Pupillary light reflex

Mediated by rods and cones of the retina which are stimulated by light, and transmit via their axons in the optic nerve. As with the visual path, temporal retinal fibers remain ipsilateral, whereas nasal retinal fibers decussate in the optic chiasm. Fibers subserving the light reflex bypass the lateral geniculate body (LGB) (unlike fibers for the vision which enter the LGB) to synapse in the pretectal nuclear complex at the level of the superior colliculus. Intercalating neurons connect to both the Edinger-Westphal nucleus. The preganglionic fibers travel within the third nerve to the ciliary ganglion as described above under Pupilloconstrictor (parasympathetic). Monocular light normally stimulates bilaterally symmetric (i.e., equal) pupillary constriction (ipsilateral response is called direct, a contralateral response is consensual).

The pupillary light reflex (PLR) or photopupillary reflex is a reflex that controls the diameter of the pupil, in response to the intensity (luminance) of light that falls on the retinal ganglion cells of the eye, thereby assisting in adaptation to various levels of lightness/darkness. A greater intensity of light causes the pupil to constrict (miosis/myosis) (allowing less light in), whereas a lower intensity of light causes the pupil to dilate (mydriasis, expansion) (allowing more light in). Thus, the pupillary light reflex regulates the intensity of light entering the eye.

The pupillary light reflex pathway has an afferent limb (within CN II) and efferent limb (within CN III). The ganglion cells of the retina project bilaterally to the pretectal nuclei. The pretectal nuclei projects crossed and uncrossed fibers to the Edinger-Westphal nucleus, which gives rise to the preganglionic parasympathetic fibers. These fibers exit the midbrain with CN III and synapse with postganglionic parasympathetic neurons of the ciliary ganglion, which innervates the sphincter muscle of the iris.