

Ophthalmology

4th yr Revision Lecture

Mr David Cheung

www.mrdavidcheung.com

Structure

Structure

- Why Ophthalmology is Important

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- Why Ophthalmology is Important
- Ophthalmology as a Career

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- Why Ophthalmology is Important
- Ophthalmology as a Career
- Lecture

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- Why Ophthalmology is Important
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- Lecture
- Tips for using an Ophthalmoscope

Why Ophthalmology is Important

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- 10-15% of GP practice

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- 10% of A&E attendances

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- 10-15% of GP practice
- 10% of A&E attendances
- Involved in many systemic diseases:
 - Diabetes, Peripheral Arterial Disease, MS, Thyroid, RA

Ophthalmology as a Career

Why's it great?

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- Constantly evolving/ Technology Driven subspecialty/ Lots of Toys

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 - You see, you diagnose, you treat
 - Pathology down the microscope

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 - 40:60 M:F consultant ratio

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 - 40:60 M:F consultant ratio
 - v. few egos

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 - Often feel detached from rest of medicine
 - Difficult to go back

Career Structure

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 - 6 years basic OST

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- RCOphth.ac.uk

Lecture

Revision

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- Deliberately simple

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- Not didactic lecture

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- Core knowledge on Bham Med School Website

Revision

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 - Acute Red Eye

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 - Acute Visual Loss

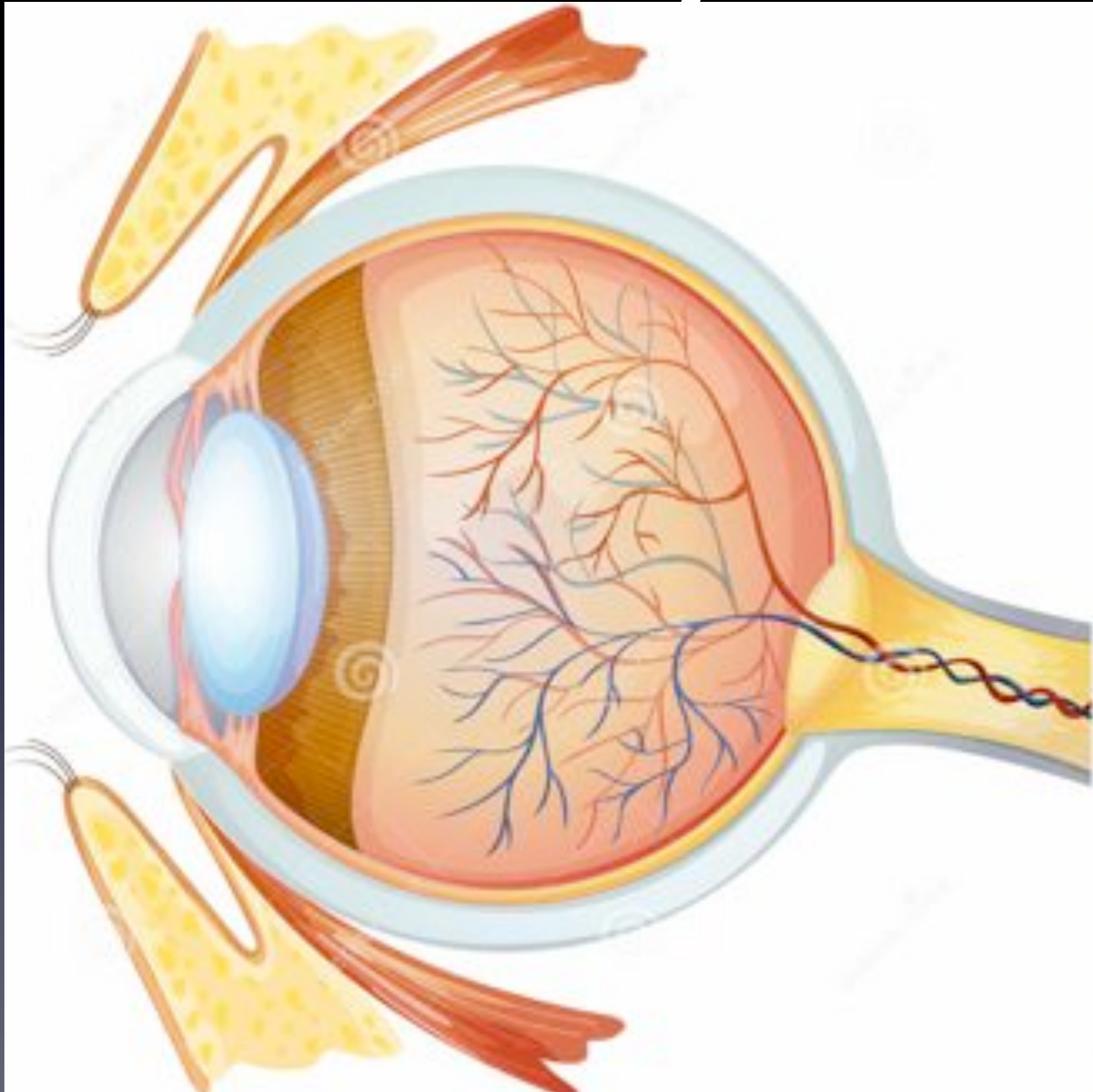
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 - Acute Red Eye
 - Acute Visual Loss
 - Macular Degeneration

Revision

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- Core knowledge on Bham Med School Website
 - Acute Red Eye
 - Acute Visual Loss
 - Macular Degeneration
 - Diabetic Eye Disease

The Eye





Ophthalmic History & Examination

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History

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- Ocular history

Ophthalmic History & Examination

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Ophthalmic History & Examination

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Examination

- Eyelids

Ophthalmic History & Examination

History

- Ocular history
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- PMHx
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Examination

- Eyelids
- Anterior Segment: Cornea, Conjunctiva, Anterior Chamber, Lens

Ophthalmic History & Examination

History

- Ocular history
- FHx
- PMHx
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Examination

- Eyelids
- Anterior Segment: Cornea, Conjunctiva, Anterior Chamber, Lens
- Intraocular Pressure

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History

- Ocular history
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Examination

- Eyelids
- Anterior Segment: Cornea, Conjunctiva, Anterior Chamber, Lens
- Intraocular Pressure
- Fundoscopy

Ophthalmic History & Examination

History

- Ocular history
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Examination

- Eyelids
- Anterior Segment: Cornea, Conjunctiva, Anterior Chamber, Lens
- Intraocular Pressure
- Fundoscopy
- Extraocular movements

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- Ocular history
- FHx
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Examination

- Eyelids
- Anterior Segment: Cornea, Conjunctiva, Anterior Chamber, Lens
- Intraocular Pressure
- Fundoscopy
- Extraocular movements
- Visual Acuity

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Examination

- Eyelids
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- Intraocular Pressure
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- Visual Acuity
- Peripheral Vision

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- Extraocular movements
- Visual Acuity
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- Pupil reflexes

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Expected Competencies

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Expected Competencies

- **Naked Eye**

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Examination

- Eyelids
- Anterior Segment: Cornea, Conjunctiva, Anterior Chamber, Lens
- Intraocular Pressure
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Expected Competencies

- Naked Eye
- Direct Ophthalmoscope

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Expected Competencies

- Naked Eye
- Direct Ophthalmoscope
- Confrontation Field Testing

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Expected Competencies

- Naked Eye
- Direct Ophthalmoscope
- Confrontation Field Testing
- Snellen Vision Testing

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Expected Competencies

- Naked Eye
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- Snellen Vision Testing
- Pupil Assessment

Snellen Chart Vision



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- Central Visual Acuity



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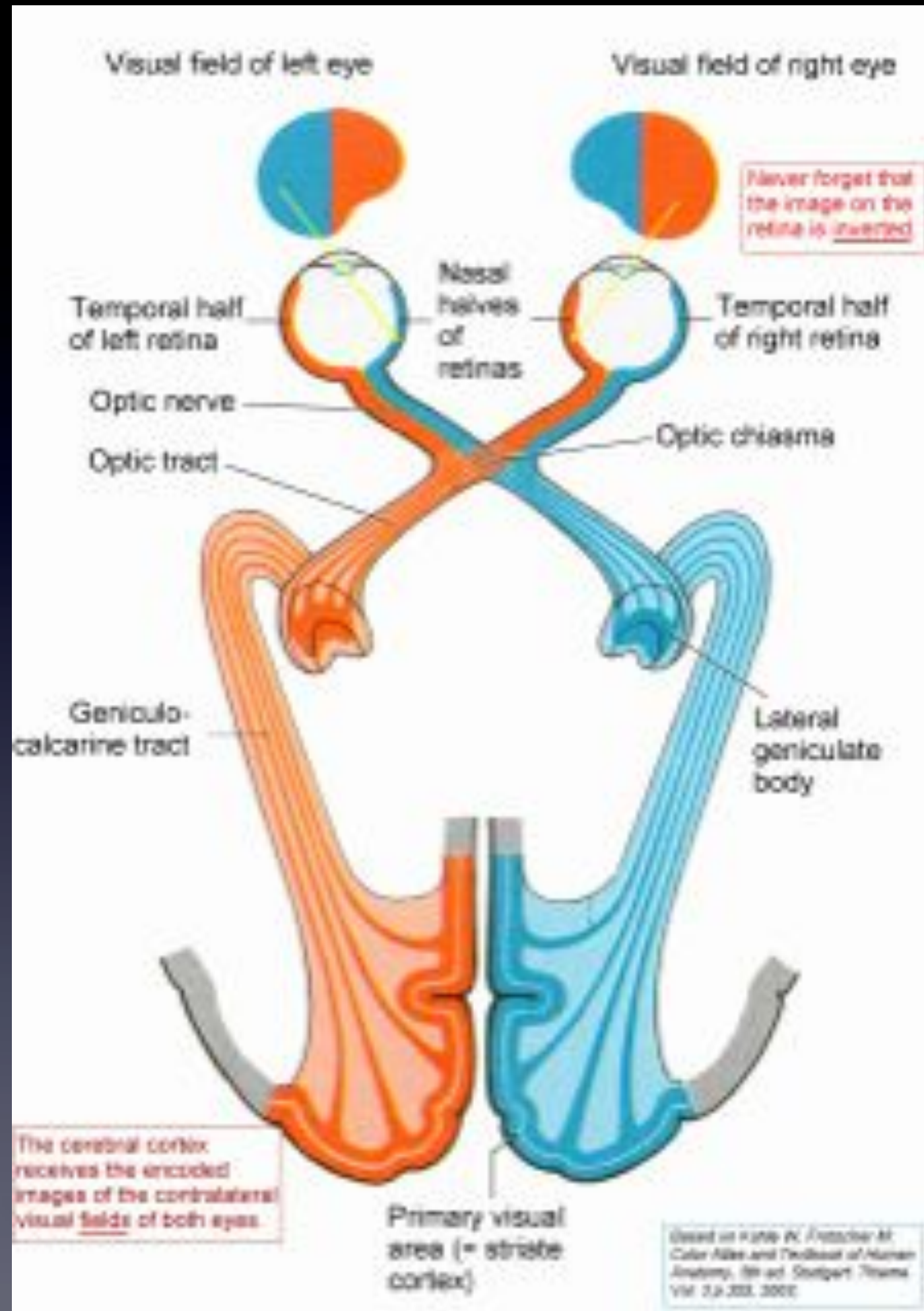
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- 6/12?
- 3/12?
- Counting fingers/ Hand movements/ Perception of light/ No perception of light



