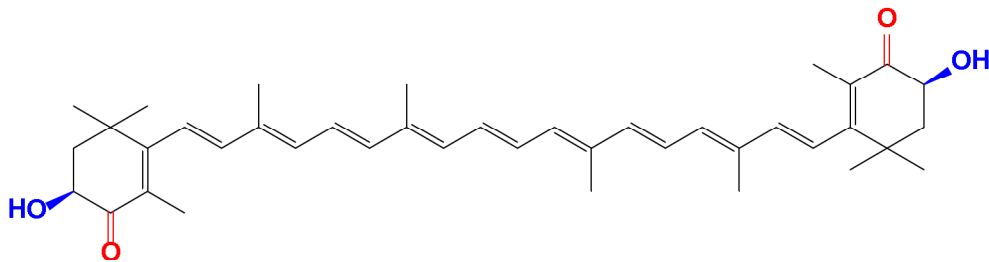


CYANOTECH EXHIBIT 1032

Xanthophyll Structures and Polarities; Retinal Sections

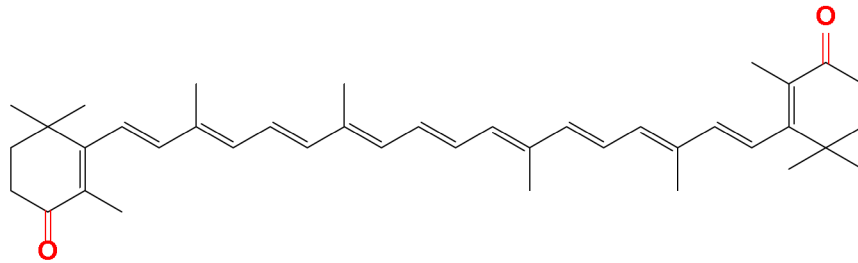
Xanthophyll Structures and Polarities

(Differences highlighted in color. Polarities calculated in ChemDraw)



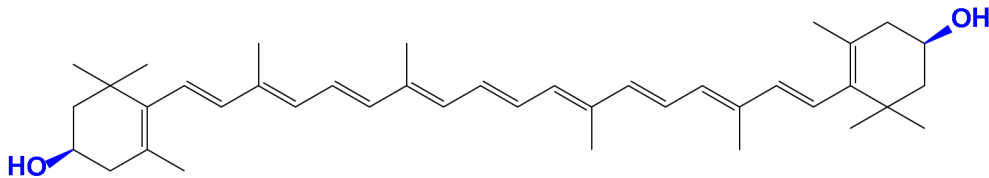
Astaxanthin

Log P: 6.57



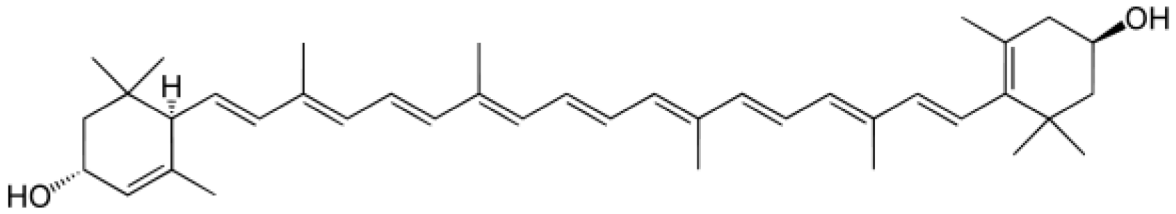
Canthaxanthin

Log P: 8.16



Zeaxanthin

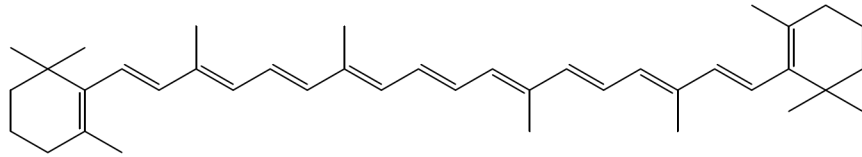
Log P: 8.22



Lutien

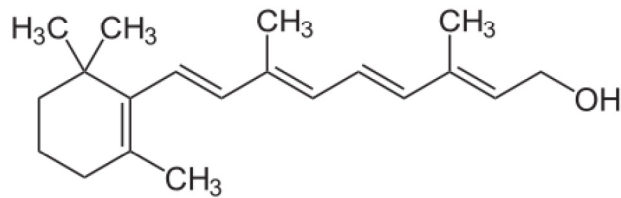
Log P: 8.22

For comparison:



