

Vision
Accomodation&
pupillary light reflex
By

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- **VISUAL ACUITY :-**
- **-Definition :-** DEGREE TO WHICH DETAILS OF OBJECTS ARE PERCIEVED
- **Visual threshold** is minimal amount of light that elicit sensation of light
- 2 lines can be seen as 2 if a visual angle of about 1 minute between them
- **-Snellen s chart to measure visual acuity**
- Normal acuity = ($d/D = \text{Patient} / \text{normal} = 6/6$)
- A person of 12/6 has better vision than normal vision (not hyperope)
- A person of 6/12 has less vision than normal vision

DUPLICITY THEORY OF VISION (2 kinds of vision under diff conditions)

Q.Differentiate between cones & rods vision.

1-PHOTOPIC VISION (bright light vision)

- served by cones
- high visual acuity = colors & details
- low sensitivity to light = needs high visual threshold to be stimulated

2-SCOTOPIC VISION (night vision, dimlight vision)

- served by rods
- low visual acuity =no colors or details
- great sensitivity to light =low visual threshold

VISUAL PATHWAY:-

- Cones & rods → bipolar cells → ganglion cells → optic nerve (axons of ganglion cells) → optic chiasma → optic tract → lateral geniculate body in thalamus → axons of cells form geniculocalcarine tract----- optic radiation → visual cortex in occipital cortex (Brodmann area 17 on sides of calcarine fissure)

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- * 1- some ganglion cells axons pass from optic tract to pretectal region of midbrain for pupillary reflexes & eye movement**
- * 2- Some axons of ganglion cells from optic chiasma pass directly to hypothalamus for circadian rhythm (light-dark cycle)**
- *3-Some axons from lateral geniculate body in thalamus to superior colliculus in midbrain for accommodation. R & its miosis component**

-VISUAL PATHWAY & FIELD :-

- **-The nasal fibers cross to opposite side while the temporal fibers do not cross**
- **Nasal fibers conveys temporal field of vision**
- **temporal fibers conveys nasal field of vision**