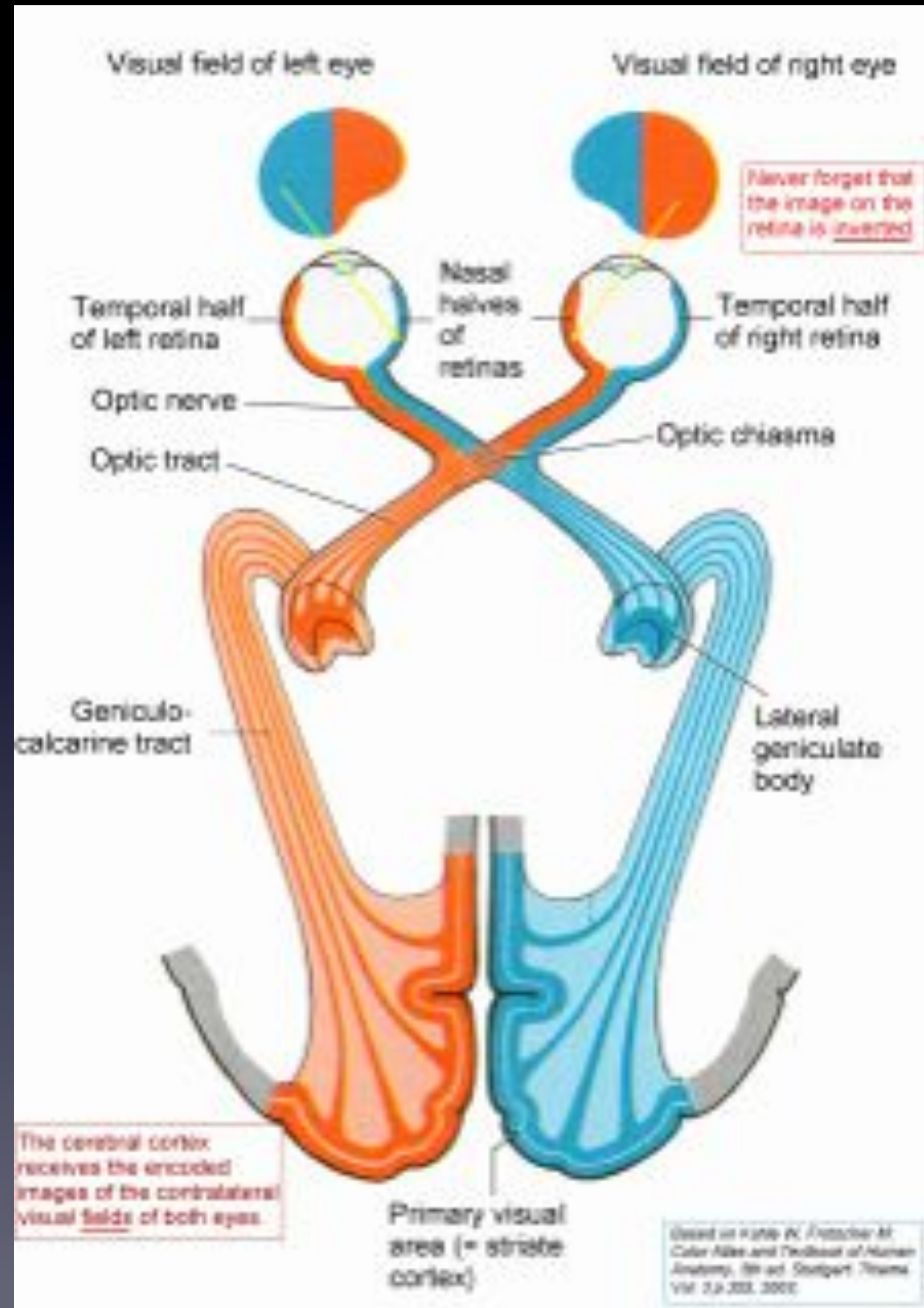
Confrontational field testing

Visual Pathways



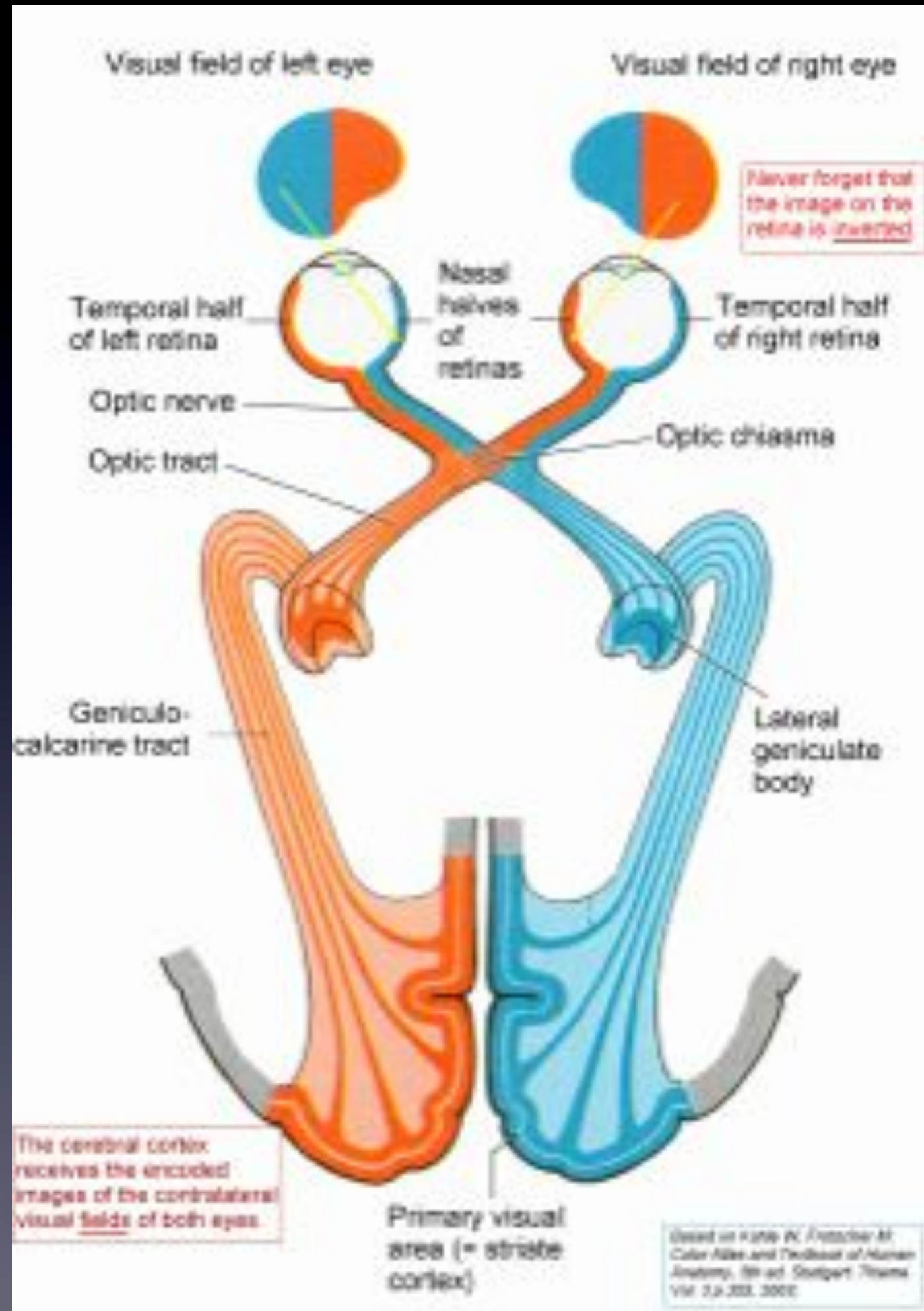
Visual Pathways

- Horizontal & vertical inversion on retina



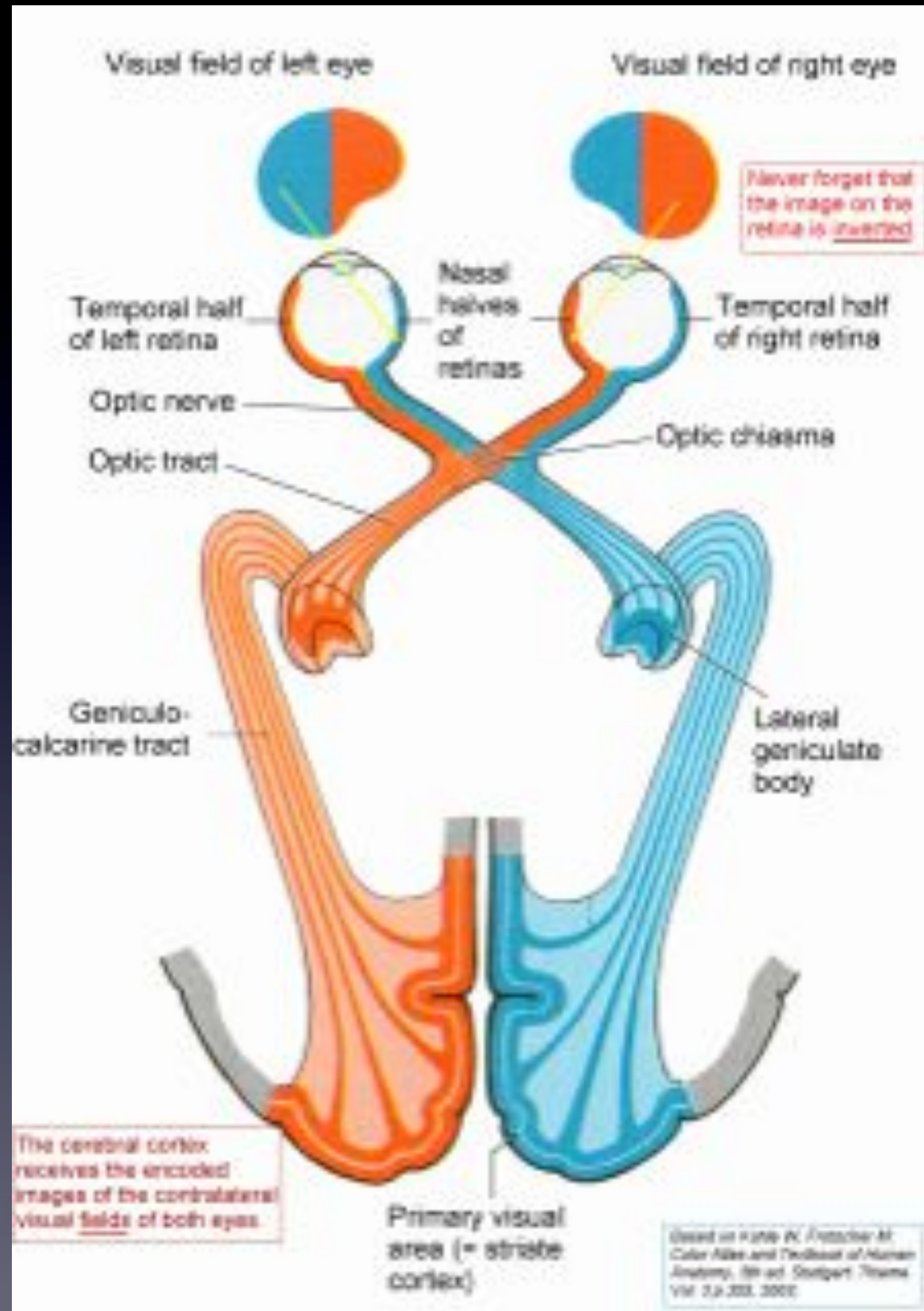
Visual Pathways

- Horizontal & vertical inversion on retina
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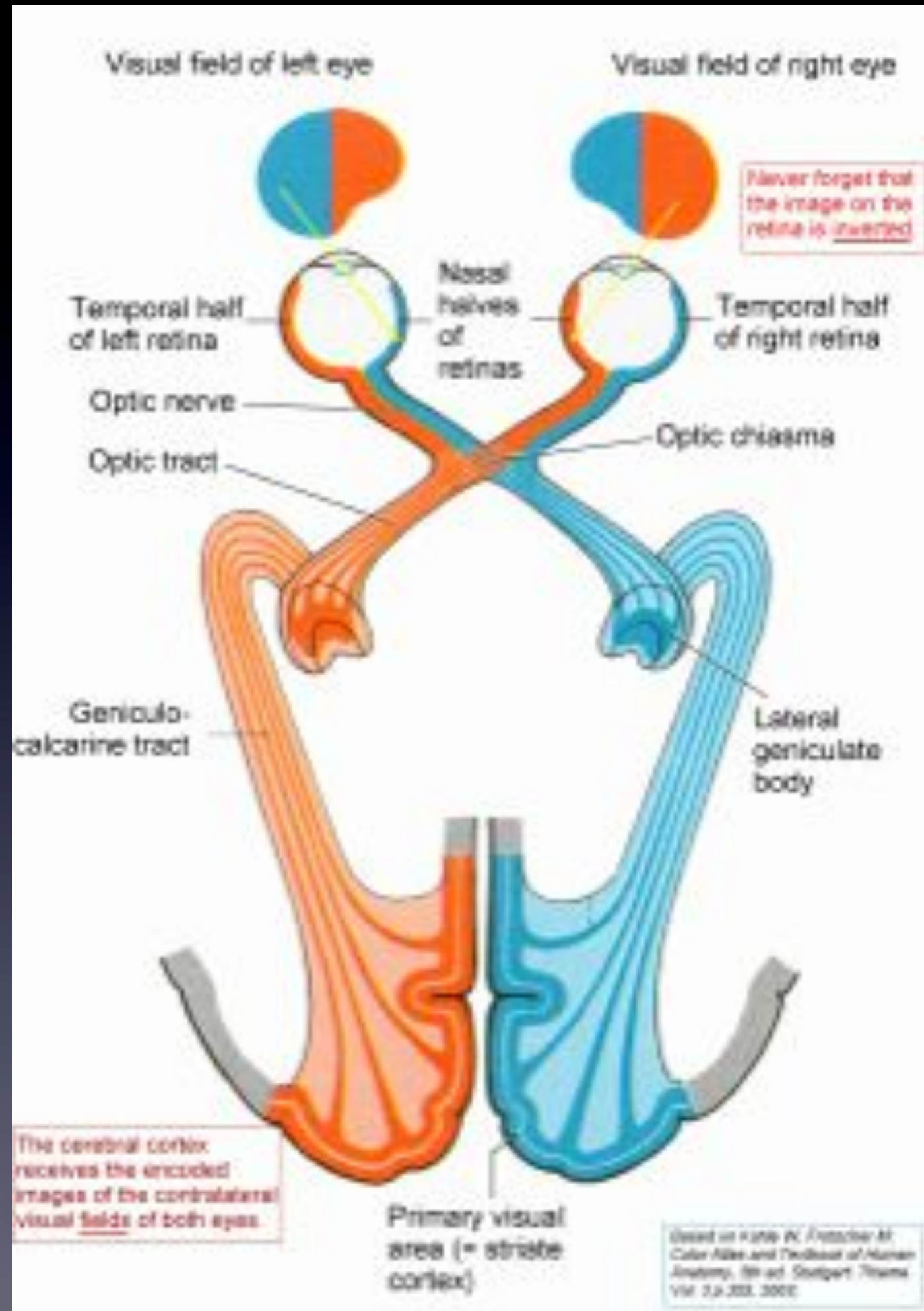
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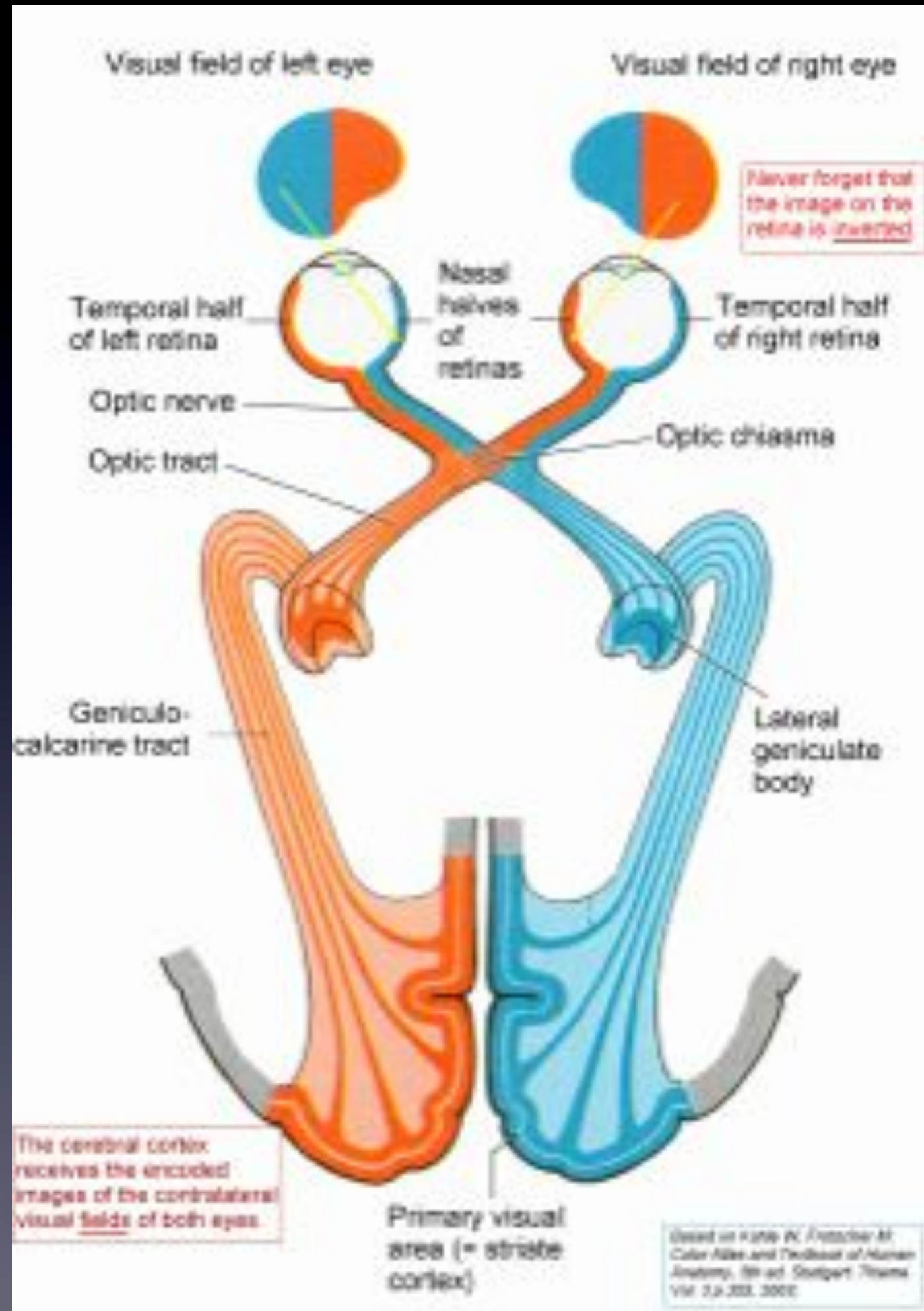
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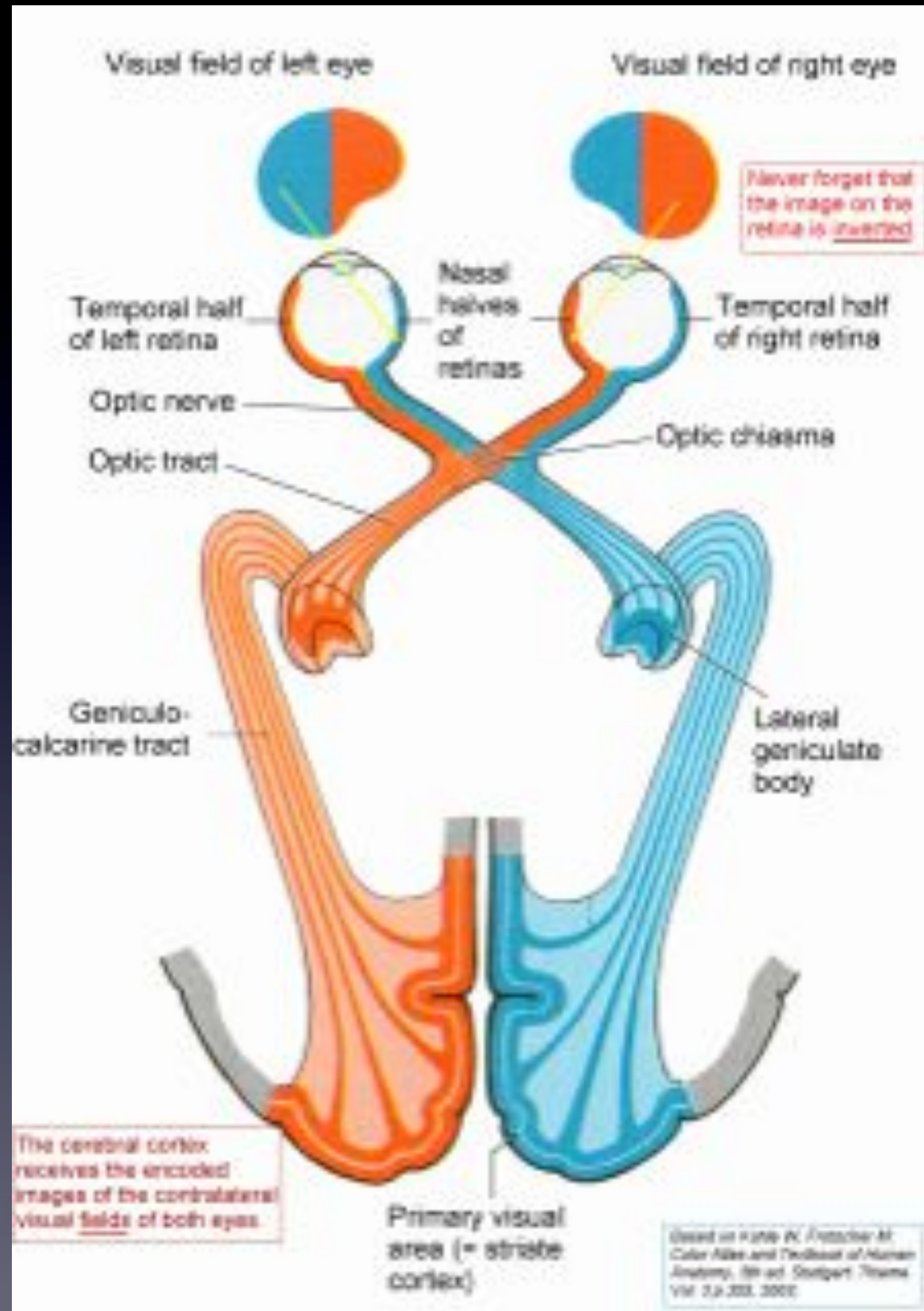
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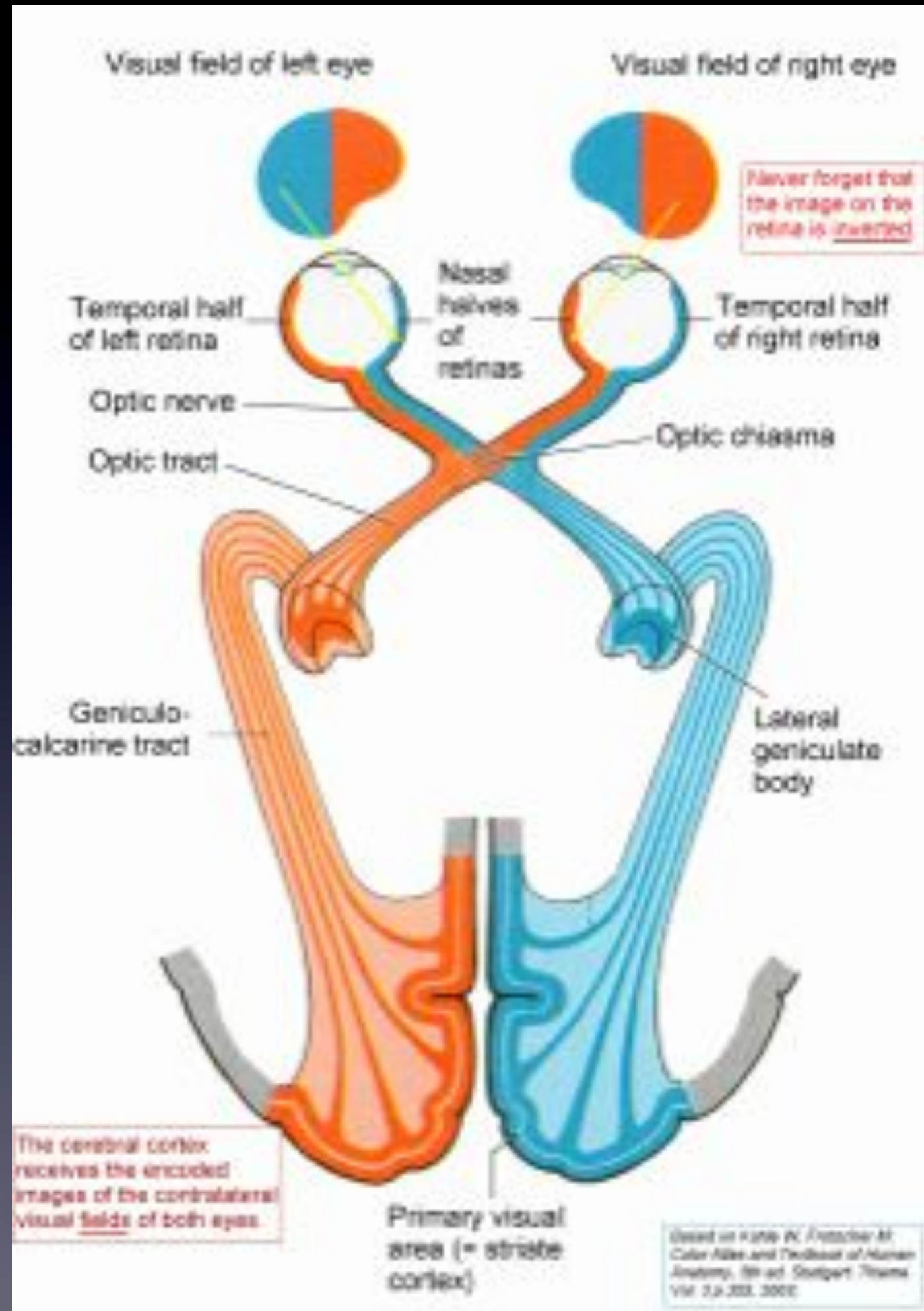
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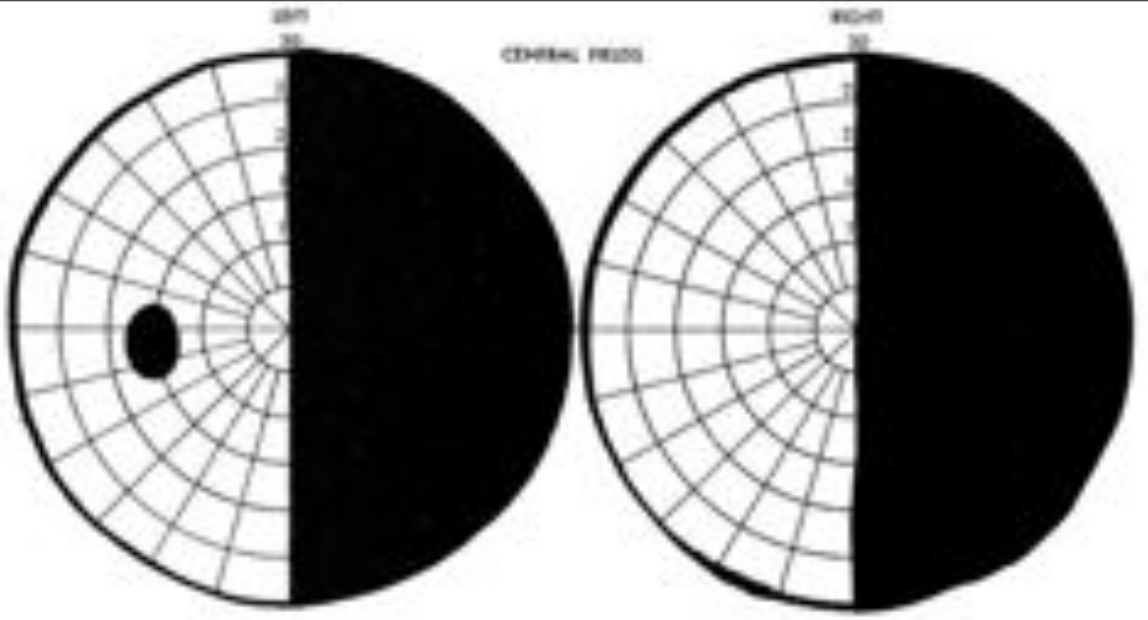
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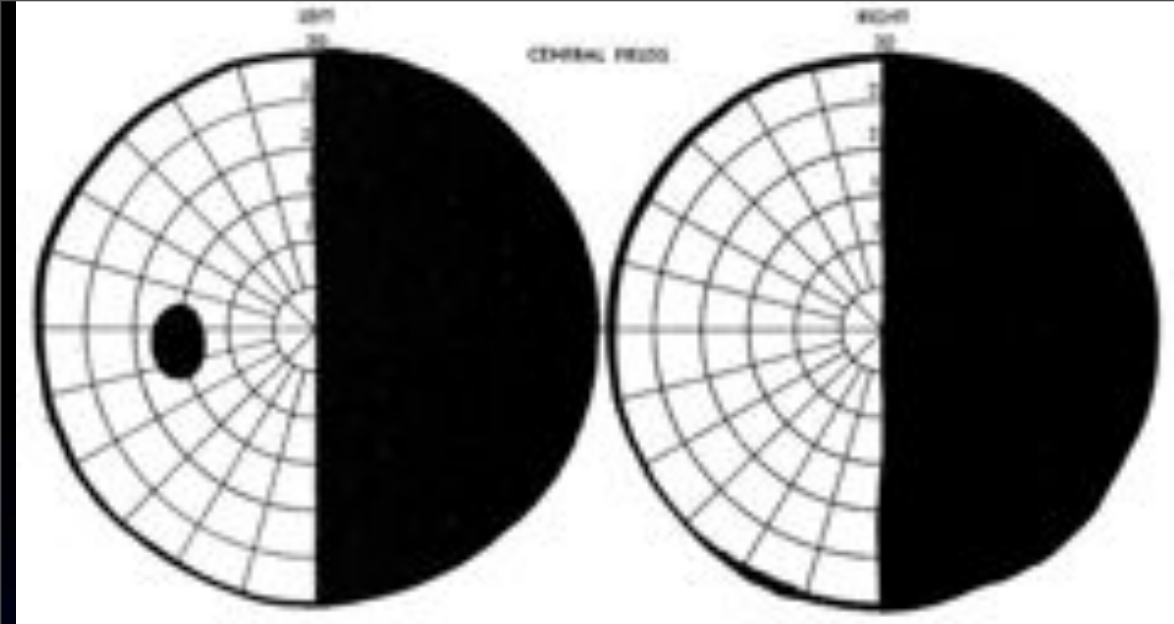
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 - high- low- high



