

## **Morphological Features in the Pigeon Pecten Suggesting a Role in Transport to the Vitreous**

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The pecten is a unique structure of the avian species. There are three types of pectens: conical, vaned and pleated. The pleated pecten is the most common and the number of pleats, size, and shape vary from species to species. The diurnal pigeon has a well-developed pleated pecten. The internal folds are oriented with the long axis parallel to the capillaries and the pleats are held together by a dorsal bridge. There are several functions that have been suggested for the pecten with the main role being to supply oxygen and nutrients to the optic nerve head and vitreous. In a study by Pettigrew et al., (Nature 343:362-363, 1990) the investigators visualized fluorescein moving from the pecten into the vitreous chamber in puffs during saccadic eye movements. In the current study, we sought to determine if there were any morphological features of the pigeon pecten that would support transport into the vitreous. Pigeons were transcidentally perfused with a 2% paraformaldehyde solution in a 0.1M phosphate buffer, the eyes removed and then processed for either scanning electron microscopy (SEM) or light microscopy (LM) using Epon-Araldite for an embedding media. Toluidine blue-stained 0.5-1 $\mu$ m plastic retinal sections were analyzed using LM. SEM images were obtained using a Philips XL30 ESEM or LEO 1430 SEM with the isolated pecten viewed from all sides. Utilizing SEM the dorsal aspect of the pecten bridge was observed to contain randomly spaced pores that were 10-15 $\mu$ m in length and 5-8 $\mu$ m in diameter. These pores were not observed on the pleated folds. LM investigation of sectioned material showed that these pores led into what appears to be a duct that ran from the top of the bridge down into the pleat and ended in a blind terminal near the perivascular area of the capillaries. No direct contact was observed between these ducts and the pecten capillaries. These results show that morphological structures exist in the dorsal aspect of the pecten bridge that would facilitate transport of substances to and from the vitreous. The capillaries within the pecten have specialized endothelium with luminal microvilli that appear adapted for transport and absorption. Thus, this highly vascularized structure can provide a means of nutrient transport without inhibiting the path of photons to the photoreceptors as is the case with species containing inner retinal vessels.  
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