AQUEOUS HUMOR OUTFLOW IN *SQUALUS ACANTHIAS*

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A substantial body of information is available on the formation of aqueous humor in *Squalus acanthias* (Spiny dogfish). Many similarities exist in the aqueous inflow physiology and chemistry when compared with other vertebrates including primates, dogs and rabbits (Maren, Exp Eye Res. 16:403-411, 1973; Maren et al., Invest Ophthal Vis Sci. 14:662-673, 1975). However, the mechanism by which aqueous humor leaves the anterior chamber is less certain. In most vertebrates, aqueous humor leaves the anterior chamber via a venous plexus-like structure known in primate eyes as Schlemm's Canal. However, Maren's studies showed that there is a significant amount of aqueous to vitreous exchange of ions which suggests that the vitreous may serve as the sink for circulated aqueous humor. In support of this is a morphologic study by Jampol and Forrest (Jampol and Forrest, Exp Eye Res. 13:315-319, 1972.). Although this study addressed structures involved with formation and not egress of aqueous humor, the micrographs do not show the existence of a chamber angle structure like Schlemm's Canal for the drainage of aqueous humor. We conducted a series of studies at the Mount Desert Island Biological Laboratory (Salisbury Cove, ME), both morphologic and physiologic in nature, to better understand the process through which aqueous humor leaves the *Squalus acanthias* eye.

Intraocular pressure (IOP) was measured by pneumotonometer *in situ* immediately postmortem in order to establish the appropriate perfusion pressure. For perfusion and morphologic studies, postmortem *Squalus acanthias* eyes were immediately enucleated and stored in cool seawater. Within 20 min, whole eyes or isolated anterior ocular segments were perfused at ambient sea temperature (14°-16°C) with phosphate buffered saline (PBS) according to previous methods, fixed at flow and prepared for morphologic analysis (Erickson-Lamy et al., Exp Eye Res. 52:723-731, 1991; Erickson-Lamy et al., Curr Eye Res. 7:799-807, 1988.).

IOP was measured to be 11.64±0.64 mmHg (±SEM, n=25). Therefore, all perfusions were carried out at a constant pressure of 12 mmHg. Perfusion studies found a reproducible outflow rate of perfusate out of the anterior segment. Moreover, studies with fluorescein showed that the perfusate egress appeared to be through discrete channels near the limbus, similar to other vertebrate eyes.

Glaucoma is a human condition usually characterized by an elevation in intraocular pressure due to a blockage in the aqueous outflow pathways. However, the exact mechanism for the blockage remains unknown. Understanding the physiology of aqueous humor drainage in other species could lend insight into the pathogenesis of glaucoma.

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