β -carotene

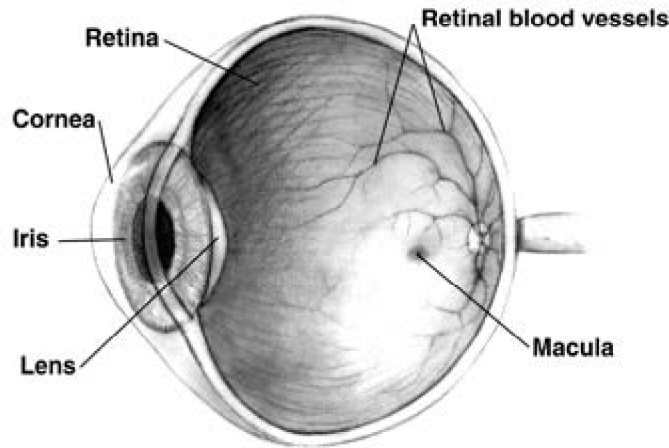
Log P: 10.68



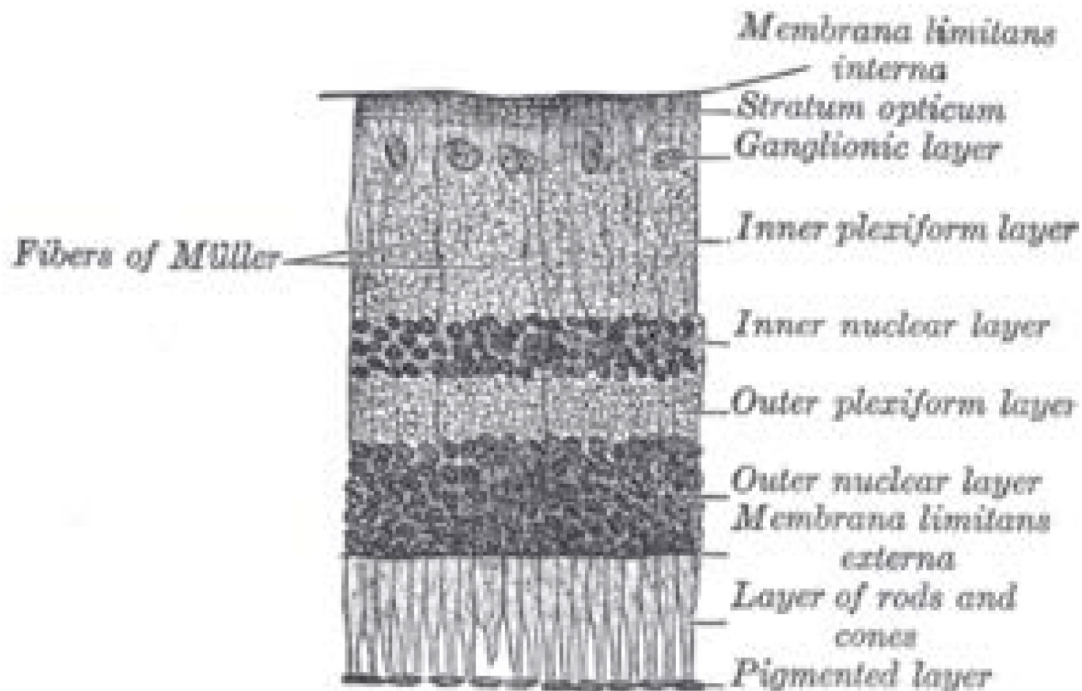
Vitamin A

Log P: 4.69

RETINAL SECTIONS AND LEGENDS



<http://en.wikipedia.org/wiki/Retina>, sourced from National Inst. Of Health, National Eye Insitute



<http://en.wikipedia.org/wiki/Retina>, sourced from the 20th U.S. edition of Gray's Anatomy (1918)

Section of vertebrate retina

The vertebrate retina has ten distinct layers. From closest to farthest from the vitreous body - that is, from closest to the front exterior of the head towards the interior and back of the head:

Inner limiting membrane – basement membrane elaborated by Müller cells

Nerve fibre layer – axons of the ganglion cell nuclei (note that a thin layer of Müller cell footplates exists between this layer and the inner limiting membrane)

Ganglion cell layer – contains nuclei of ganglion cells, the axons of which become the optic nerve fibres for messages and some displaced amacrine cells

Inner plexiform layer – contains the synapse between the bipolar cell axons and the dendrites of the ganglion and amacrine cells.

Inner nuclear layer – contains the nuclei and surrounding cell bodies (perikarya) of the bipolar cells.

Outer plexiform layer – projections of rods and cones ending in the rod spherule and cone pedicle, respectively. These make synapses with dendrites of bipolar cells. In the macular region, this is known as the Fiber layer of Henle.

Outer nuclear layer – cell bodies of rods and cones

External limiting membrane – layer that separates the inner segment portions of the photoreceptors from their cell nucleus

Photoreceptor layer – rods/cones

Retinal pigment epithelium - single layer of cuboidal cells (with extrusions not shown in diagram)

These can be simplified into 4 main processing stages: photoreception, transmission to bipolar cells, transmission to ganglion cells which also contain photoreceptors, the photosensitive ganglion cells, and transmission along the optic nerve. At each synaptic stage there are also laterally connecting horizontal and amacrine cells.

The optic nerve is a central tract of many axons of ganglion cells connecting primarily to the lateral geniculate body, a visual relay station in the diencephalon (the rear of the forebrain). It also projects to the superior colliculus, the suprachiasmatic nucleus, and the nucleus of the optic tract. It passes through the other layers creating the Optic disc in primates.

Additional structures, not directly associated with vision, are found as outgrowths of the retina in some vertebrate groups. In birds, the pecten is a vascular structure of complex shape that projects from the retina into the vitreous humour; it supplies oxygen and nutrients to the eye, and may also aid in vision. Reptiles have a similar, but much simpler, structure.

<http://en.wikipedia.org/wiki/Retina>