OPTIC NERVE (CRANIAL NV II)

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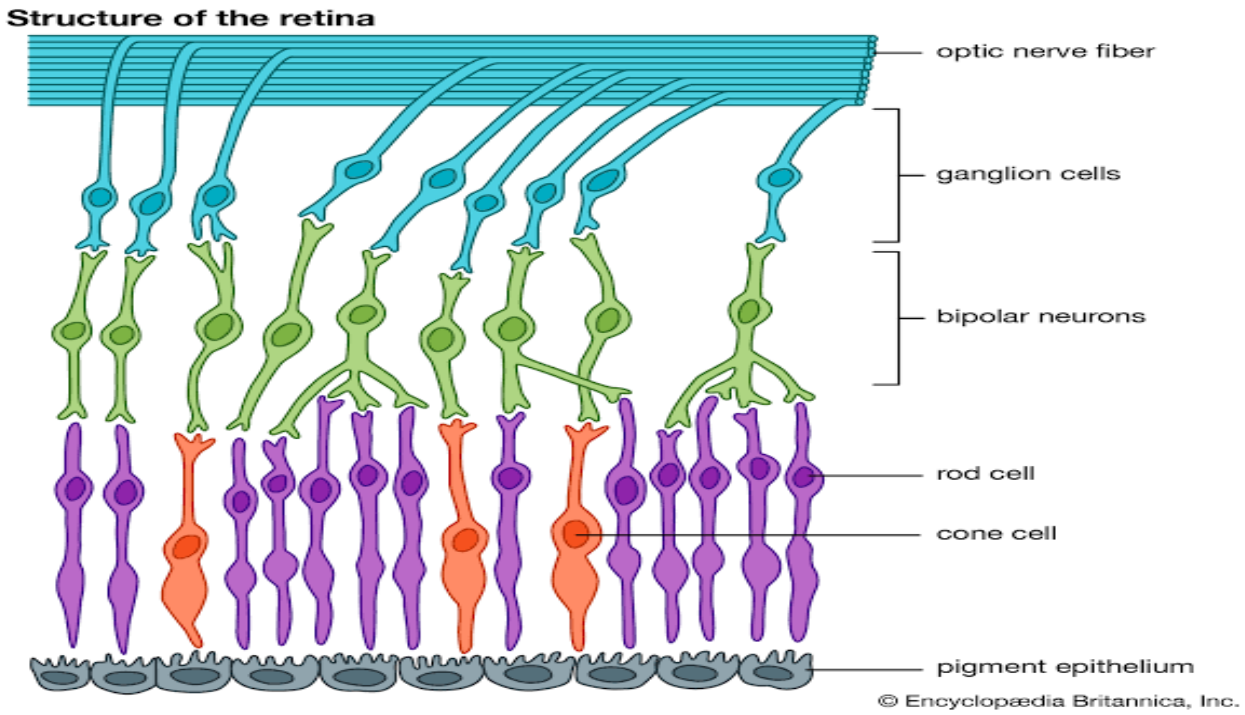
2nd year MBBS

The optic nerve

- It is the second CN nerve,responsible for transmitting the special sensory information for vision.
- It is part of the CNS rather than PNS.therefore,it is sorrounded by meninges(not by epi,peri and endoneurium)
- Its myelin sheath is formed by oligodendrocyte(cells of CNS),not by schwann cells.