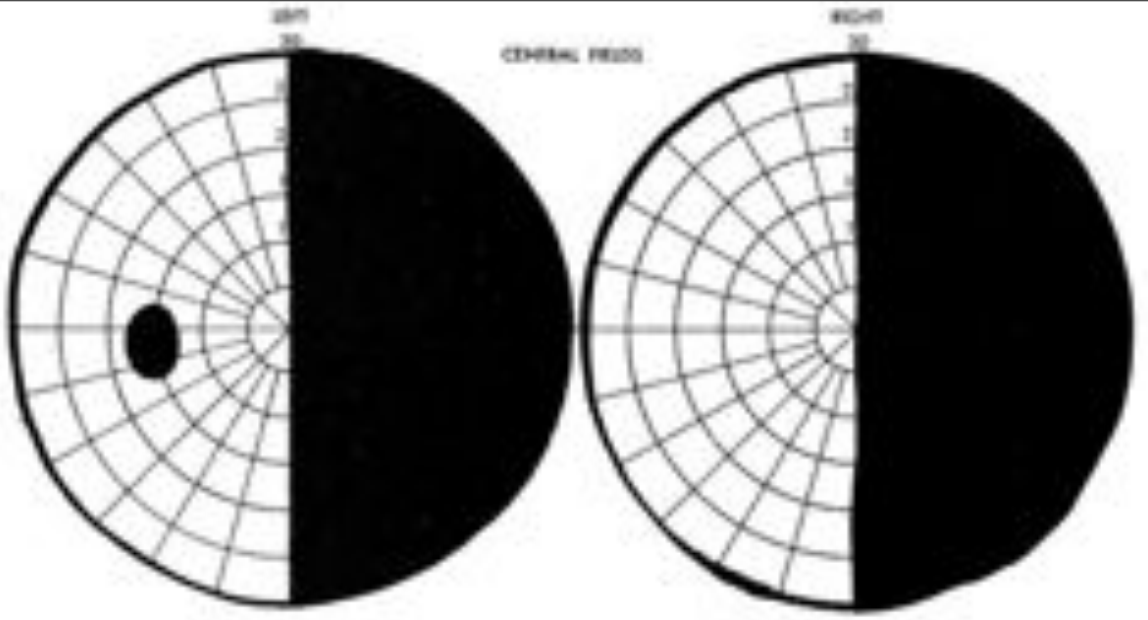
Visual Fields Examination

Indications

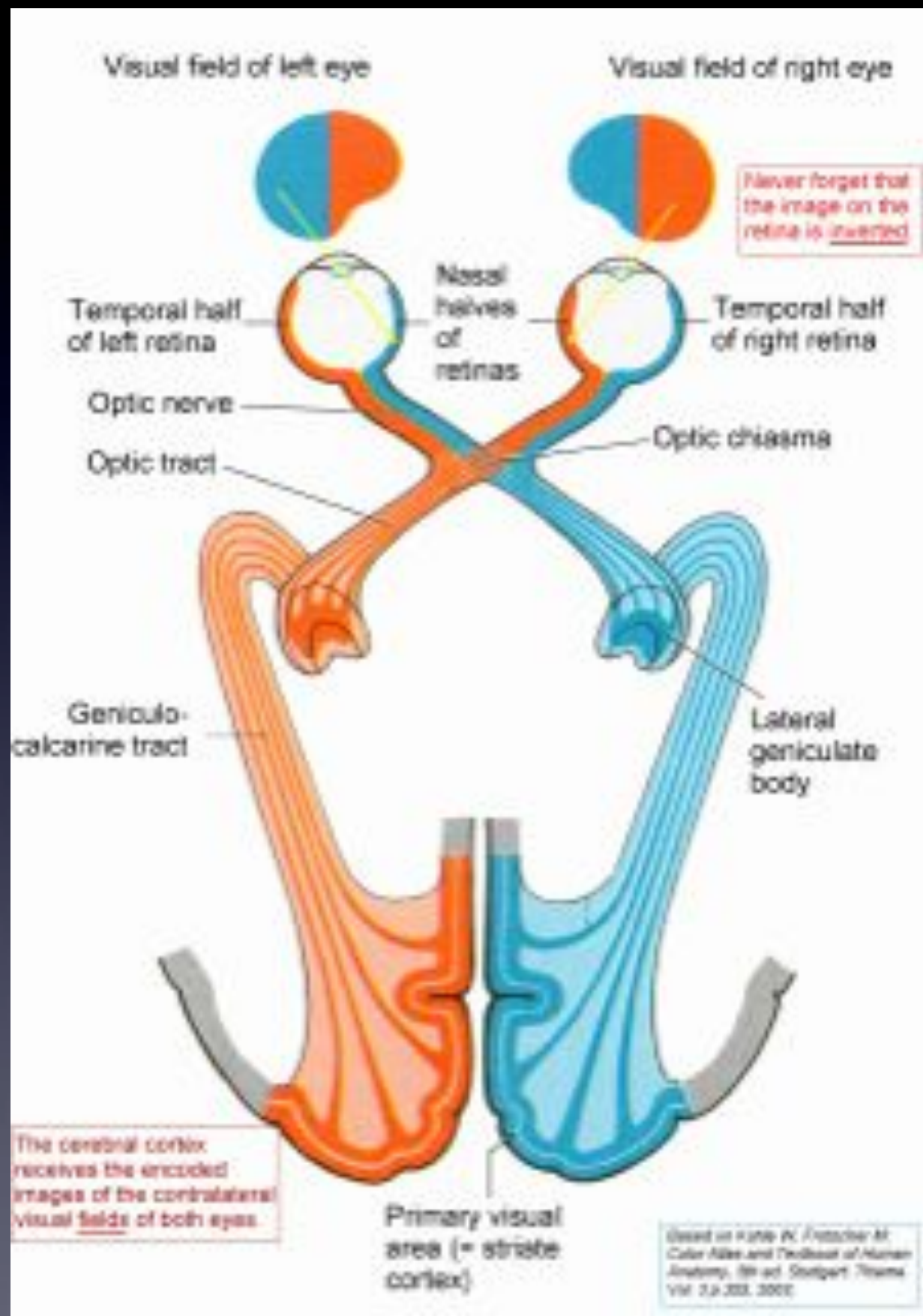


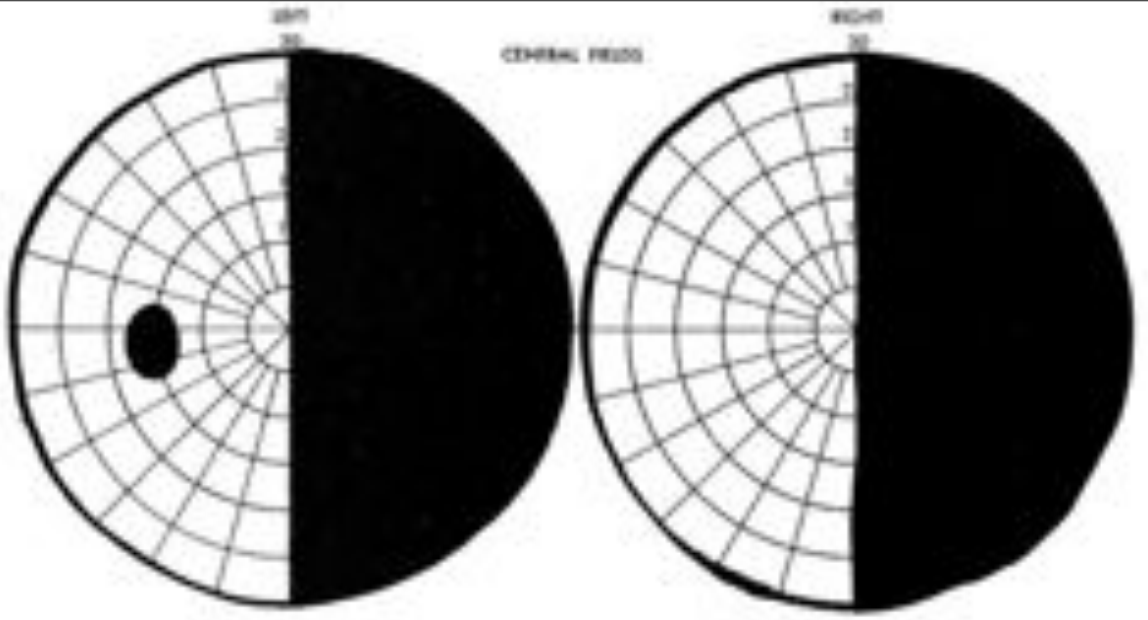


Congruous Homonymous Hemianopia

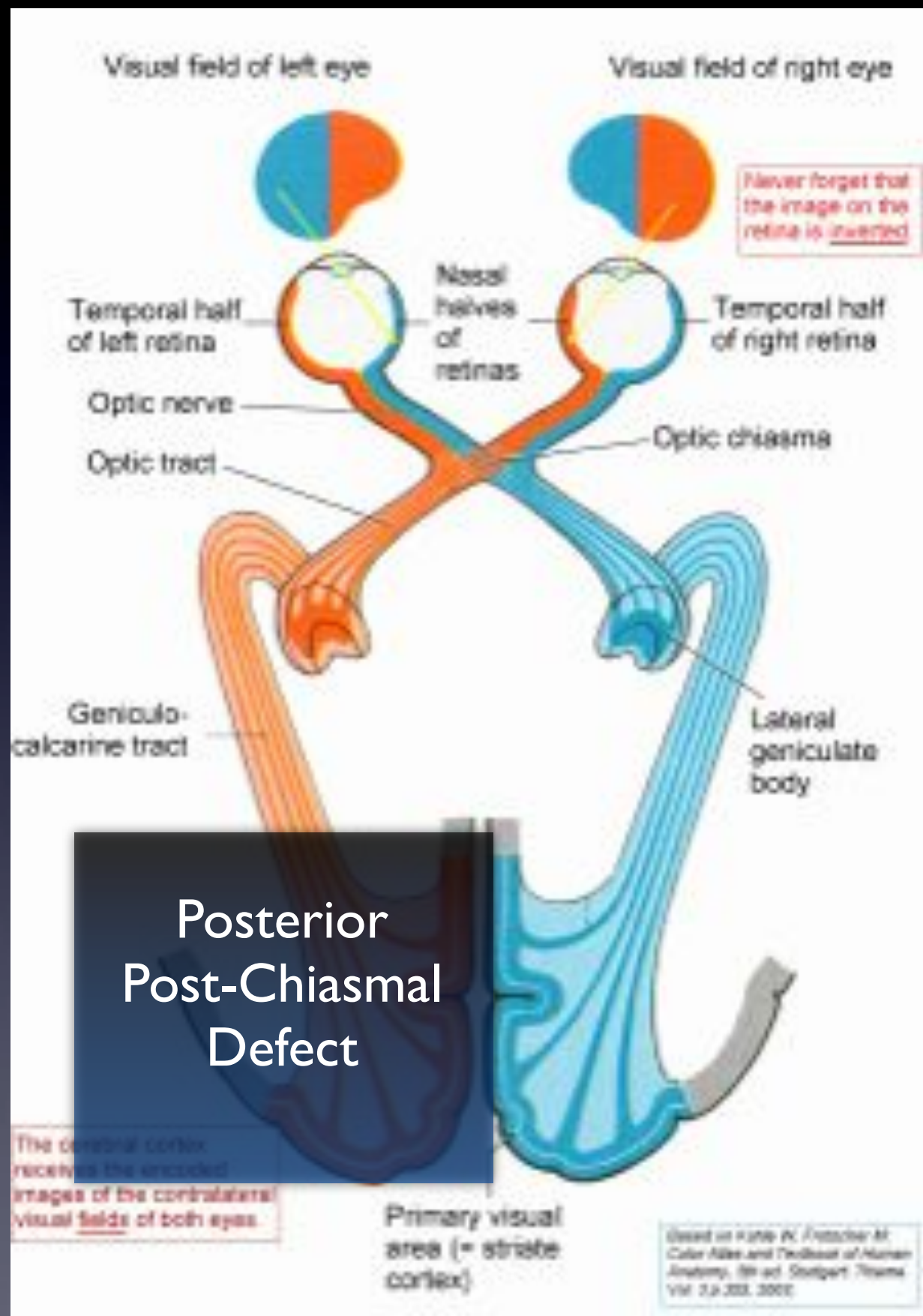


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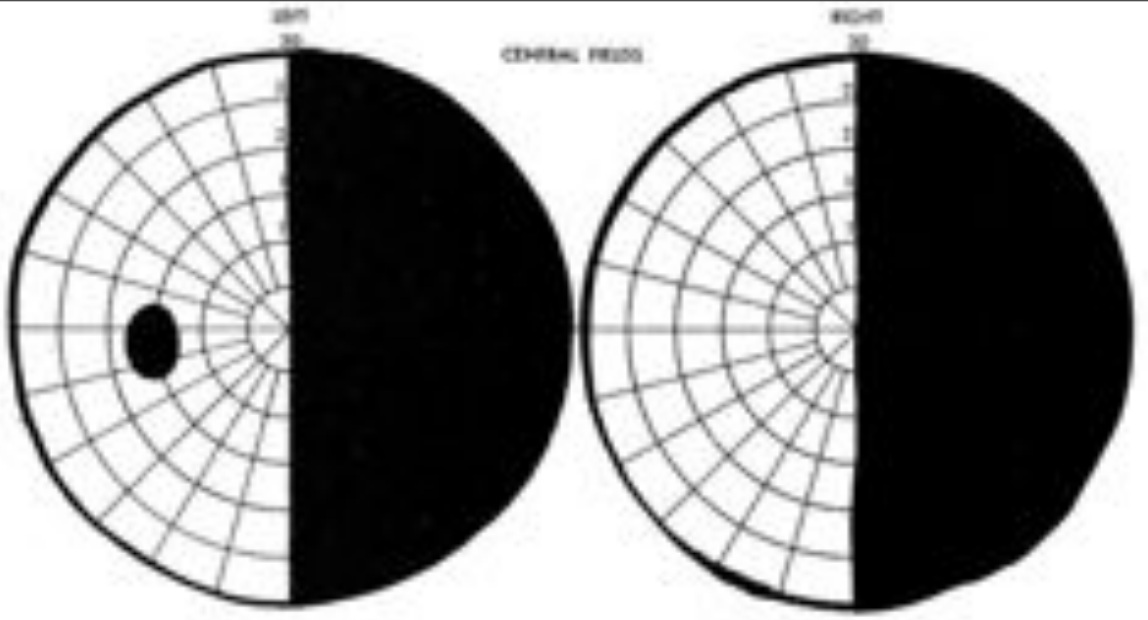


Posterior
Post-Chiasmal
Defect

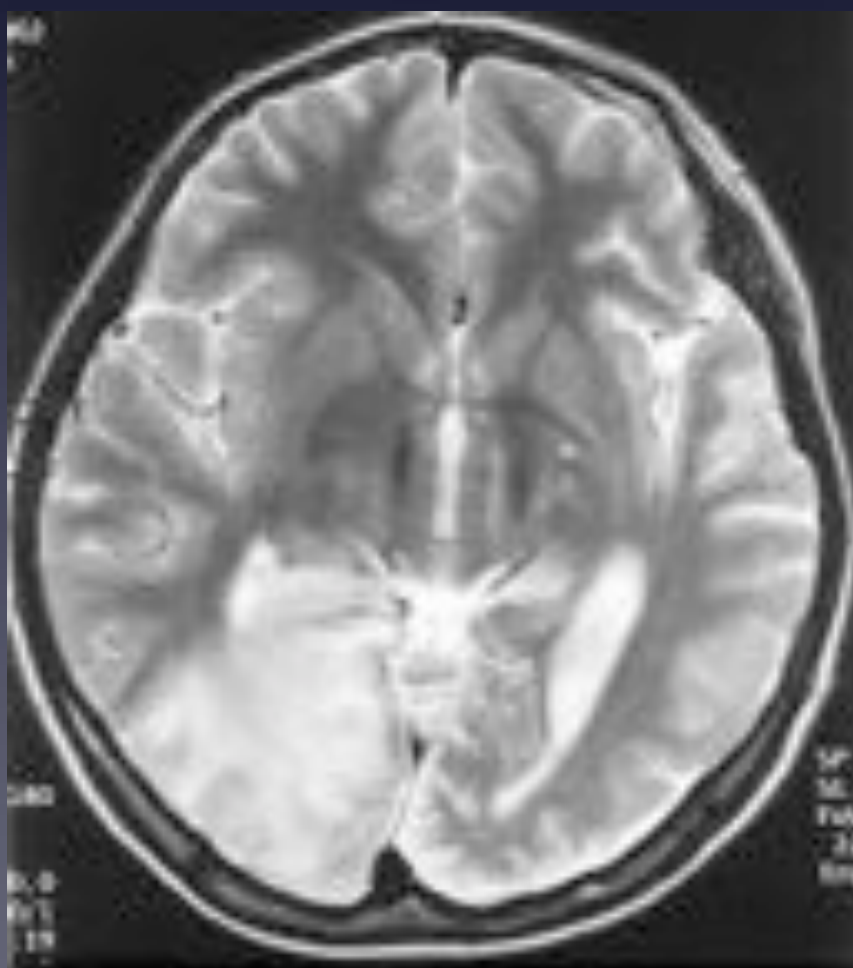
The cerebral cortex receives the encoded images of the contralateral visual fields of both eyes.

Primary visual area (= striate cortex)

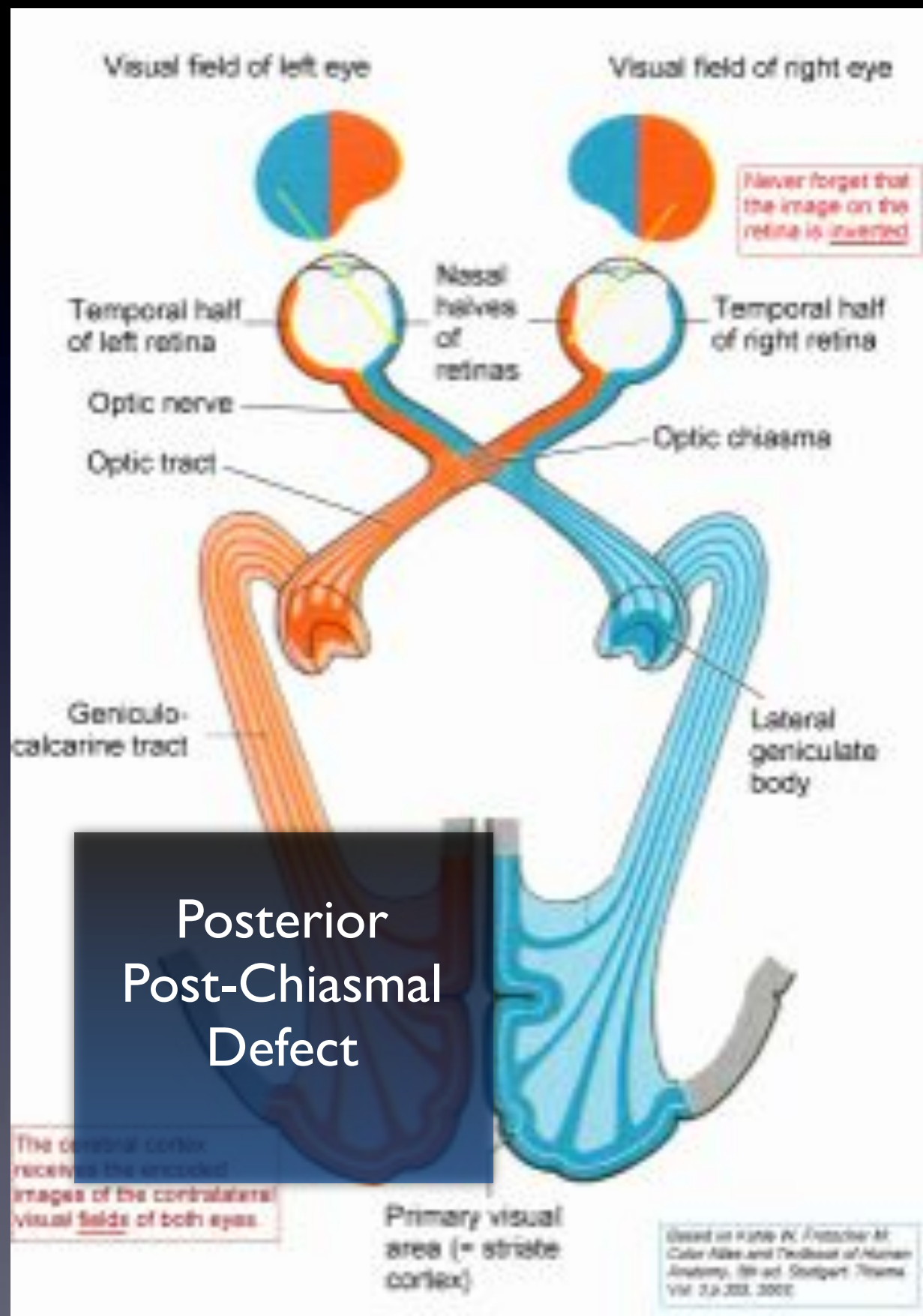
Based on Figure 14, Fletcher & Collier Atlas and Textbook of Human Anatomy, 8th ed. Churchill Livingstone, Vol. 1, 2003, 2002.

