Anatomy of the Globe of the California Sea Lion, (Zalophus californianus)

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Purpose: To record the anatomic features of normal globes of Zalophus californianus.

Methods: Normal globes submitted from captive or stranded specimens archived at the Comparative Ocular Pathology Laboratory of Wisconsin were examined. Clinical observations gross photographs, axially oriented microscopic sections cut in the vertical plane or horizontal plane and sections cut at right angles across the ciliary body and iris were used. Transmission electron microscopy was done on the cornea and iris.

Results: Distinctive features include the presence of a flattened plateau on the anterior surface, a thin Bowman’s layer, and a very thin Descemet’s membrane. The pupillary margin of the iris lacks a dilator muscle; however, the dilator at the iris base is excessively robust and extends to the base of the pars plicata. The sphincter muscle at the base of the iris is also robust extending posterior to the base. There is a small circumferential muscle at the base of the pars plicata. There is a thick and long pectinate ligament and the ciliary cleft is very wide. The pars plicata attaches directly to the lens capsule at the equator. The tapetum lucidum is behind almost the entire retina both above and below the optic disk. The sclera at the limbus and at the posterior pole is remarkably thick becoming thin at the equator. There is a vascular plexus surrounding the optic nerve similar to that seen in cetacean species.

Conclusions: These distinctive features of the California Sea Lion provide advantages which reflect a lifestyle heavily reliant on vision both above and below water and in the dimly lit and cold environment of this marine mammal.