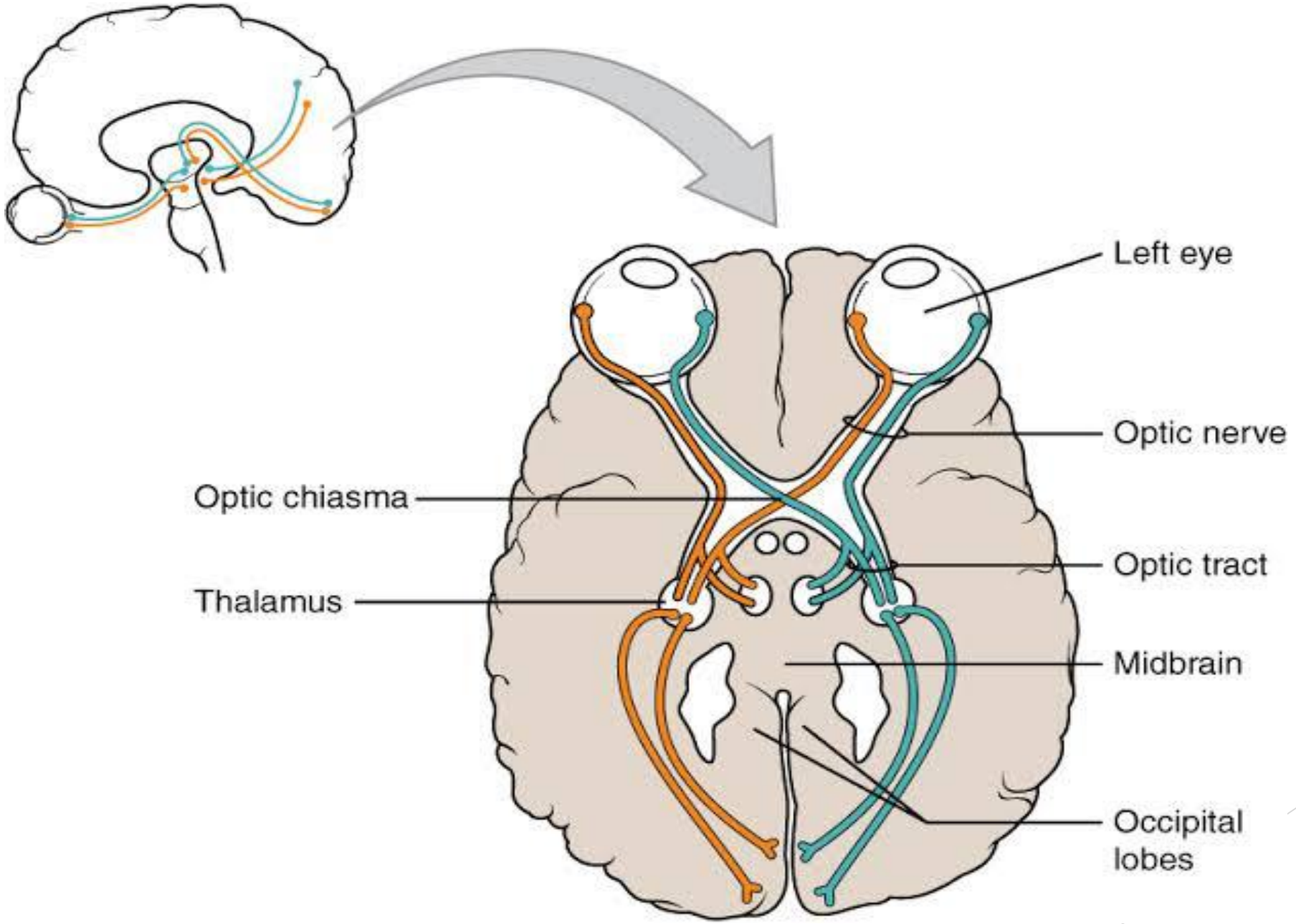
Origin

- It is formed by the axons of the ganglionic layer of retina.
- It leaves thorough the optic disc and enters the middle cranial fossa through optic canal.



INTRA CRANIAL PATHWAY

- Within the middle cranial fossa, fibres from nasal half of both retina cross the midline to form the optic chiasma.
- Right optic tract:contains ipsilateral temporal and contralateral nasal fibres.
- Left optic tract:contains ipsilateral temporal and contralateral nasal fibres.