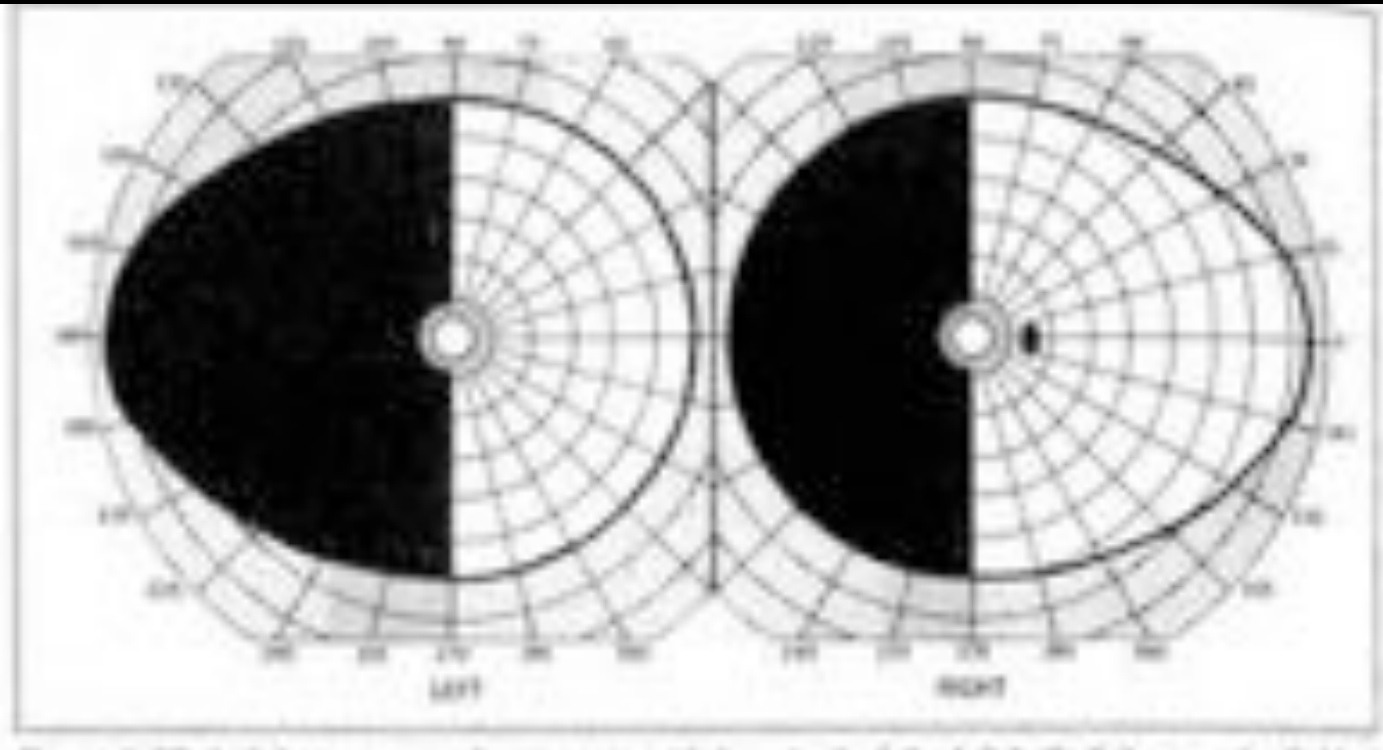


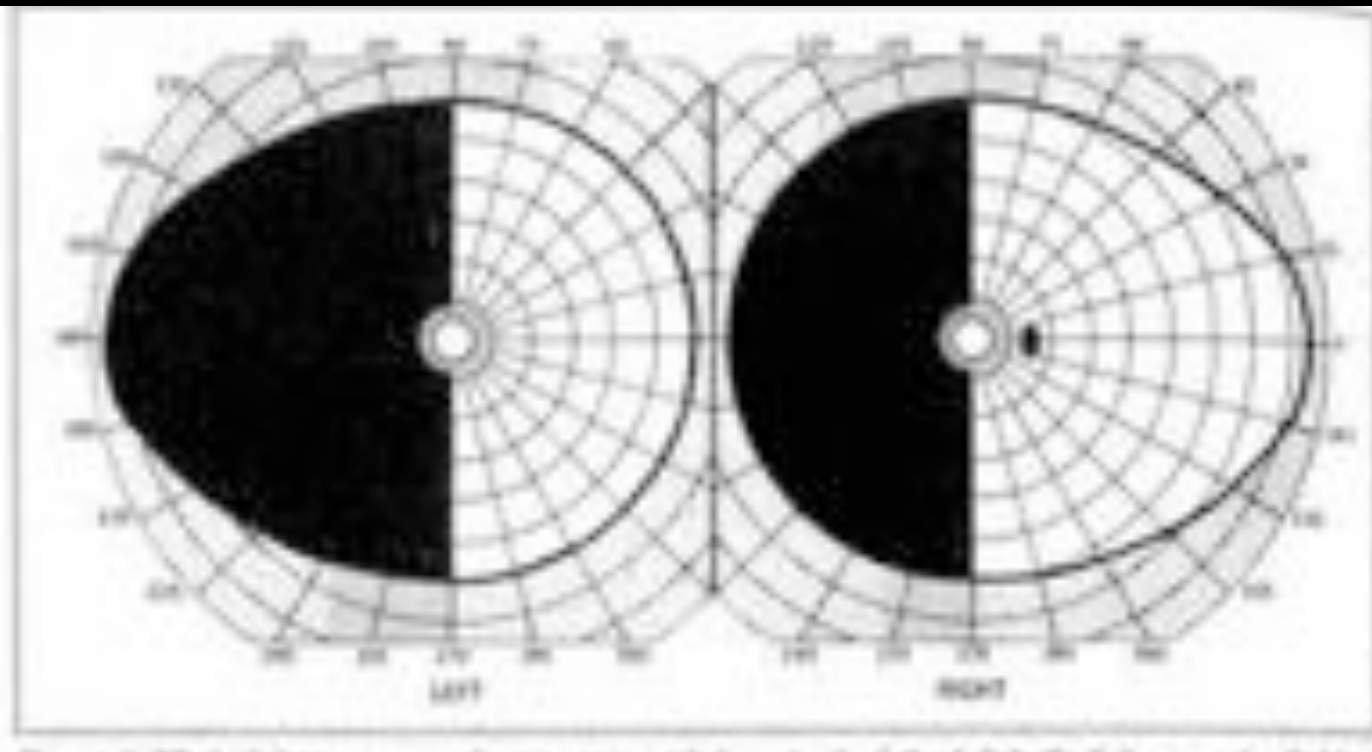
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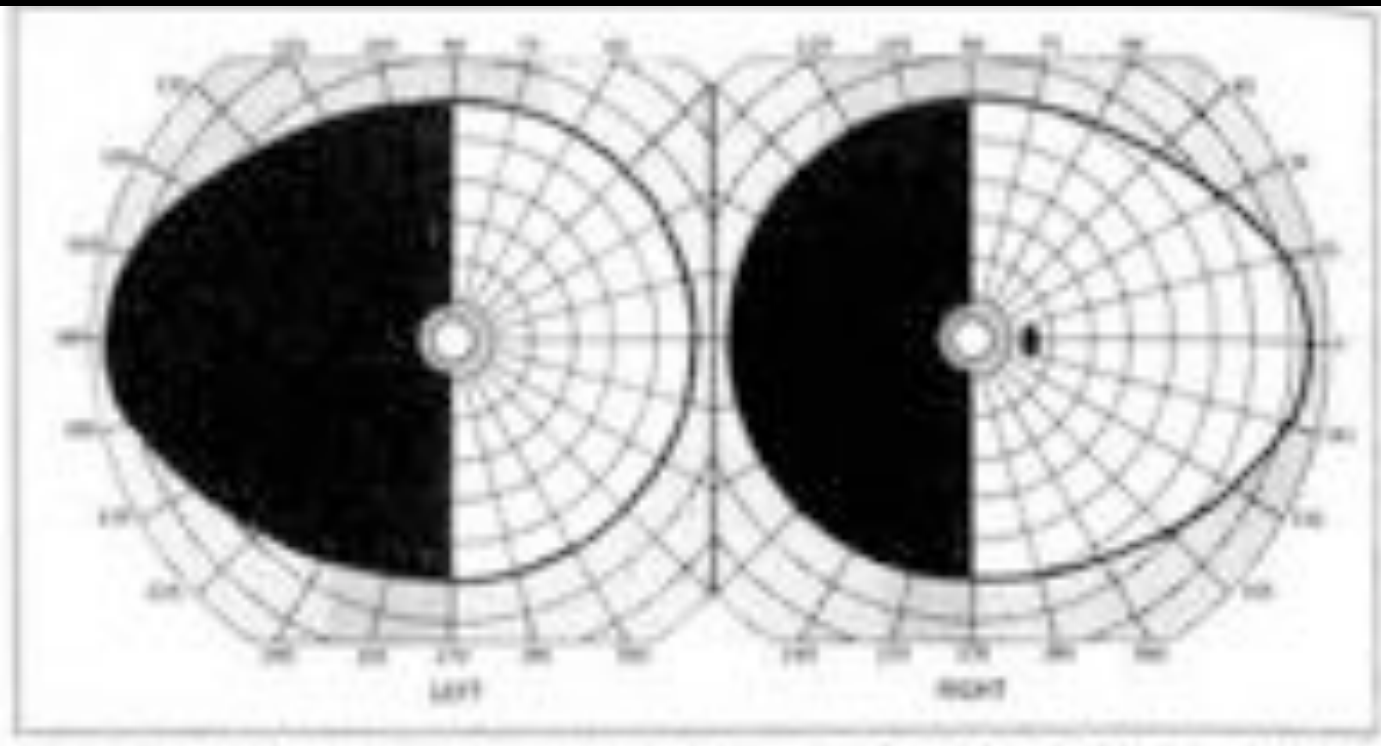
PCA CVA



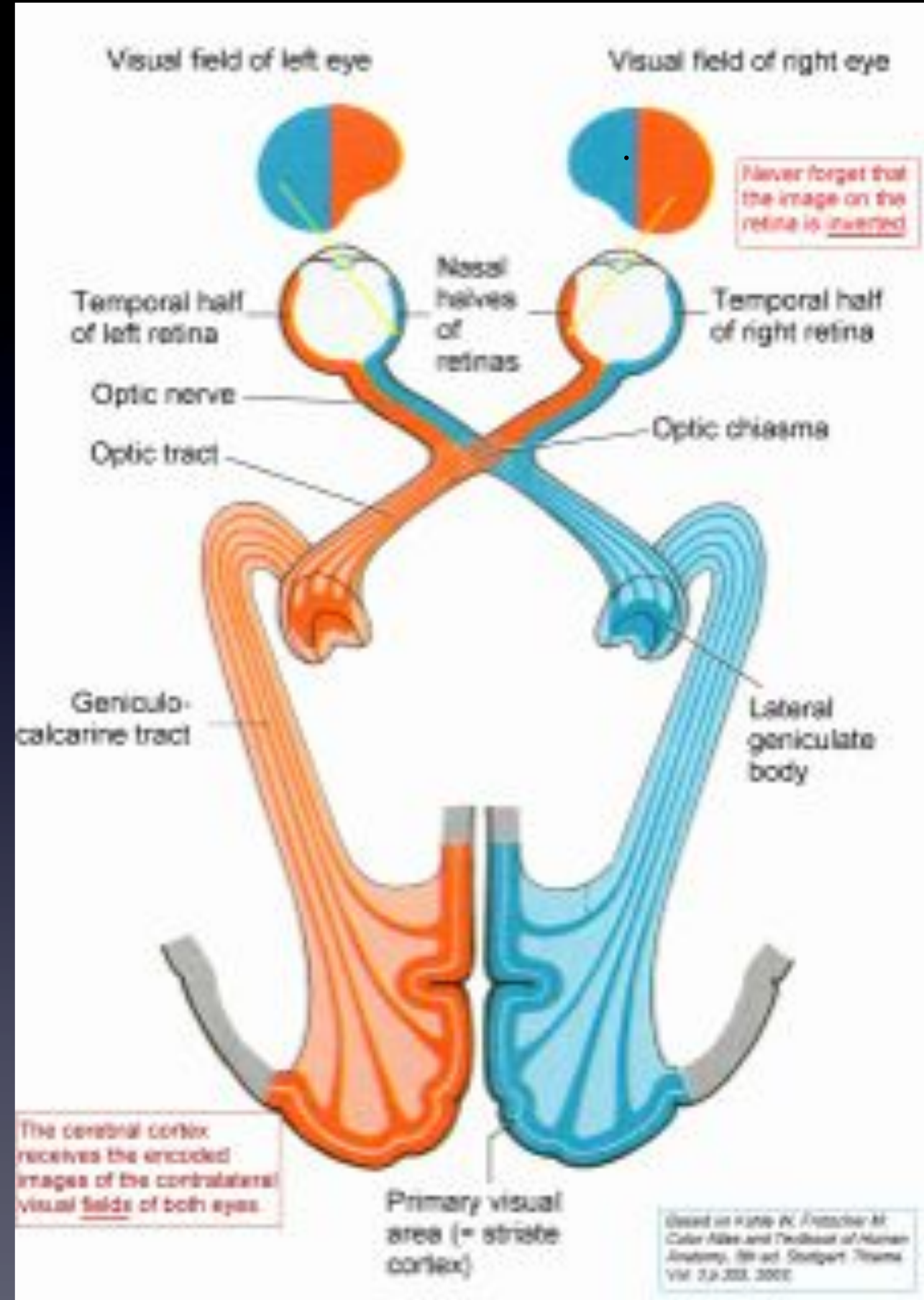


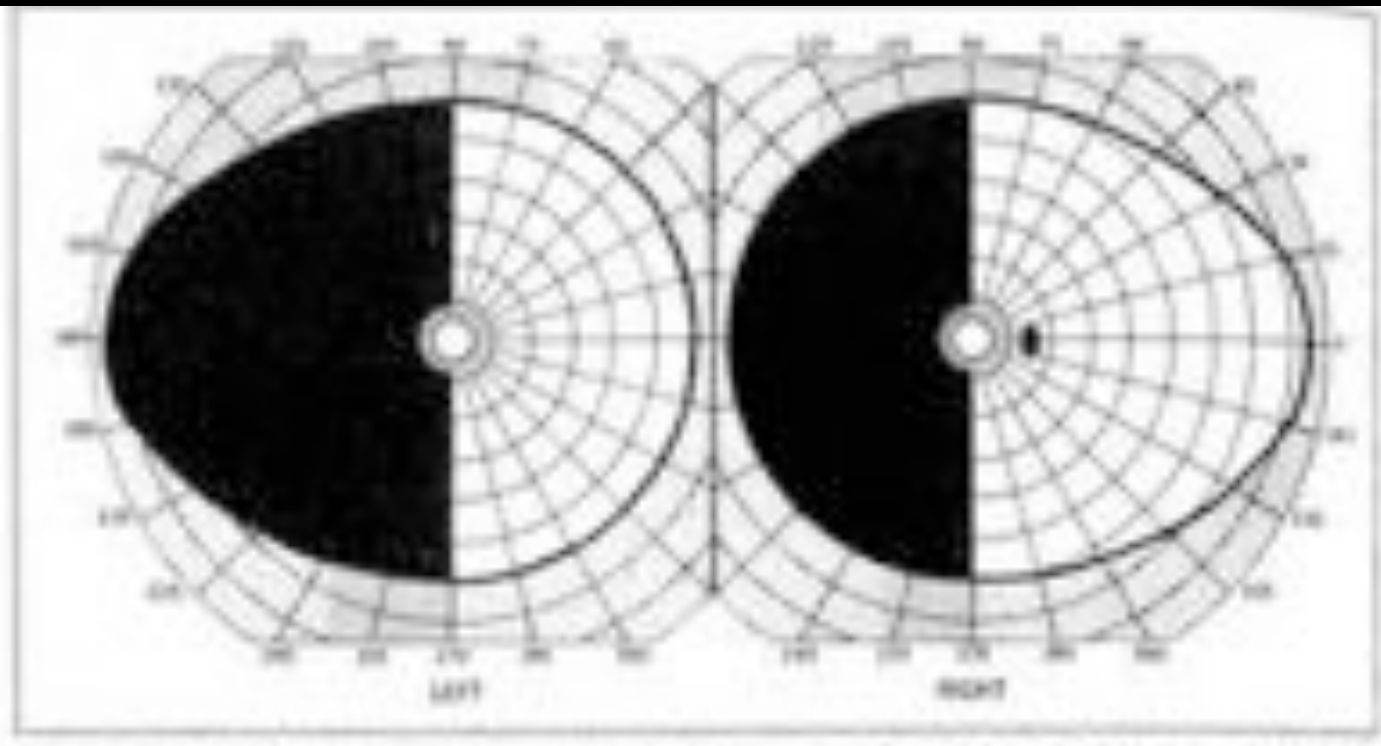


Congruous Homonymous
Hemianopia with macular sparing

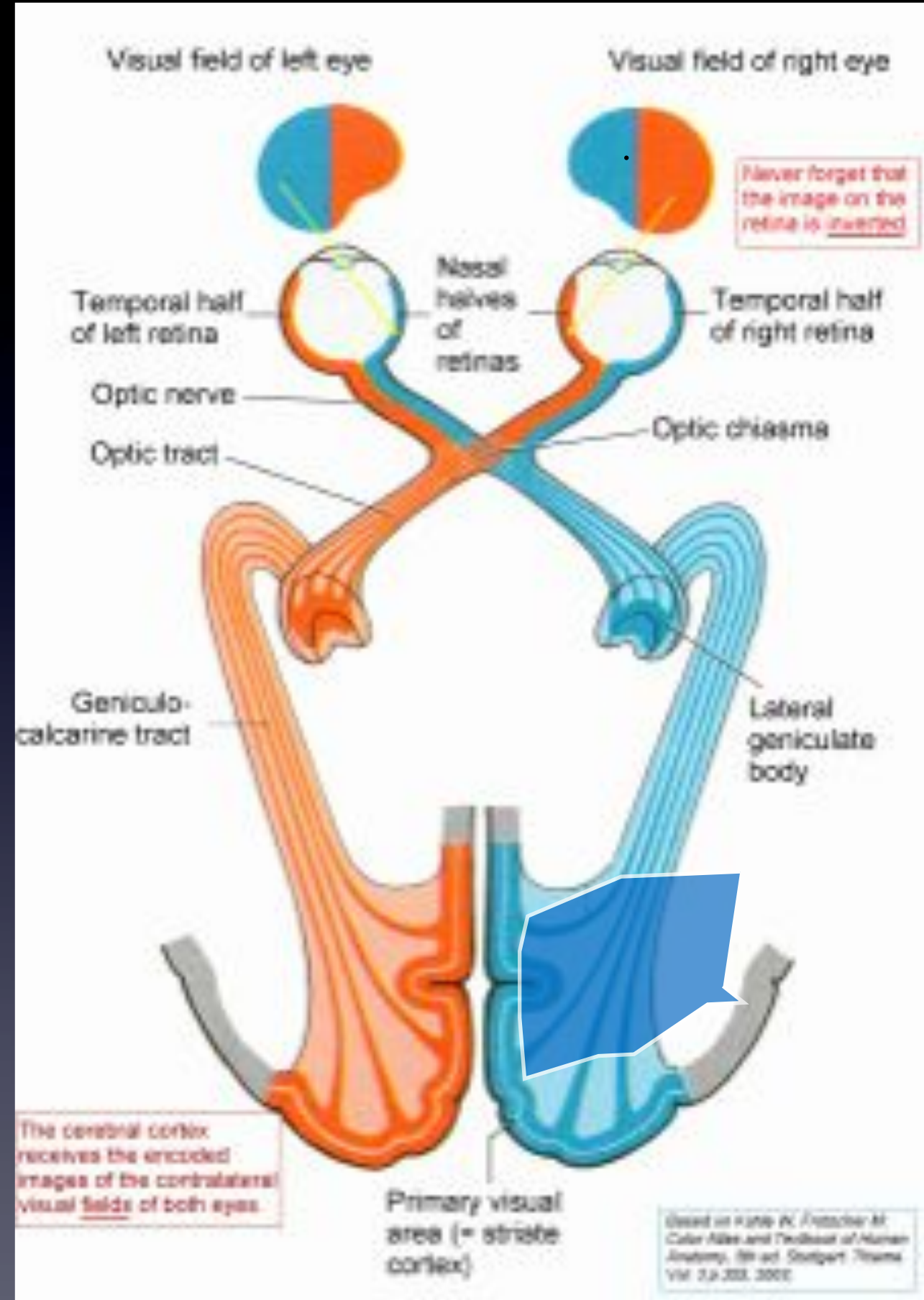


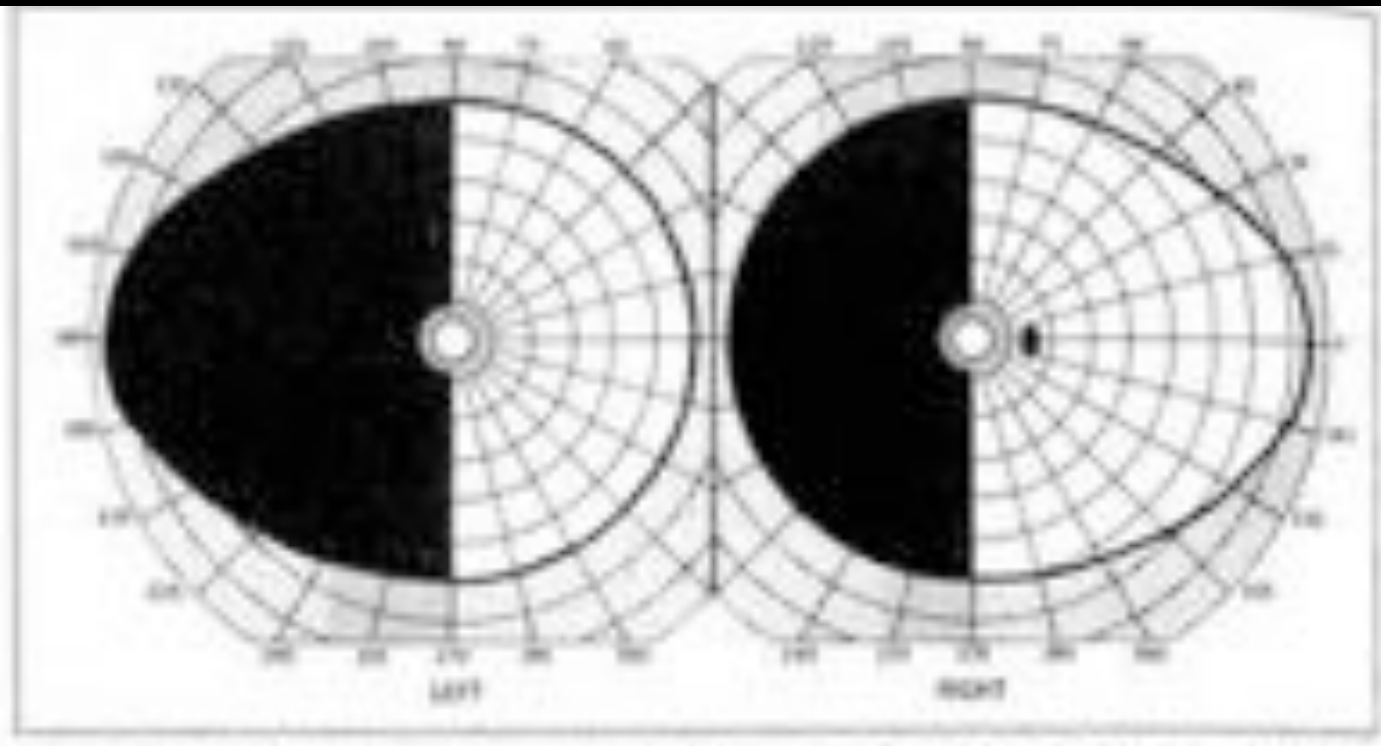
Congruous Homonymous Hemianopia with macular sparing





