A significant temperature increase is found as summer progresses, as expected. We were unable to account for the day to day variations by grouping values according to time of day or time of tide, although there is a consistant tendency for water drawn at low tide when the intakes are closer to the surface to be warmer than that from high tide. The temperature recorded in the Gull Shed and in the storage tank could be different by as much as 0.8°C, but the direction was not consistant, and the average difference (-0.045 $\pm$ 0.116°C, N = 31) is clearly not significant. Temperatures at other outlets likewise showed no obvious pattern of variation.

A COMPARATIVE STUDY OF ELASMOBRANCH CORNEAL AND SCLERAL COLLAGENS

Gary W. Conrad, Paul T. Kelly, Klaus von der Mark and Henry F. Edelhauser, Division of Biology, Kansas State University, Manhattan, Kansas; Max-Planck-Institut für Biochemie, Martinsried bei München, West Germany; Department of Physiology, The Medical College of Wisconsin, Milwaukee, Wisconsin, and Mount Desert Island Biological Laboratory, Salsbury Cove, Maine

Vertebrate corneas are transparent, non-vascularized tissues of the eye, composed of three cell-types separated from one another by two basement membranes and an orthogonal gridwork of collagen fibrils. For most animals, if the cornea is transferred to an isotonic salt solution in vitro, it rapidly absorbs water, swells, and loses its transparency. However, the cornea of elasmobranchs and the primary spectacles of cyclostomes can be placed in isotonic saline, or even distilled water, without swelling or losing their transparency. Resistance to swelling by elasmobranch corneas and cyclostome spectacles is correlated with the presence of fibers (sutural fibers) which traverse the stroma perpendicularly to the collagenous plies and appear to connect its anterior and posterior faces. It is not known which corneal cells synthesize the sutural fibers, nor whether the fibers contain collagen. In the present study we have used collagen type-specific antibodies, together with indirect immunofluorescence, to localize the types of collagen within and surrounding the shark cornea and have used peptide fingerprint analysis to characterize the predominant collagen α- and β-chains in shark cornea and cartilage.

Corneas, dissected from young and adult spiny dogfish sharks (Squalus acanthias), were prepared for transmission electron microscopy and immunofluorescence. In the latter case, tissues were fixed in formaldehyde solutions, sectioned with a cryostat, incubated with antibodies specific for collagen types I and II, and examined by indirect immunofluorescence. Collagen α- and β-chains were separated by sodium dodecylsulfate-slab gel electrophoresis and characterized by two-dimensional mapping of ^{125}I-labeled peptides generated by tryptic and chymotryptic digestion.

The corneal stroma, the sutural fibers which span the stroma, and the surrounding limbus were positive for type I collagen, as judged by immunofluorescence. The corneal stroma was negative for type II collagen. Scleral cartilage matrix was intensely positive for type II collagen, but was negative for type I. In confirmation of these results, slab gel electrophoresis revealed α1-, and α2-like bands from shark corneal stroma, but only an α1-like band from shark cartilage collagen. Two-dimensional peptide mapping revealed some degree of resemblance between the α1 band of shark corneal stroma and the α1 band of chick type I collagen. Likewise, the α1 band of shark cartilage collagen somewhat resembled the α1 band of chick type II collagen. The α2-like band of shark corneal stroma did not closely resemble the α2 band of chick type I collagen. The most prominent β band of shark corneal stroma appeared to be a dimer composed of one α1 chain and one α2 chain. The collagen of shark corneal stroma was very susceptible to degradation by pepsin, whereas that from shark cartilage was much less susceptible. These results are presented in detail elsewhere (Exptl. Eye Res., (in press)). Supported in part by NIH EY 00952.