Left eye
Optic nerve
Optic chiasma
Optic tract
Thalamus
Midbrain
Occipital lobes

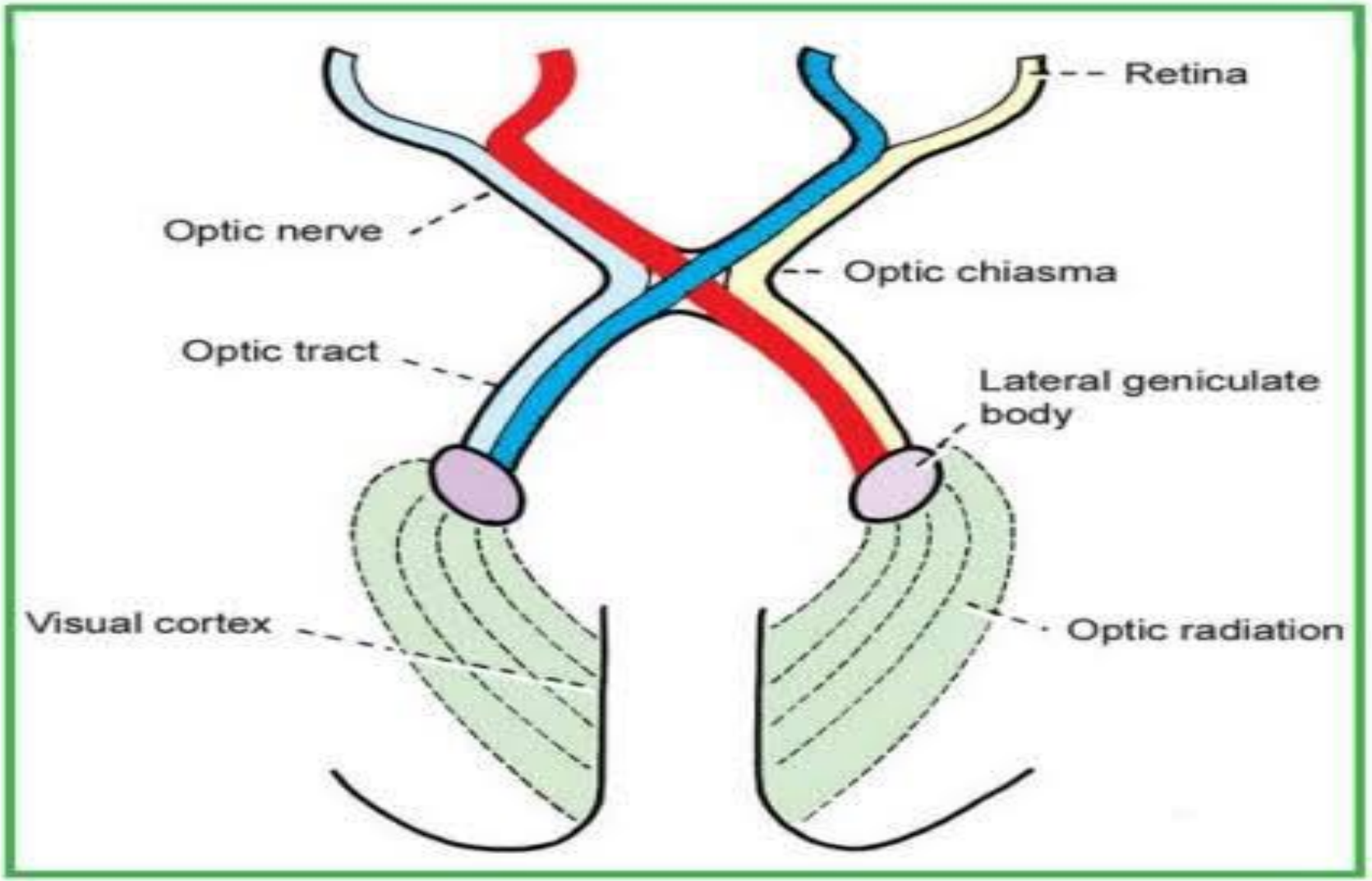


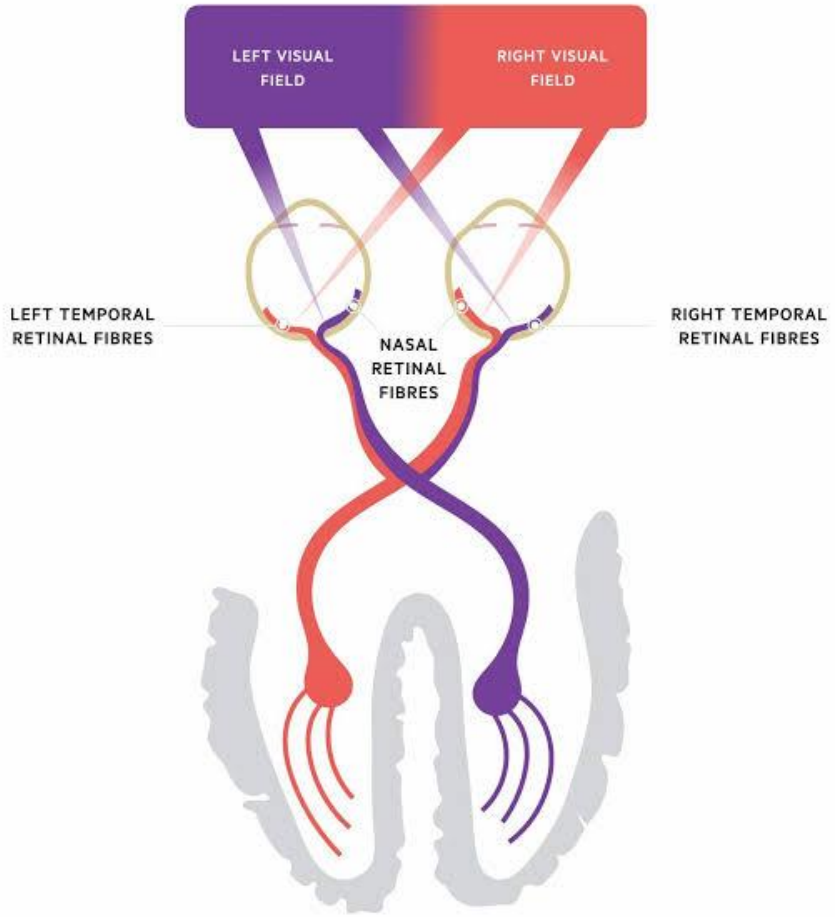
Fig. 18.1. The optic pathway. Note that the fibres from the medial (or nasal) half of each retina cross over to the optic tract of the opposite side.

LGN AND OPTIC RADIATION:

- Most of the fibres terminate by synapsing with neurons in the lateral geniculate nucleus of thalamus.
- Fibres radiate from LGN to transmit the visual input coming from optic nerve to the primary visual cortex.

