OLD PEREGRINE (Falco peregrinus)-kestrel (Falco sparverius) hybrid was brought to the Avian Clinic at the New York State College of Veterinary Medicine for evaluation of its visual system. Since hatching, the bird had a lower activity level than did similarly aged hybrid falcons, and the caretaker thought that the bird lacked visually oriented behavior. Other young hybrid falcons raised at the facility appeared healthy.

The eyes of this young falcon were more lateral than in adult peregrines or kestrels. The eyelids and ocular anterior segments appeared normal. The bird had a slow direct pupillary reflex, bilaterally. The fundus reflex was brighter than anticipated. Due to the small ocular size, visualization of the fundus was not possible. Visually oriented behavior was not demonstrable.

Similarly aged healthy peregrine, kestrel, and peregrine-kestrel hybrid falcons were examined for comparison. These falcons had eyes that were more lateral than in adults. The activity level of the abnormal hybrid was less than that of other similarly aged hybrid, kestrel, or peregrine falcons. Visually oriented behavior could not be elicited with certainty in any of the falcons examined at this age. However, pupillary reflexes were faster and fundus reflexes were less bright in all healthy falcons examined.

The affected falcon was reexamined at 15, 22, 34, and 38 days of age. Visually oriented behavior was absent consistently and the bird's activity level was consistently lower than that of similarly aged falcon chicks. From 15 days of age, the membrana nigritas was more prominent bilaterally than that of similarly aged falcons. Direct pupillary light reflexes were elicited, but were slow when the falcon was examined at 15 days of age, were absent at 22 days of age, and were seen again (although slow) at 34 and 38 days of age. At 15 days of age, the fundi were visualized. A very small number of retinal folds and large areas of pigment clumping were seen bilaterally. At 34 days of age the affected hybrid falcon continually had bizarre laterally directed head excursions which resembled the head movements of healthy falcons when they are hooded.

At 38 days of age a complete neurologic examination was performed. The bird appeared healthy except for an afferent deficit in its visual system. At this time, bilateral electroretinography was performed. The bird was anesthetized, using isoflurane, and pupillary dilation was accomplished by injecting 0.015 ml of d-tubocurarine (3 mg/ml) via a 27-gauge needle into each anterior chamber. An essentially flat-line electroretinogram was recorded bilaterally, indicating profound retinal dysfunction. Due to an extremely poor prognosis for return of visual function, the bird was euthanatized, using an overdose of iv barbiturate.

Both globes were removed immediately from the orbit and hemisectioned near the ora serrata. The posterior segment of each globe was fixed for 3 hours in 3% glutaraldehyde and 2% paraformaldehyde in 0.1 M sodium cacodylate. Small representative specimens were collected from all regions of each posterior segment and were counterstained for 1 hour in osmium tetroxide. Specimens were embedded in LR White embedding medium, sectioned at 1 micron and stained with azure II-methylene blue. A complete necropsy was performed and other gross or histologic nonocular abnormalities were not seen.

Microscopically, both eyes had diffuse disorganization of retinal layers (Fig 1), with multiple areas of rosette formation (Fig 2), multifocal retinal pigmented epithelial (RPE) absence and multifocal choroidal hypoplasia with absence of a discernible choriocapillaris in these areas. The areas devoid of RPE coincided with the areas of choroidal hypoplasia and areas of most severe disorganization of the neural retina (Fig 1). Interspersed between these areas were regions with a relatively normal neuronal architecture. An identifiable RPE component was seen consistently in these areas. Inflammation was not seen in the sections examined. Findings were considered compatible with bilateral retinal dysplasia.

Retinal dysplasia is a developmental abnormality in which abnormal neural element proliferation results in a disorganized architecture. An admixture of normally segregated nuclear layers, folds, and rosettes typify this developmental abnormality. Generally, retinal dysplasia refers to a maldevelopment of the retina due to a multiplicity of causes. In the falcon of the present report, retinal dysplasia occurred in association with areas lacking RPE, such as occurs with colobomas.

Retinal dysplasia has been reported in a prairie falcon and in a mutant strain of domestic fowl. Initially, the defect in these fowl appeared in the RPE followed by deterioration in the neural retina; the choroid was not affected in these fowl.

The RPE may be important in the normal histogenesis of the retina (ie, lack of this layer may result in dysplasia of the neural elements). Histologic findings in the hybrid falcon of the present report support this view. The most severe

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areas of disorganization of the neural retina occurred in areas devoid of RPE. The RPE also may be essential in the normal development of the choriocapillaris and an acquired loss of the RPE may result in the concomitant loss of the choriocapillaris. In the hybrid falcon of the present report, we do not know whether the multifocal absence of the RPE/choriocapillaris was a primary lack of development or was the result of secondary degeneration.

1. Forane—Ohio Medical Anesthetics, Airco, Inc, Madison, Wis.

2. ER Squibb and Sons Inc, Princeton, NJ.

3. LR White Resin, Ernest F. Fullon Inc, Schenectady, NY.