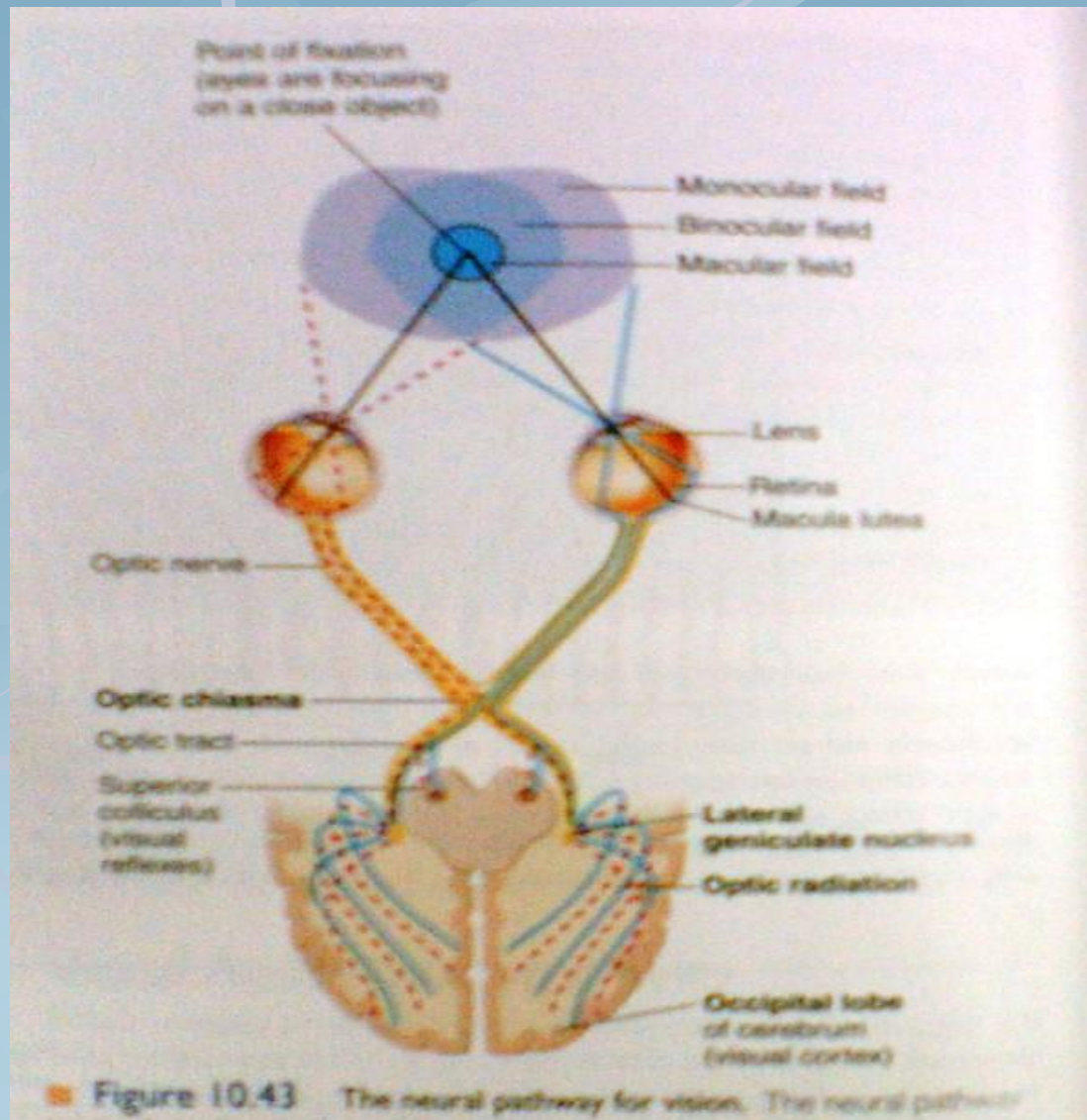
LEFT OPTIC TRACT:-

Conveys temporal fibers of the Left retina + nasal fibers of the right eye ((left nasal visual field+ right temporal visual field), both form right half of visual field of both eyes.

N.B

-- The left optic tract corresponds to the right $\frac{1}{2}$ of the visual field

--The right optic tract corresponds to the left $\frac{1}{2}$ of the visual field



Accommodation:-

- At rest (looking at far objects):-
- Ciliary muscles **relaxed**, **taut (tense)** ligaments, **flat** lens
- -near(close) objects parallel rays focus behind retina(if ciliary muscles remain relaxed)>>>>>>>blurred vision
- Solution is to increase curvature & refractive power of lens by accommodation to bring focus on retina.

■ Accommodation reflex:-



- - focusing(**increased** anterior surface curvature of lens by ciliary muscles **contraction**, **slack = relaxed** ligaments, **increased** anterior surface curvature of lens . why?
- -to add 12D to refractive power of lens.
- -both circular & longitudinal ciliary muscles contract to pull ciliary muscle forwards & inwards>>>>>..ciliary muscles edges come close to each other.
- **Test-sanson purkinje image**

- looking at a close object **(near response)**
- a- convergence. Why?
- b- pupil constriction. Why?
- c- Accomodation. Why?
- **Near point:-**
- Nearest point to eye at which object can brought into focus on retina by **ACCOMODATION**
- -10 years-----9 cm
- -At 60 years-----80-100 cm, due to hardness of lens & loss of accomodation.
- **-(presbyopia:-((triade)**
- 1-loss of accomodation 2-loss of lens elasticity
- 3- near point recceed
- -correction by **biconvex lens**

- **Pathway of accommodation:-**
- Light on eye>>>>>retina >>>>>optic nerve >>>>>optic chiasma>>>> optic tract->>>> lateral geniculate body in thalamus to superior colliculus in midbrain for->>>>EWN>>>>>ciliary ganglion to oculomotor N>>>>>>ciliary body contraction (accommodation. R) & miosis of near response
- - this pathway of near response is ventral to pupillary light reflex)

Pupillary light reflex:-

Light on one eye pupil>>>>>constiction of this pupil (direct)
& the other pupil (indirect)

Pathway of consensual Pupillary light reflex (indirect):-

Light on eye>>>>retina>>>optic nerve >>>optic chiasma>>>>optic tract>>>>pass through superior colliculus to end **in pretectal nucleus** >>>>>both oculomotor nerve nuclei (EWN)>>>>> both ciliary ganglia>>>>>supply both eyes by oculomotor nerves>>>>>>miosis in both eyes.

-Atropine drops:- block parasympathetic supply of oculomotor >>>>>>mydriasis

Q. Argyll Robertson pupil?

**In syphilis tabes dorsalis which destroy
pretectal nucleus**

-light .R is lost & accommodation .R remains

- because lesion is in pretectal nucleus only,
away from superior colliculus & fibers of
accommodation.**

- Lateral geniculate body:-
- Thus left LGB (similar to left optic tract) has all layers receive from RIGHT $\frac{1}{2}$ of visual field
- - Right LGB (similar to right optic tract) has all layers receive from LEFT $\frac{1}{2}$ of visual field.

■ **FUNCTION OF LGB:-**

- **1-acts as a relay station for visual information from optic tract to cortex.**
- **2-It has point to point transmission(spatial fidelity)**
- **3-Acts as gate controls signal transmission to visual cortex i.e control how much signals reach visual cortex**
- **4-color vision & detect shapes & texture**
- **NB/ it is rapidly conducting to visual cortex.**

- visual cortex has 6 layers

1-Primary visual cortex(braodmann area

17):- percieve sensation of vision (movement + shapes+ stereognosis+ brightness) &has blobs for color detection

2-Association visual cortex(area 18&19):-

interpretation of visual stimuli