Neurons of the visual pathway

1. Rods and cones
2. Bipolar neurons
3. Ganglion cells
4. Neurons of LGN



LESIONS OF VISUAL PATHWAY

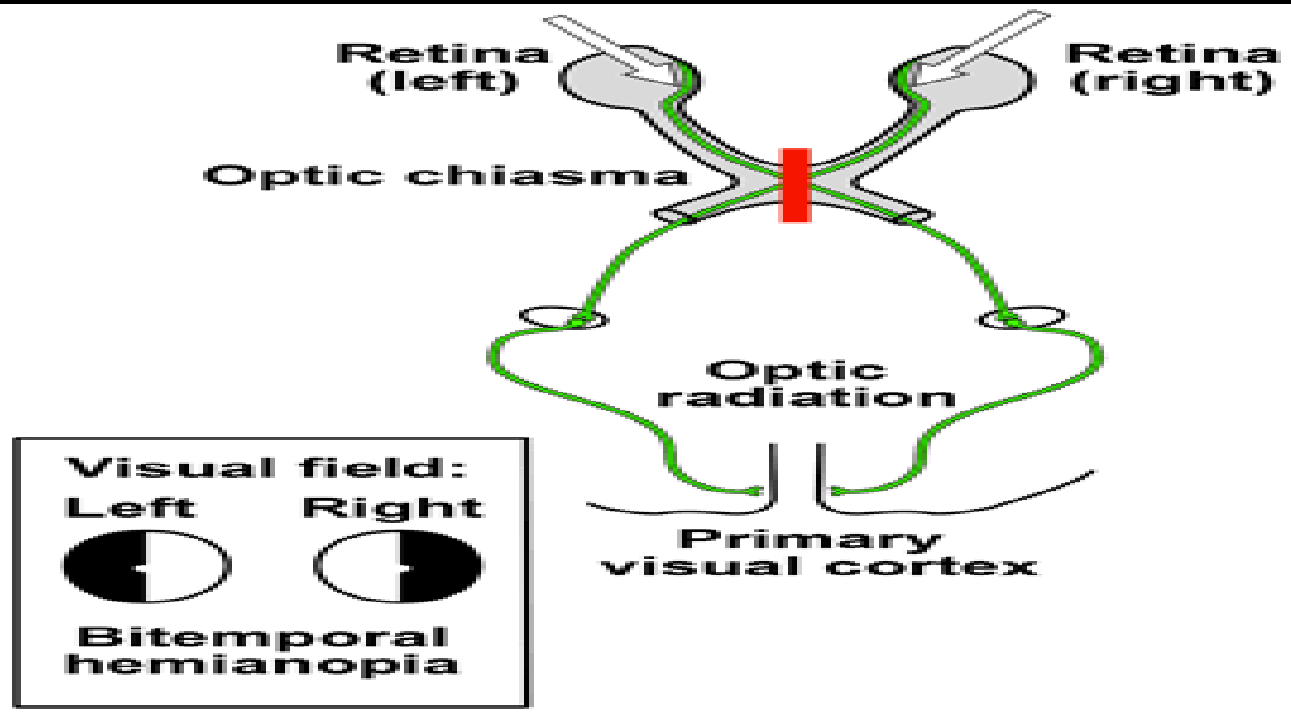
- Causes:
- Expanding tumors of the brain and neighboring structures
- Cerebrovascular accidents