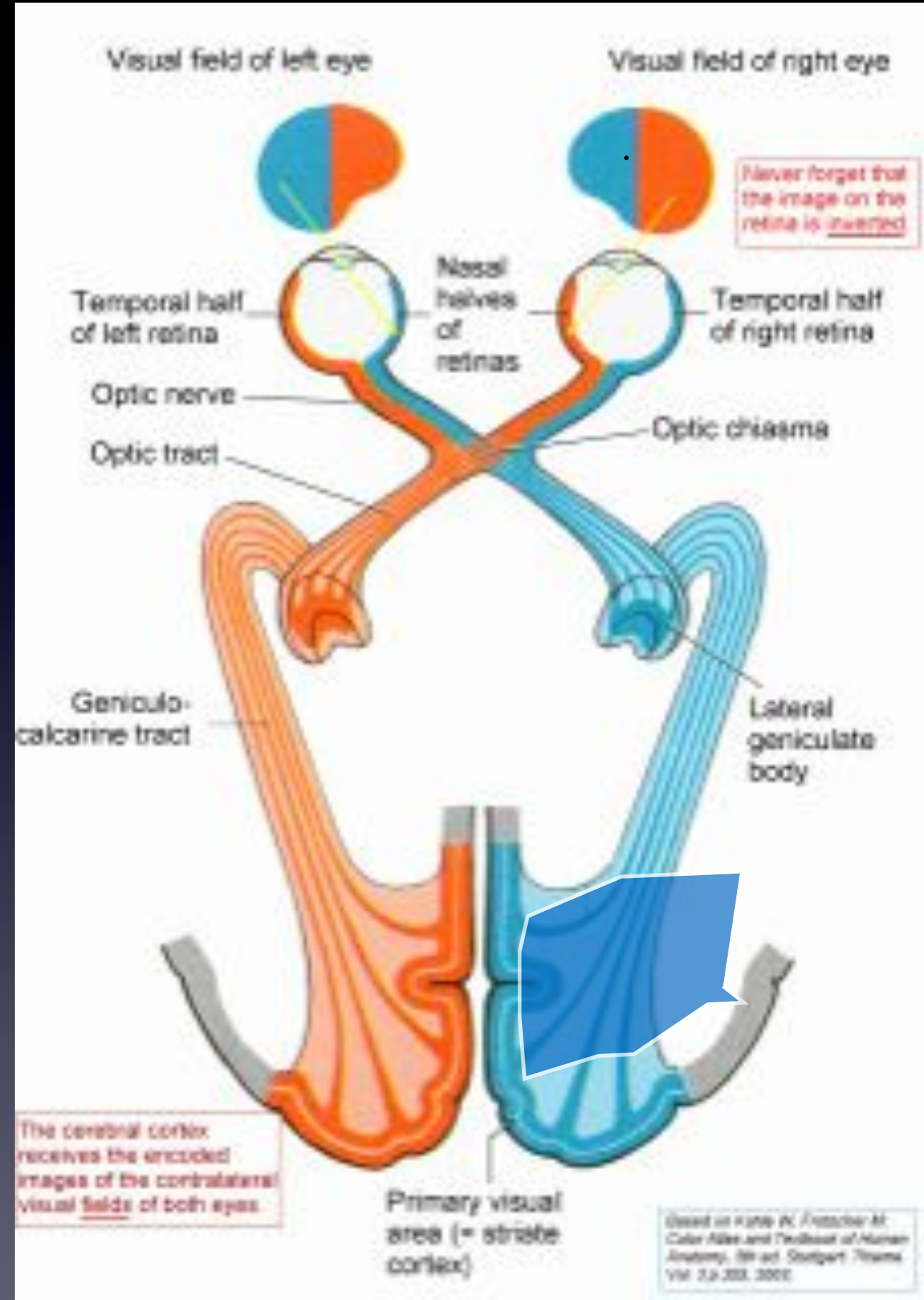
Congruous Homonymous Hemianopia with macular sparing

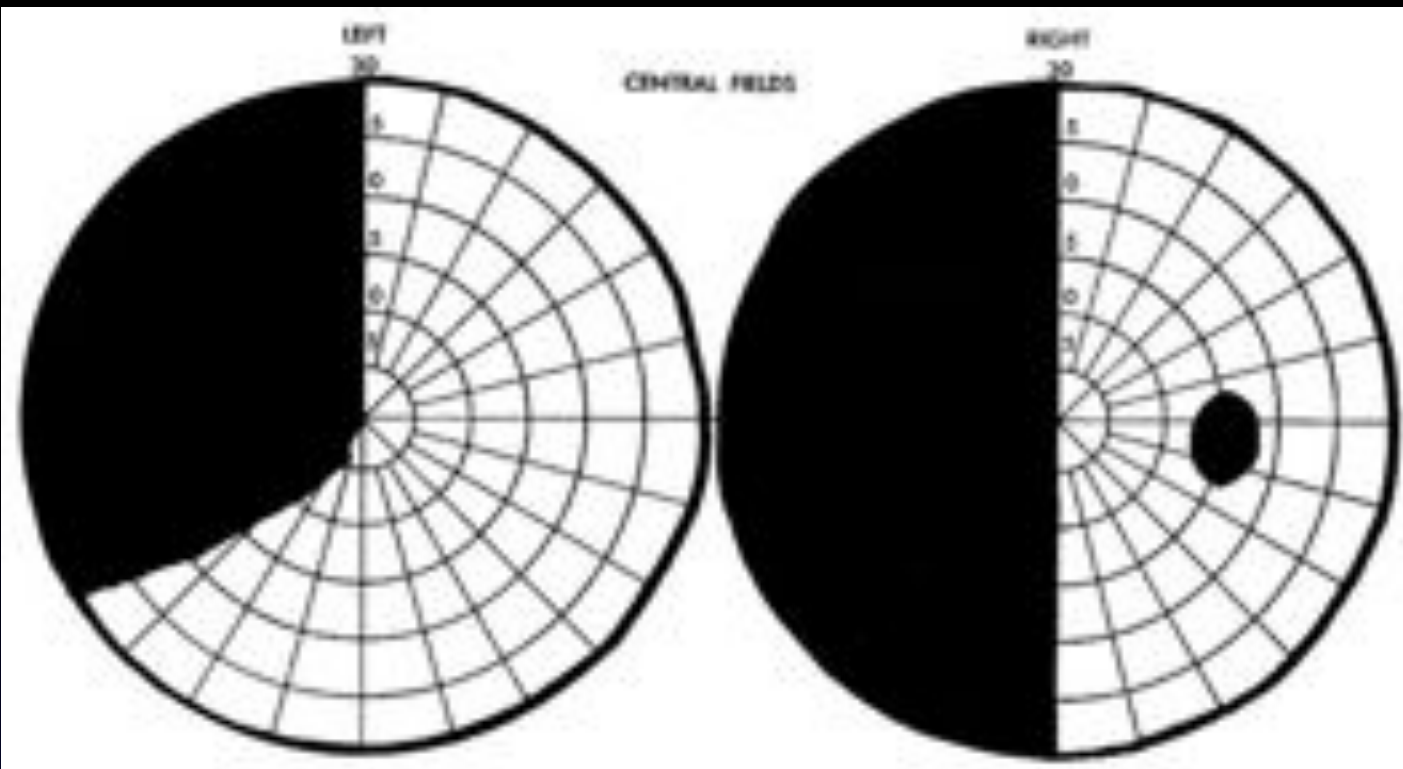


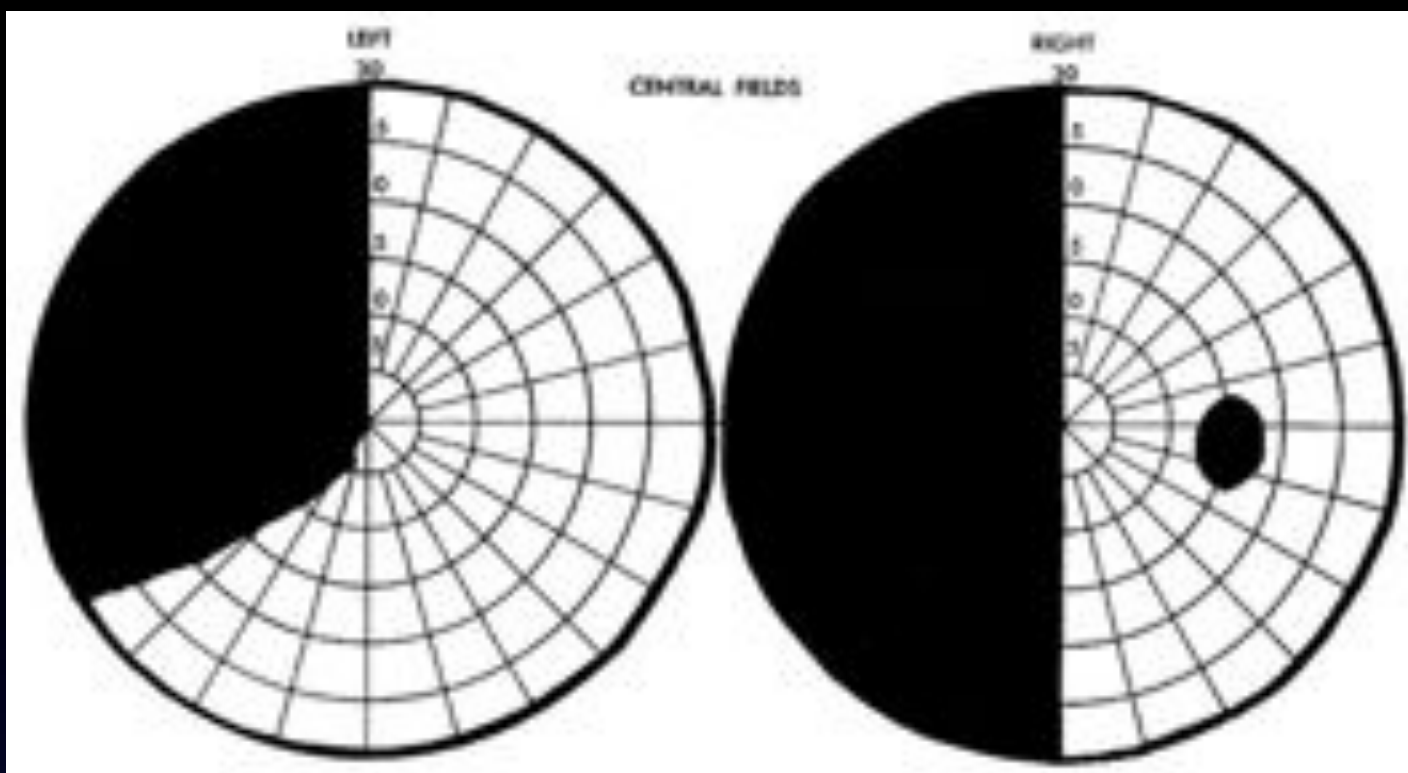


Congruous Homonymous Hemianopia with macular sparing

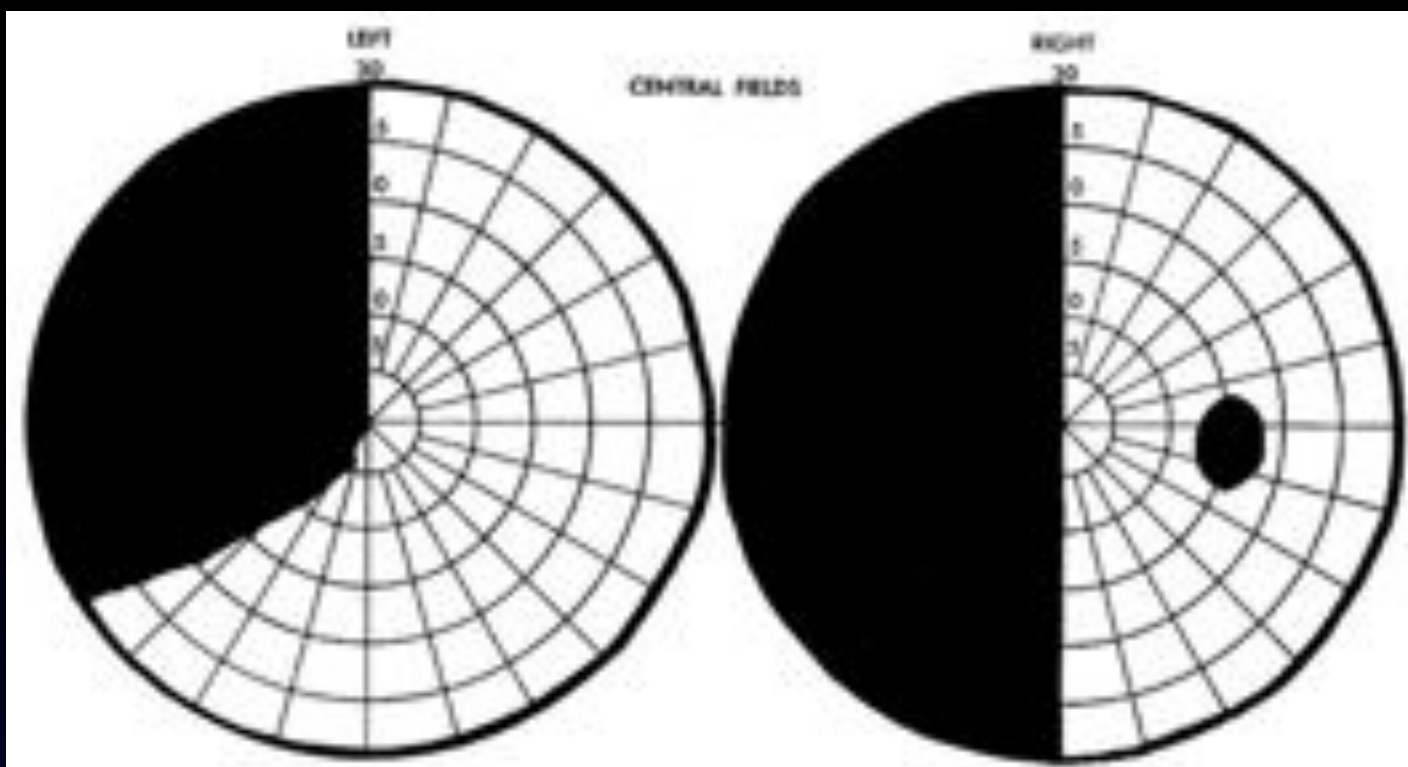
PCA with patent collateral MCA supply to macular area of Primary Visual Cortex



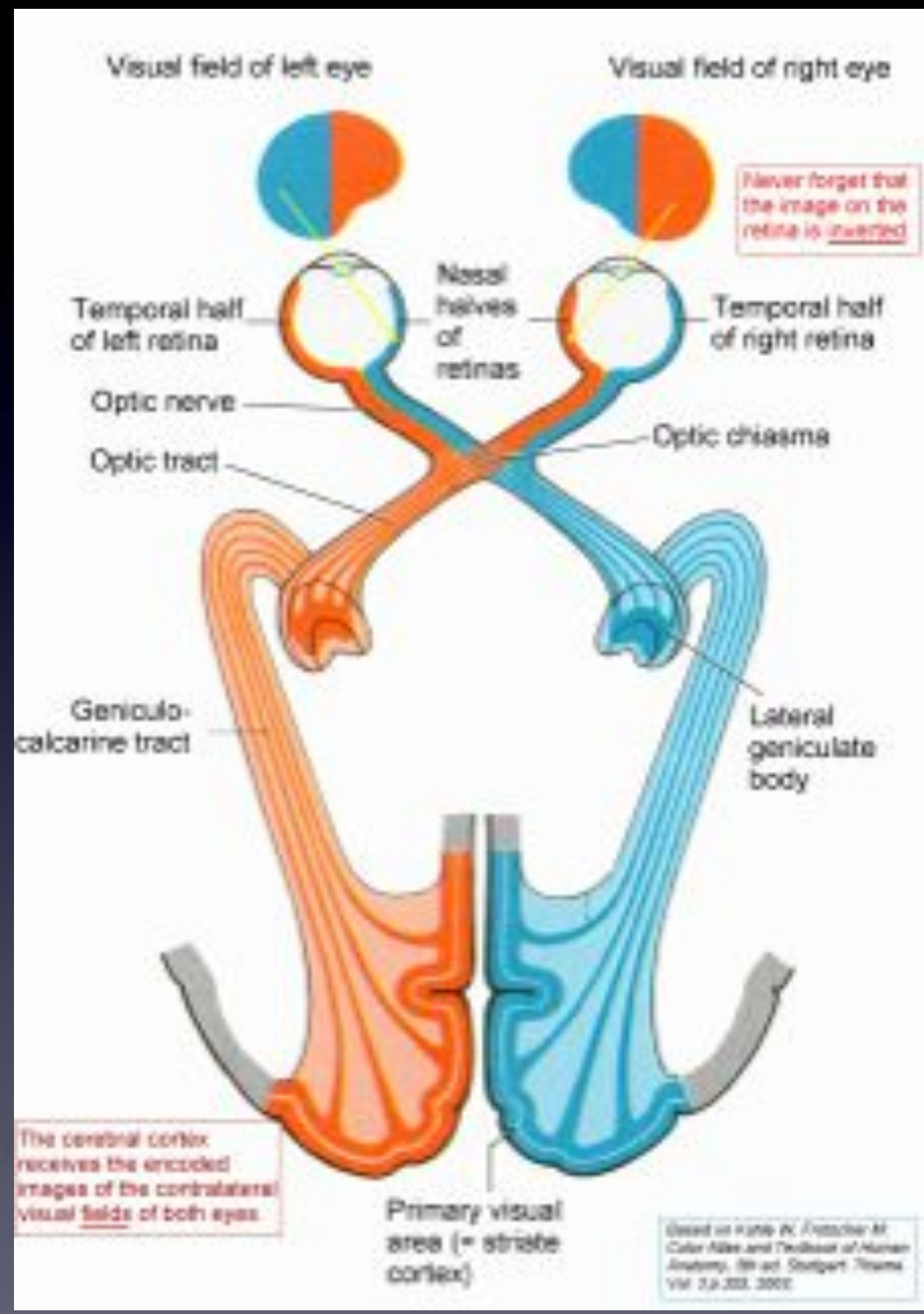


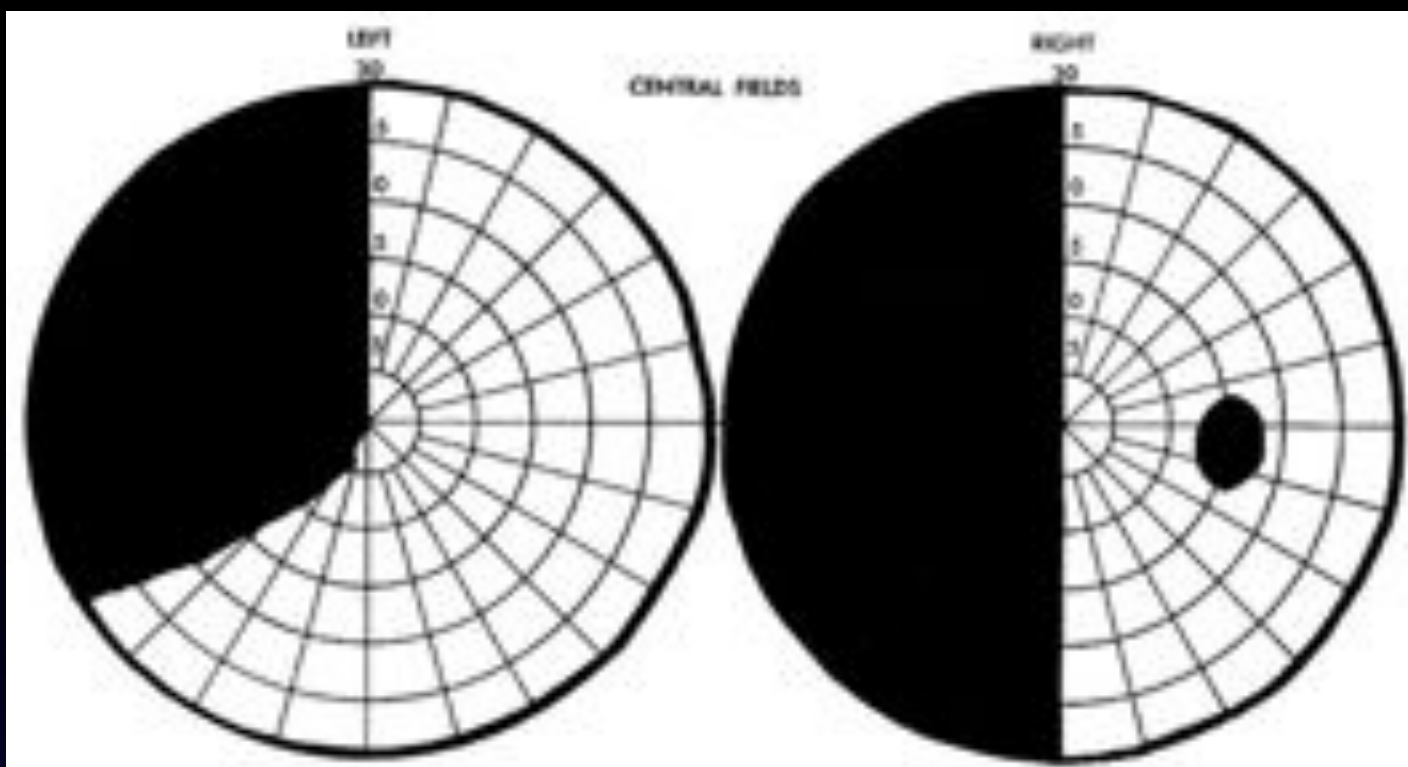


Incongruous Homonymous hemianopia

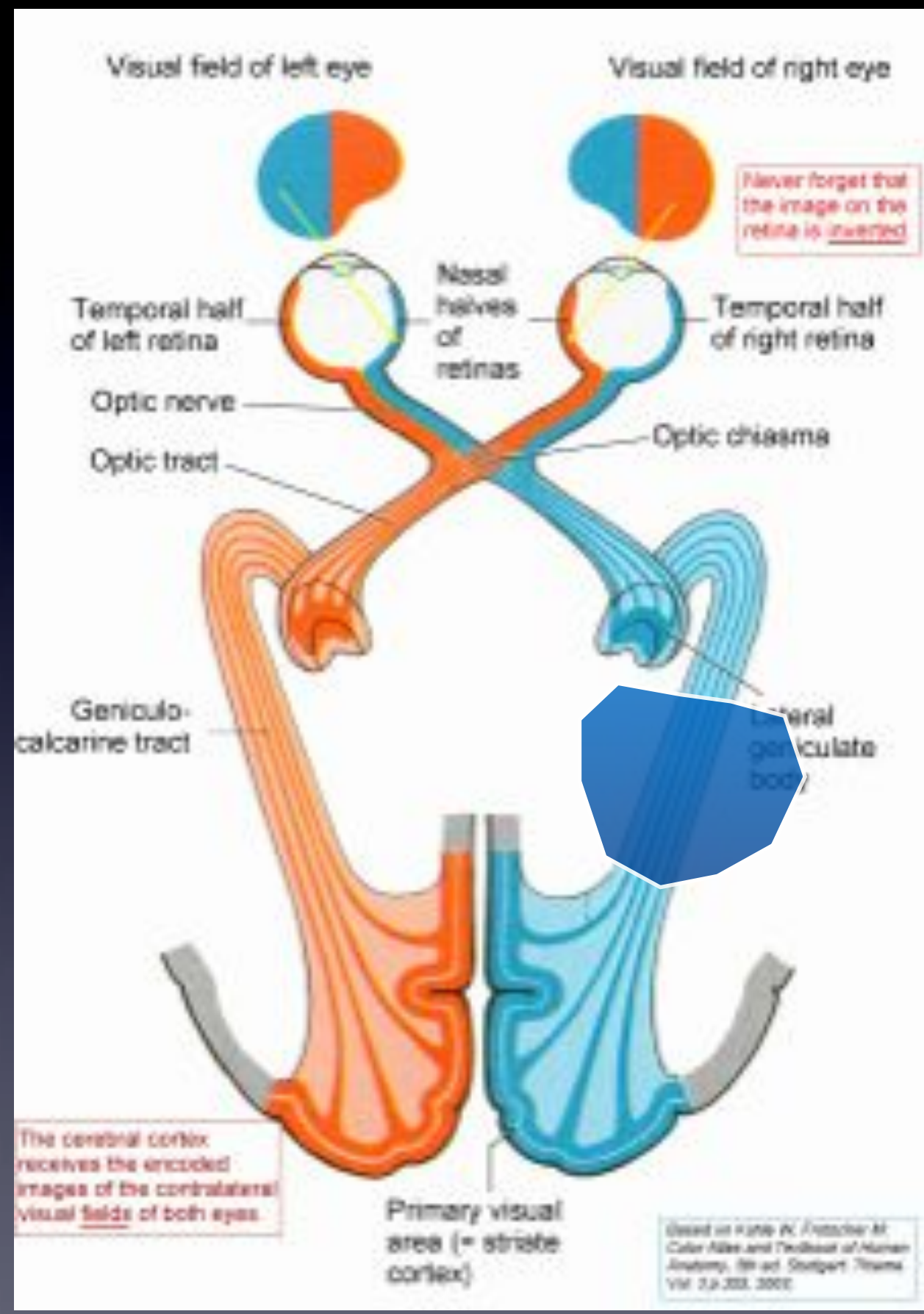


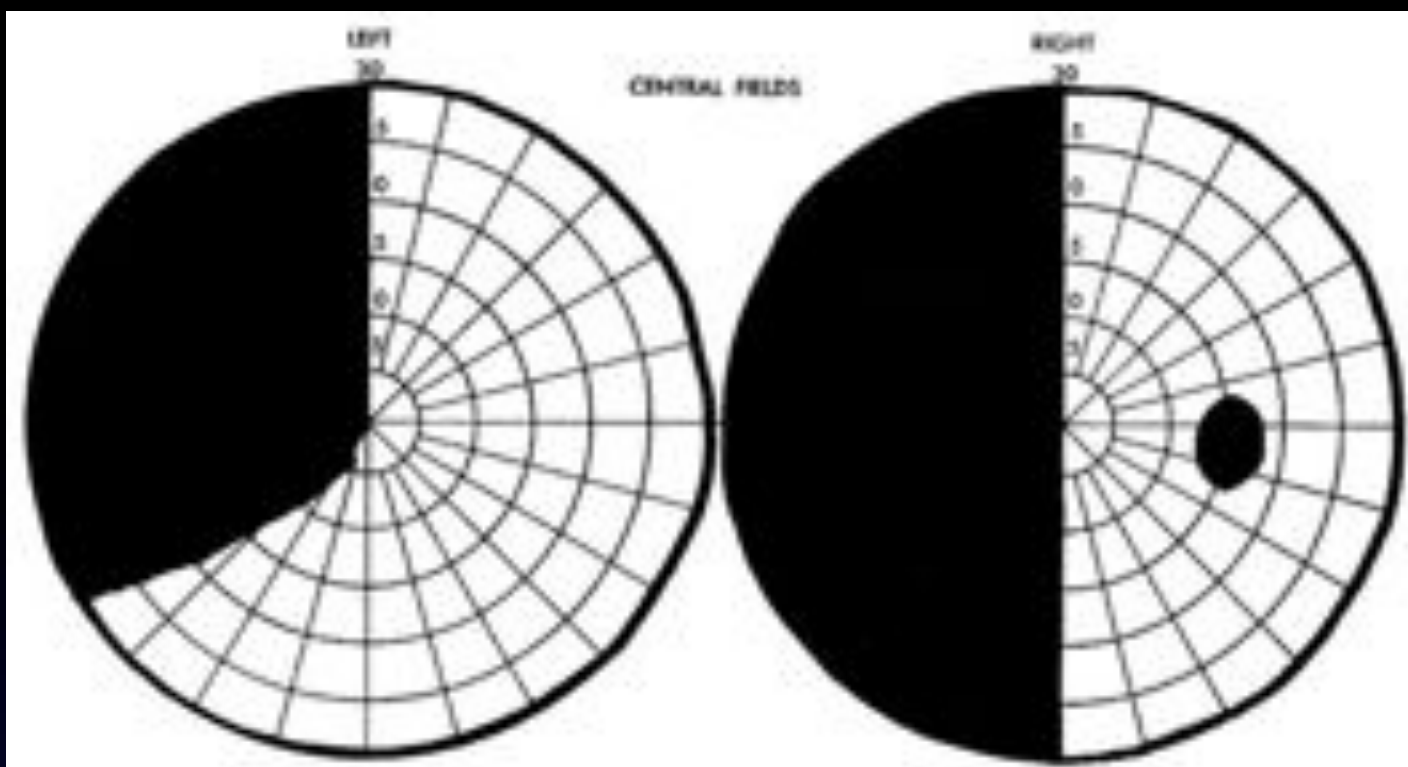
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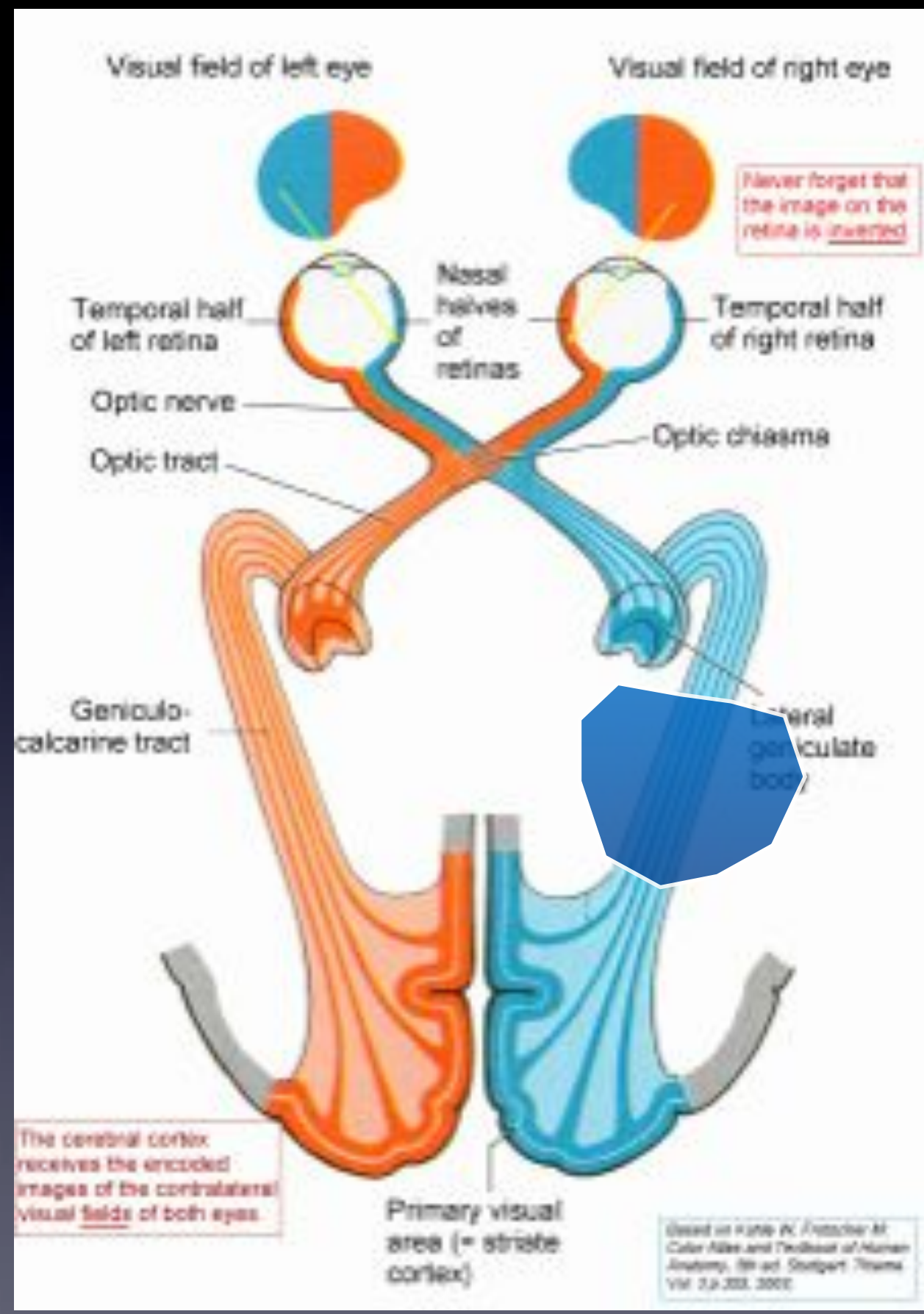
Incongruous Homonymous hemianopia