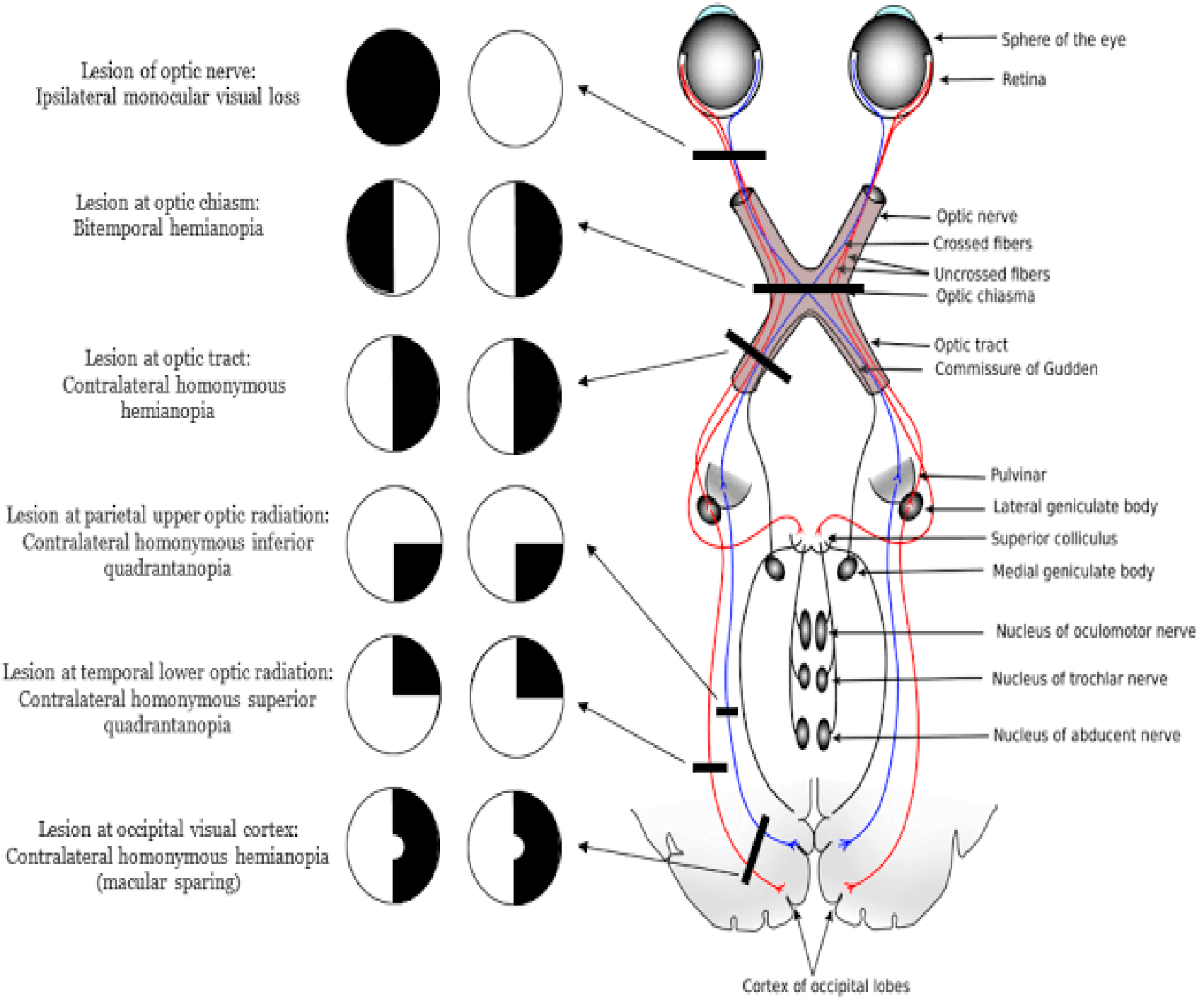
1. Monoocular blindness:complete section of one optic nerve
2. Bitemporal hemianopia:sagittal section of optic chaisma
3. Binasal hemianopia:partial lesion of the optic chiasma on its lateral side

Right Monocular Blindness

Binasal Hemianopia


Bitemporal Hemianopia


Retina (left)
Retina (right)
Optic chiasma
Optic radiation
Primary visual cortex
Visual field:
Left
Right
Bitemporal hemianopia


Lesion of optic nerve:
Ipsilateral monocular visual loss
Lesion at optic chiasm:
Bitemporal hemianopia
Lesion at optic tract:
Contralateral homonymous
hemianopia
Lesion at parietal upper optic radiation:
Contralateral homonymous inferior
quadrantanopia
Lesion at temporal lower optic radiation:
Contralateral homonymous superior
quadrantanopia
Lesion at occipital visual cortex:
Contralateral homonymous hemianopia
(macular sparing)
Sphere of the eye
Retina
Optic nerve
Crossed fibers
Uncrossed fibers
Optic chiasma
Optic tract
Commissure of Gudden
Pulvinar
Lateral geniculate body
Superior colliculus
Medial geniculate body
Nucleus of oculomotor nerve
Nucleus of trochlar nerve
Nucleus of abducent nerve
Cortex of occipital lobes


THANK
YOU