Incongruous Homonymous hemianopia

Optic Tract - Parietal CVA- MCA occlusion



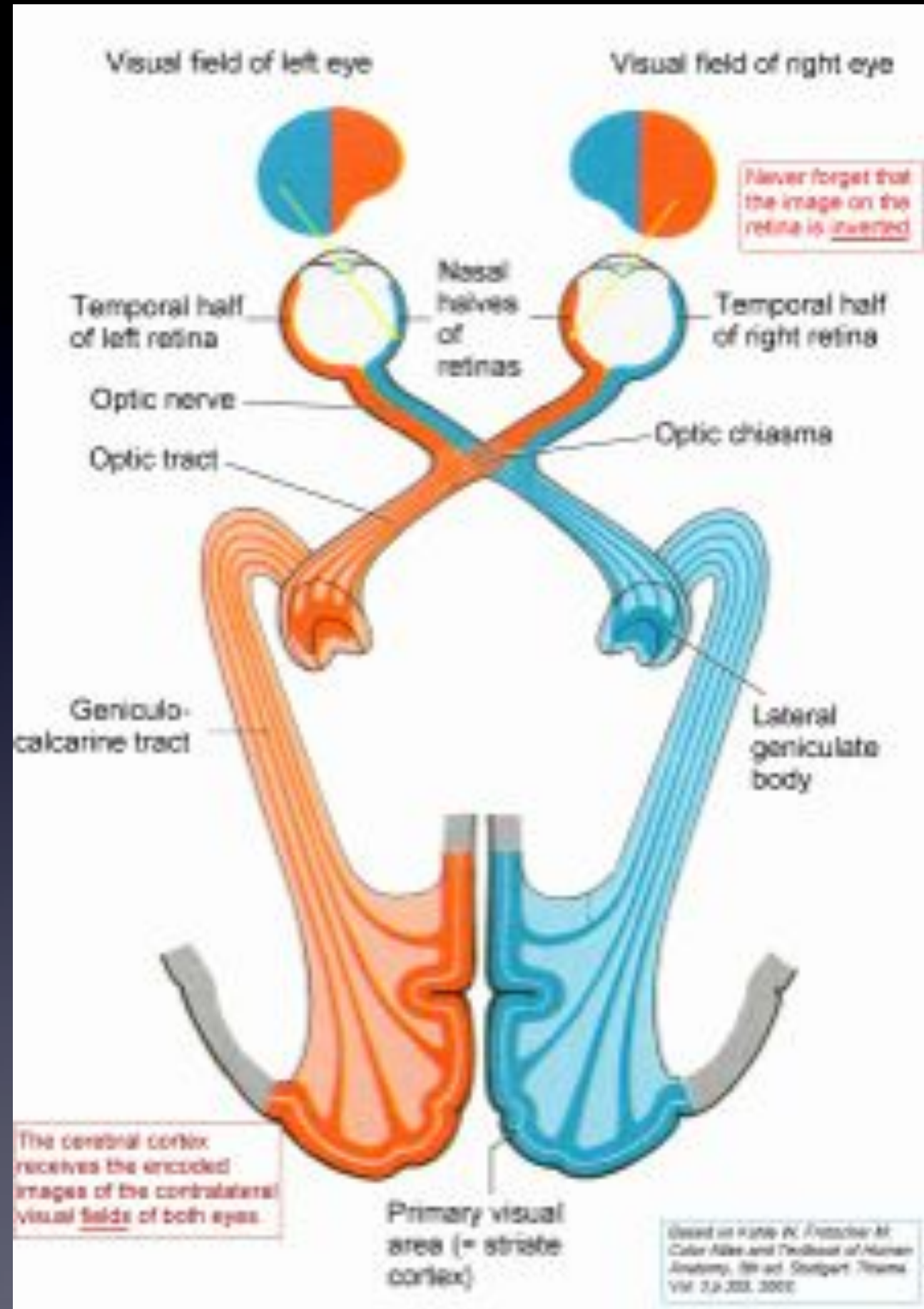




Bitemporal Hemianopia

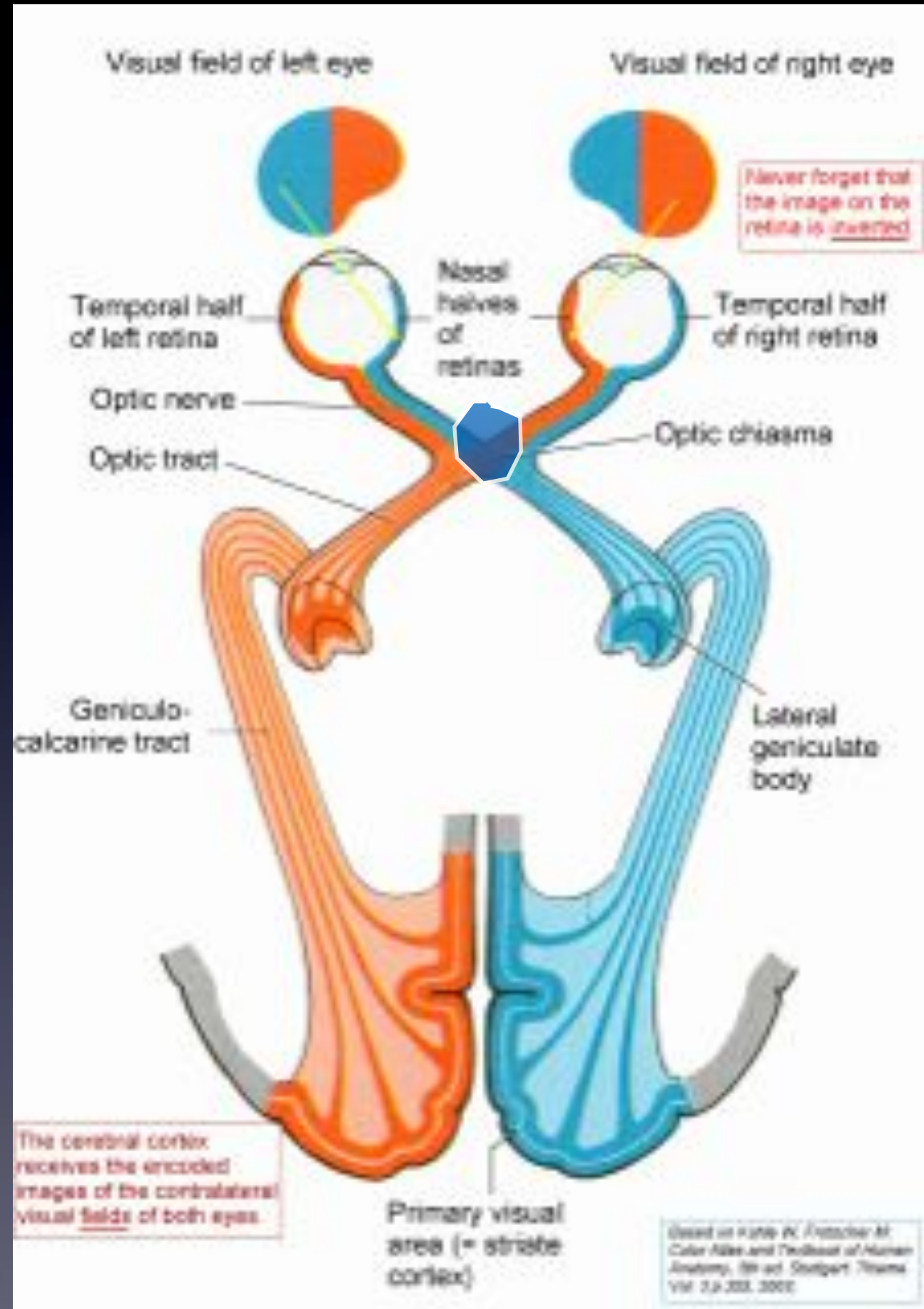


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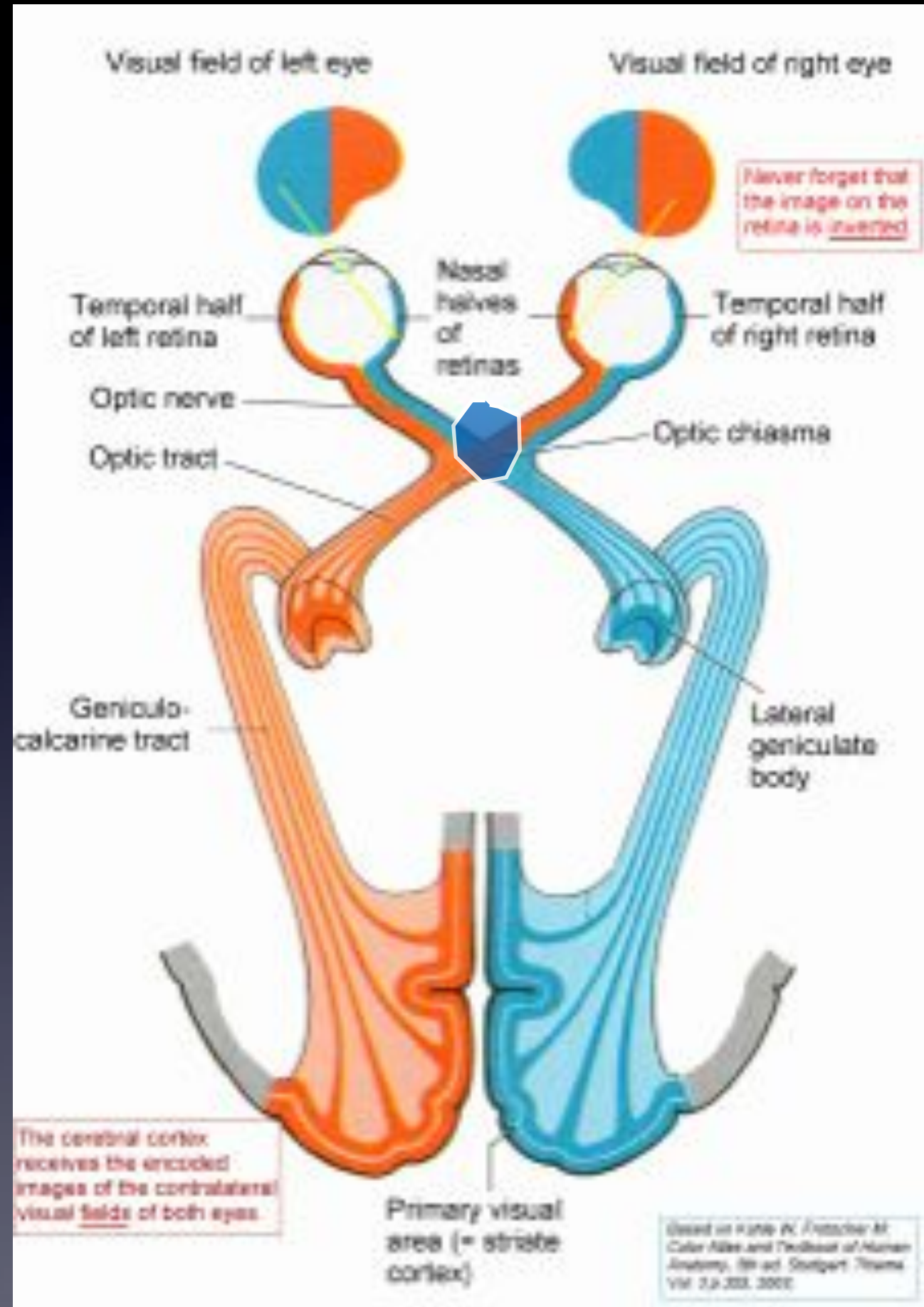
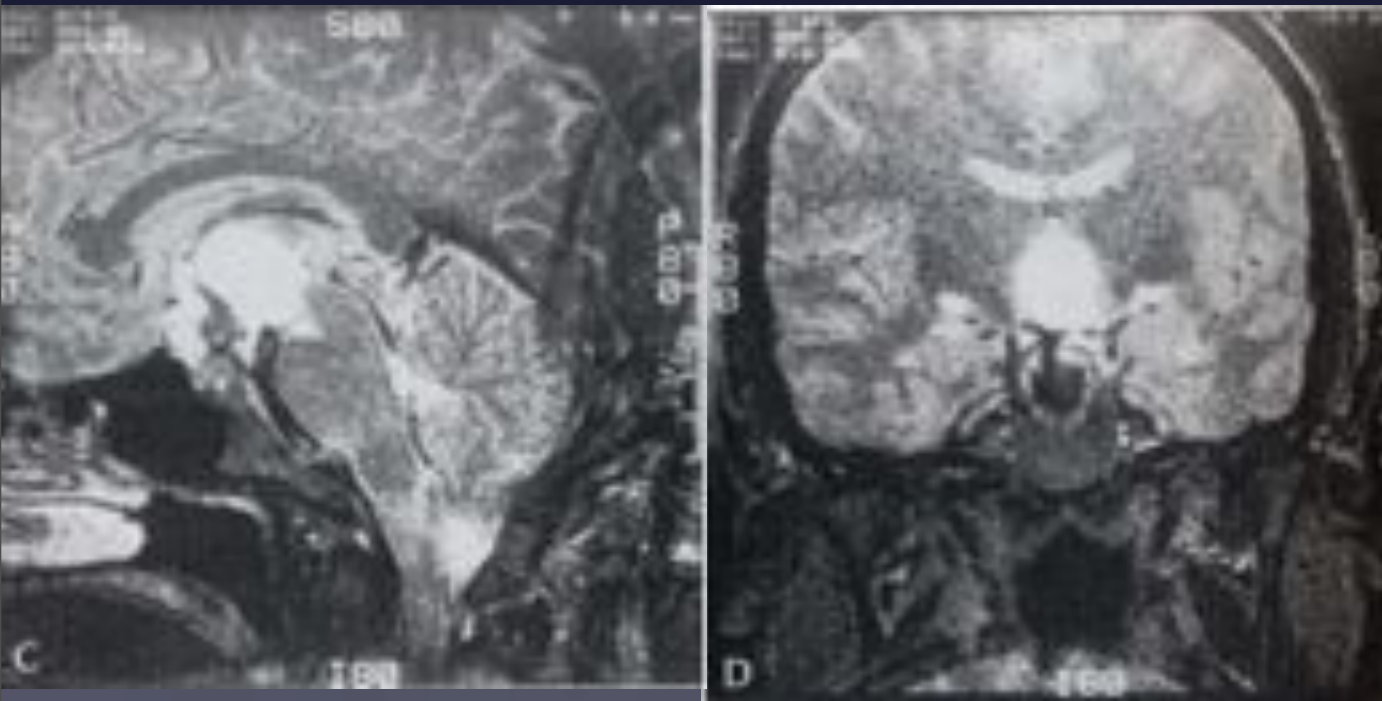


Bitemporal Hemianopia



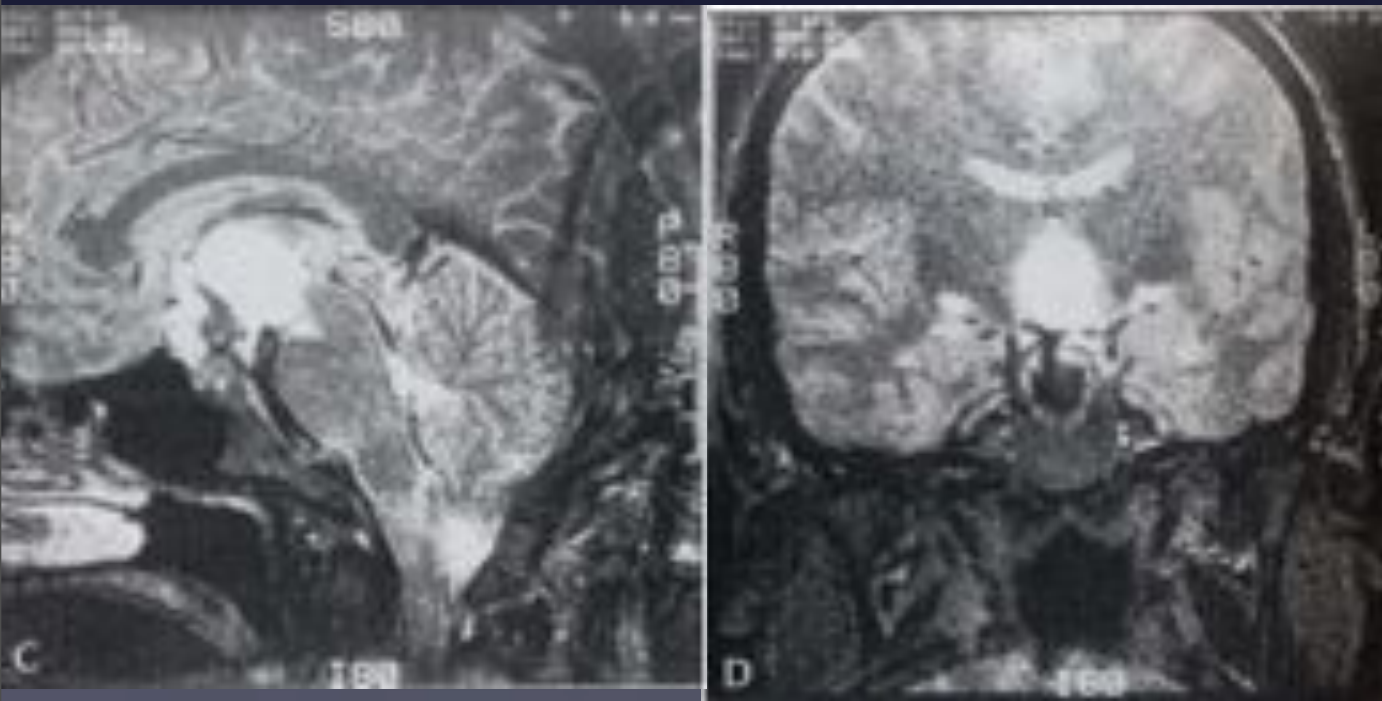


Bitemporal Hemianopia

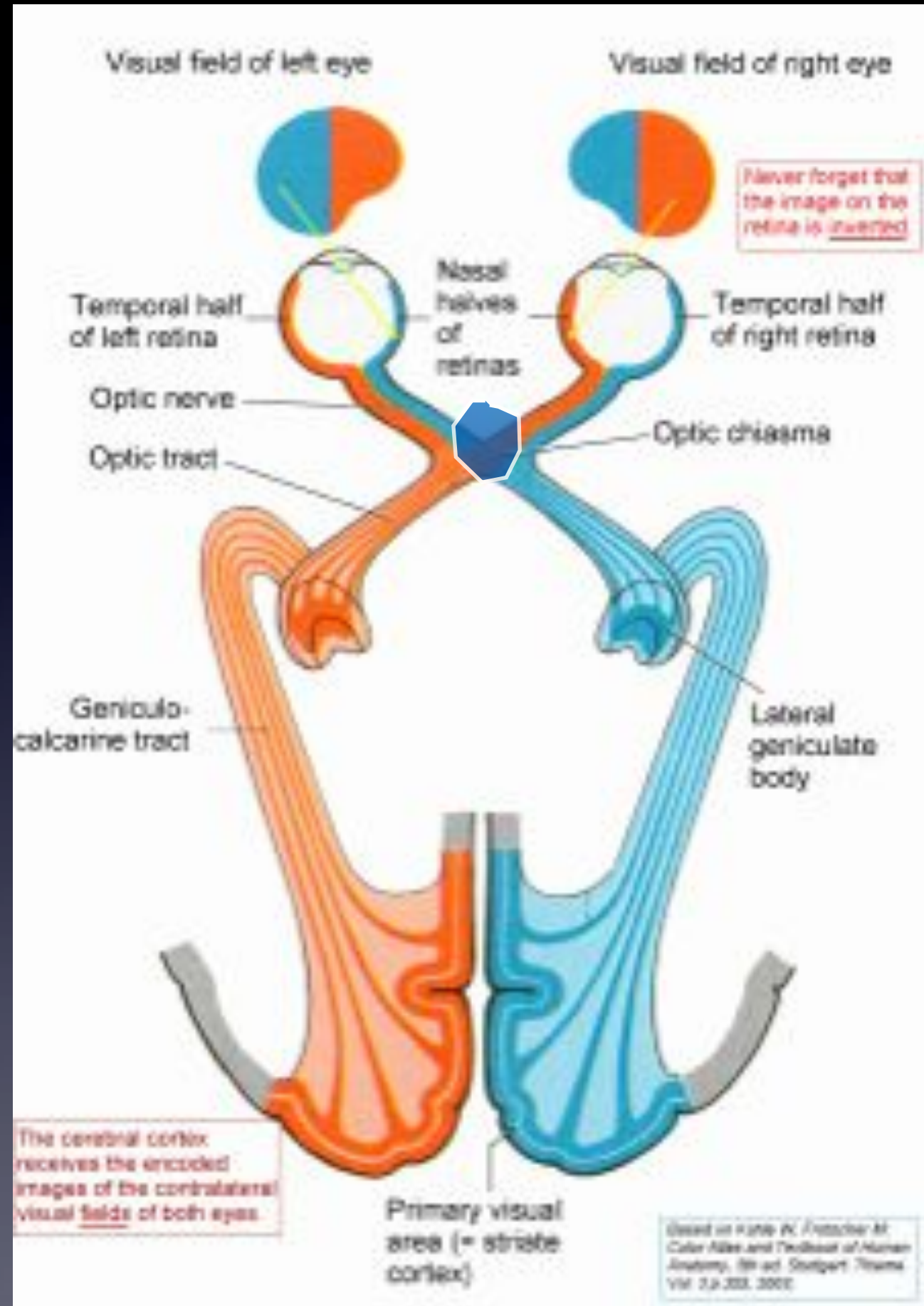




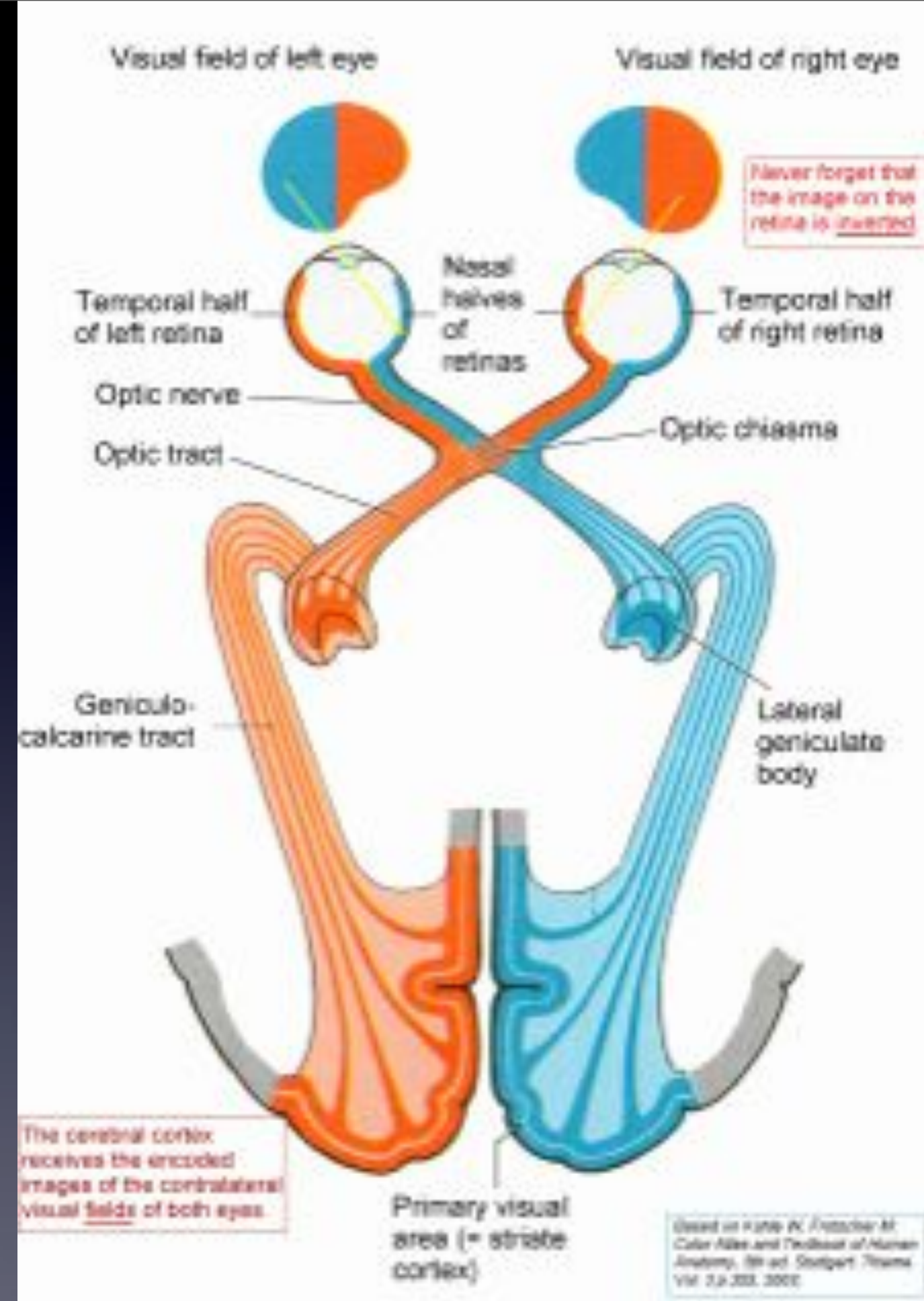
Bitemporal Hemianopia



Chiasmal Compression Pituitary Adenoma

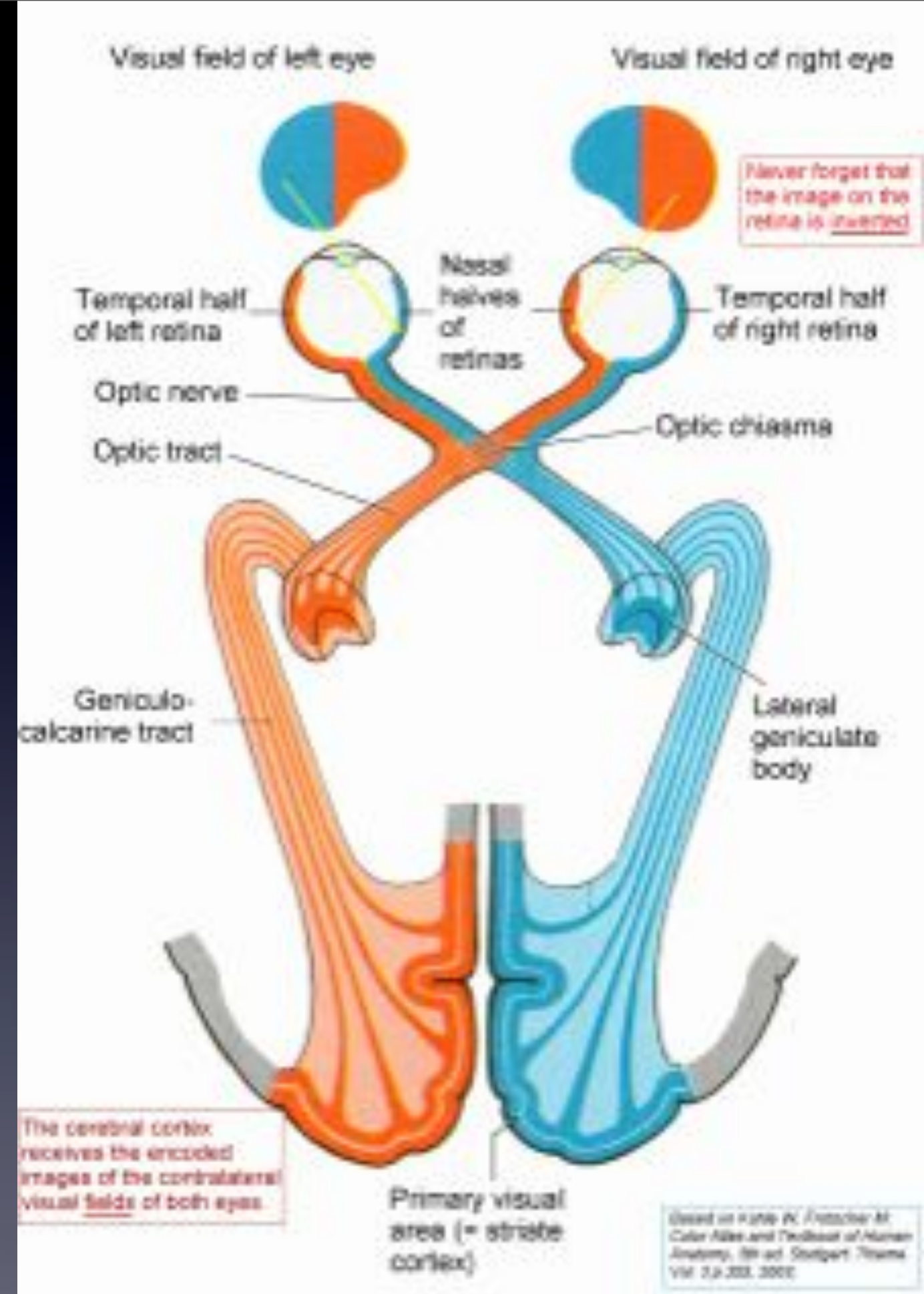


Vertical Midline defects



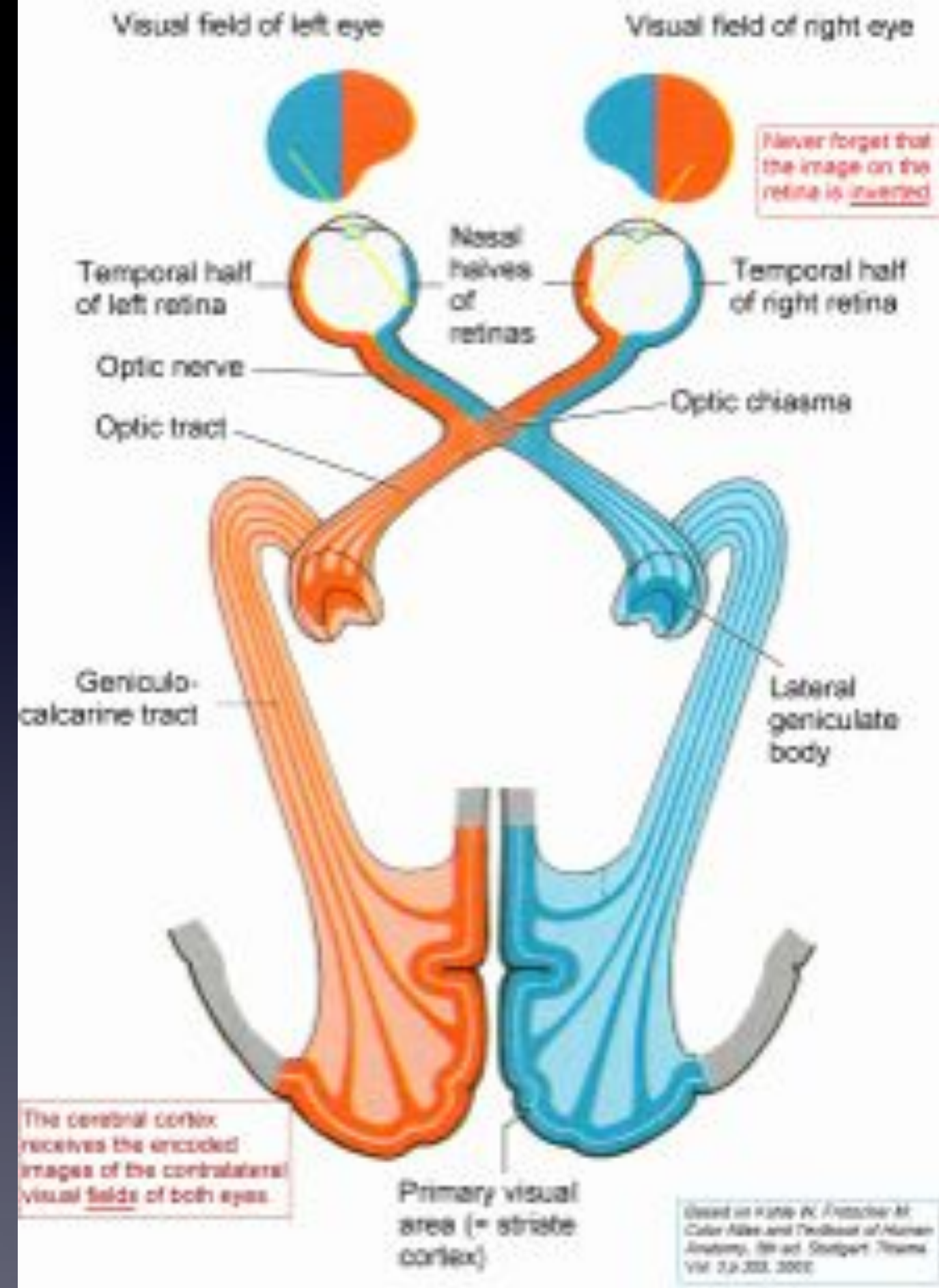
Vertical Midline defects

□ Summary



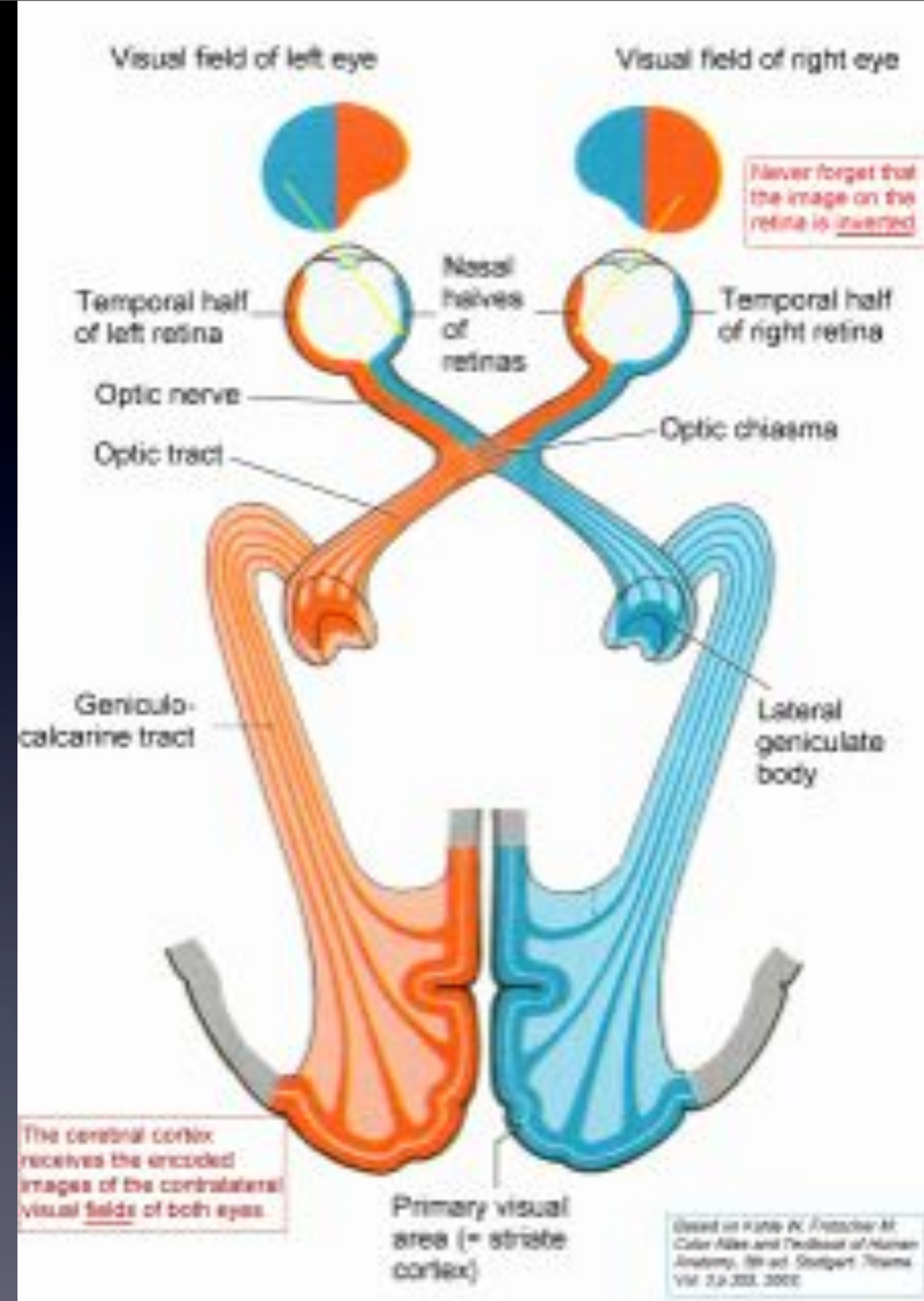
Vertical Midline defects

- Summary
- Vertical midline defects are either at or after the decussation point



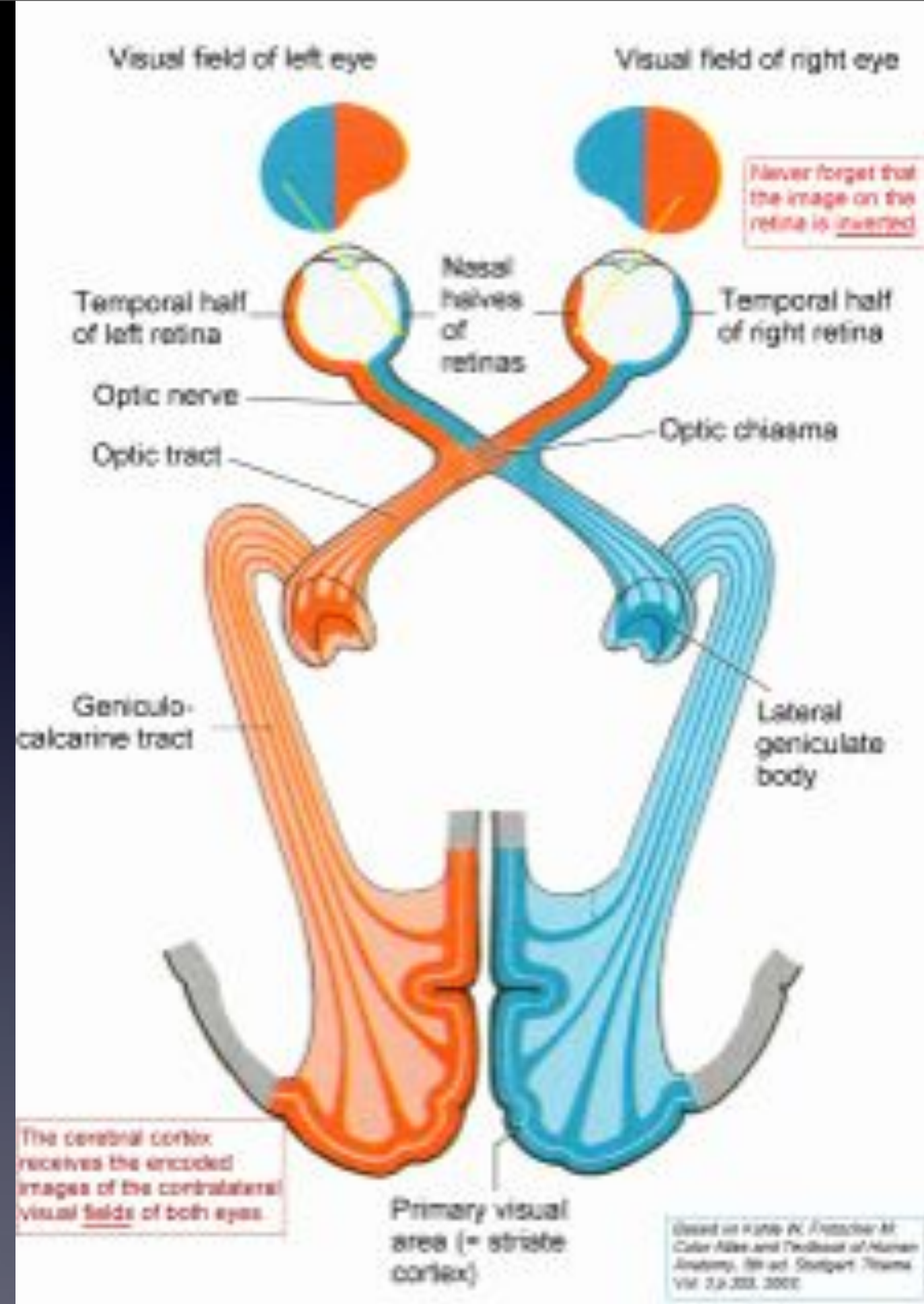
Vertical Midline defects

- Summary
- Vertical midline defects are either at or after the decussation point
- Bitemporal Hemianopia- Pituitary lesions



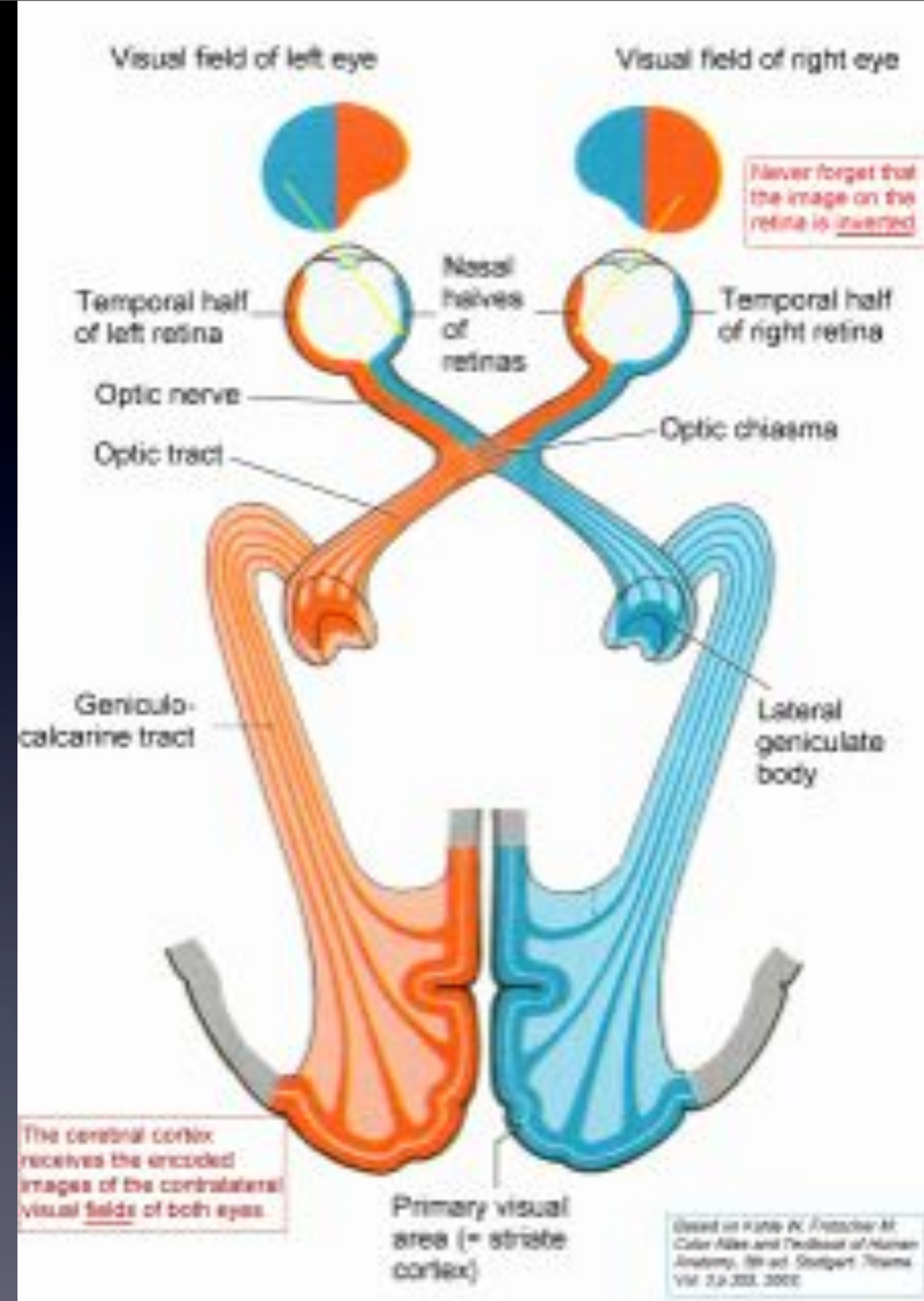
Vertical Midline defects

- Summary
- Vertical midline defects are either at or after the decussation point
- Bitemporal Hemianopia- Pituitary lesions
- Homonymous Hemianopia- Post Chiasmal



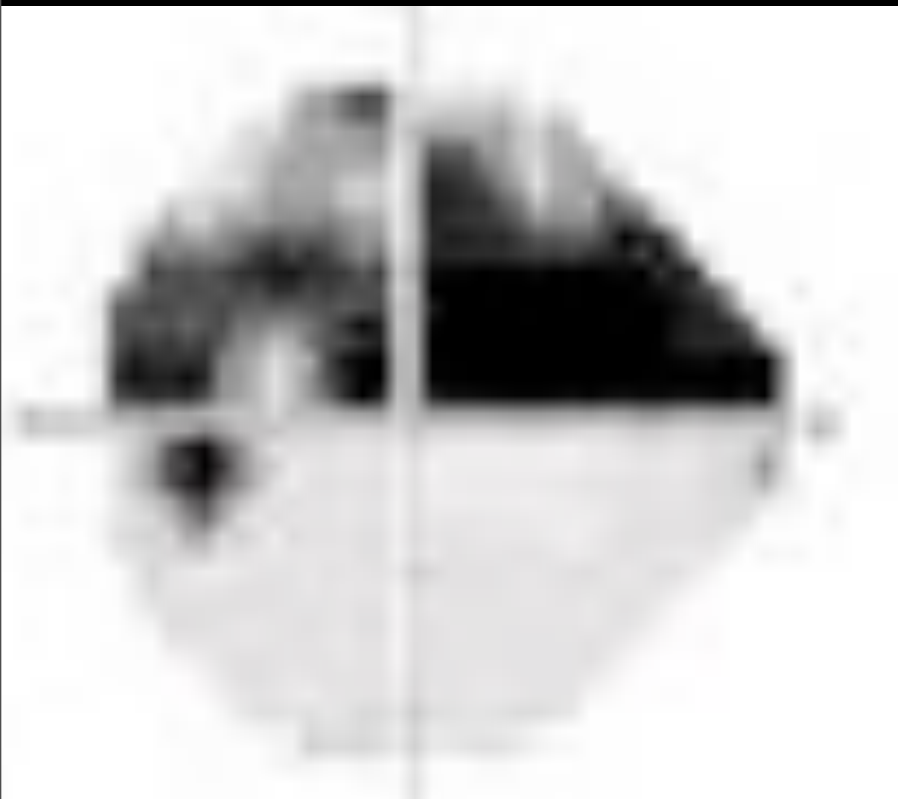
Vertical Midline defects

- Summary
- Vertical midline defects are either at or after the decussation point
- Bitemporal Hemianopia- Pituitary lesions
- Homonymous Hemianopia- Post Chiasmal
 - Congruity increases towards primary visual cortex



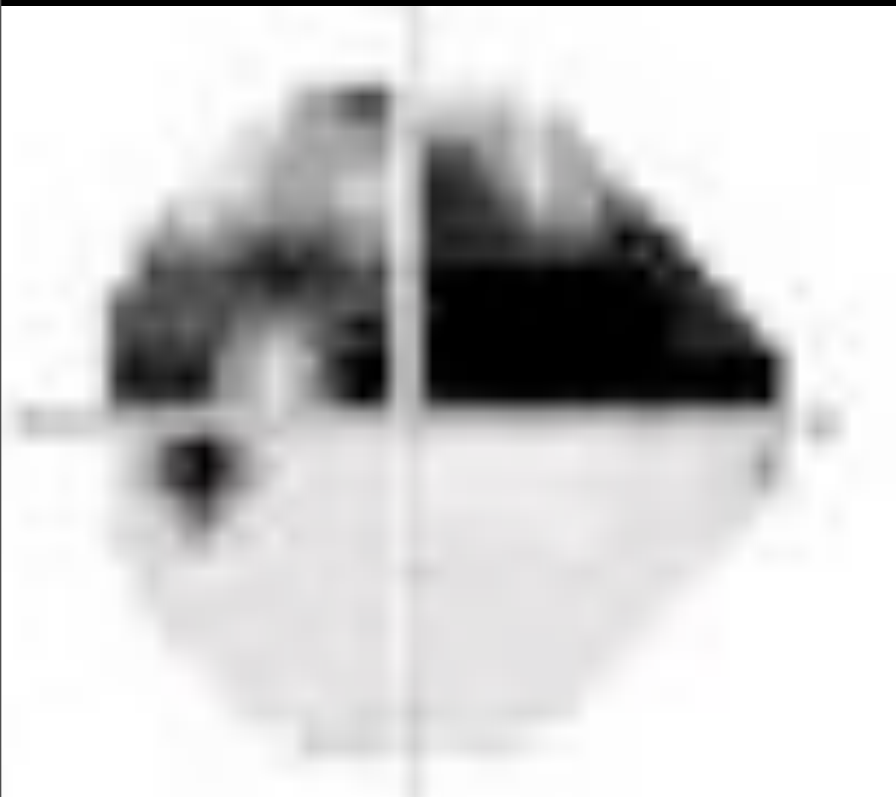
Altitudinal defects

Altitudinal defects



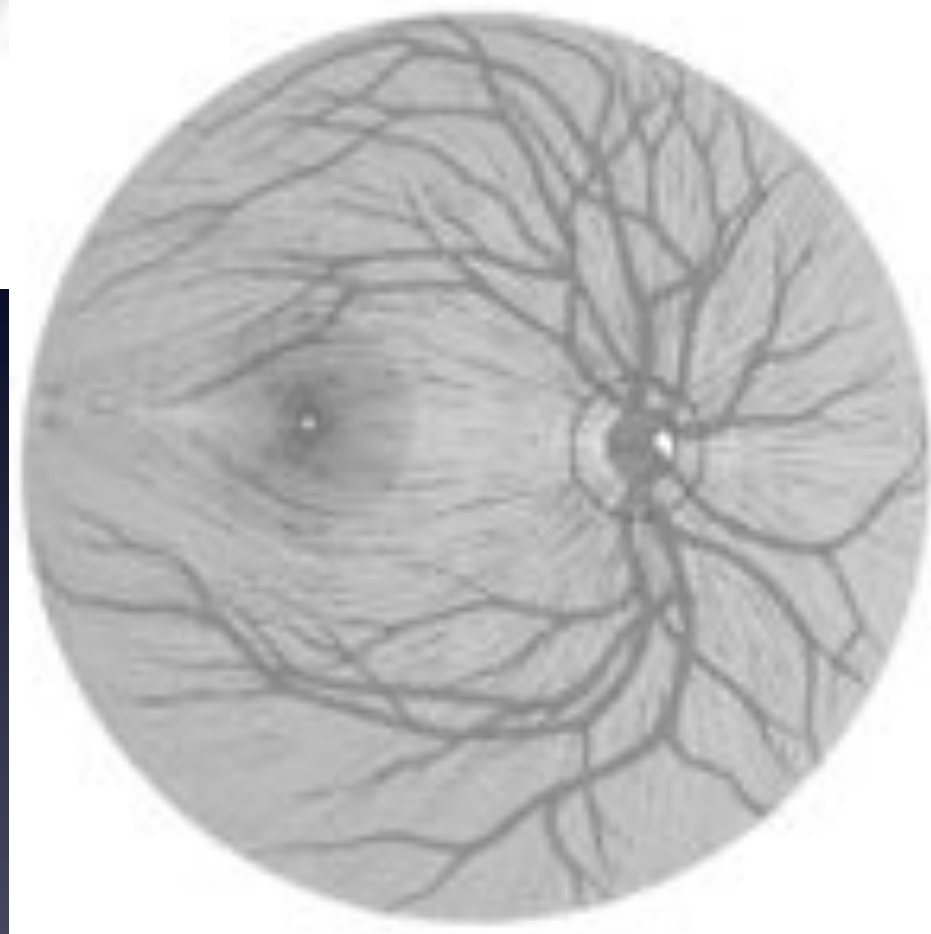
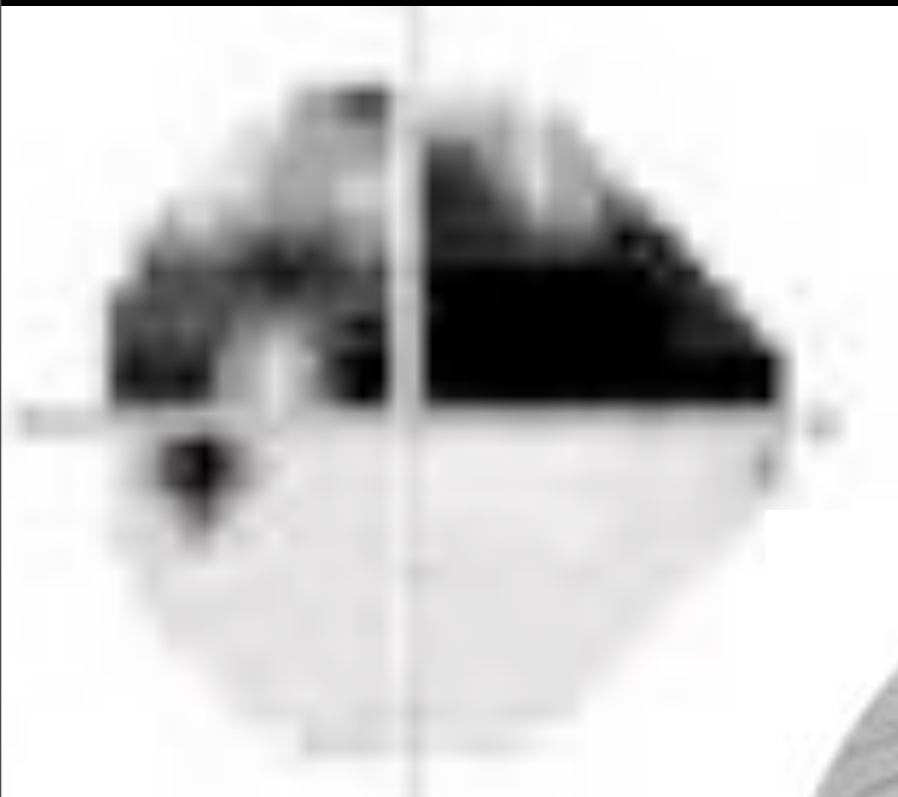
Altitudinal defects

Defects which respect the horizontal midline



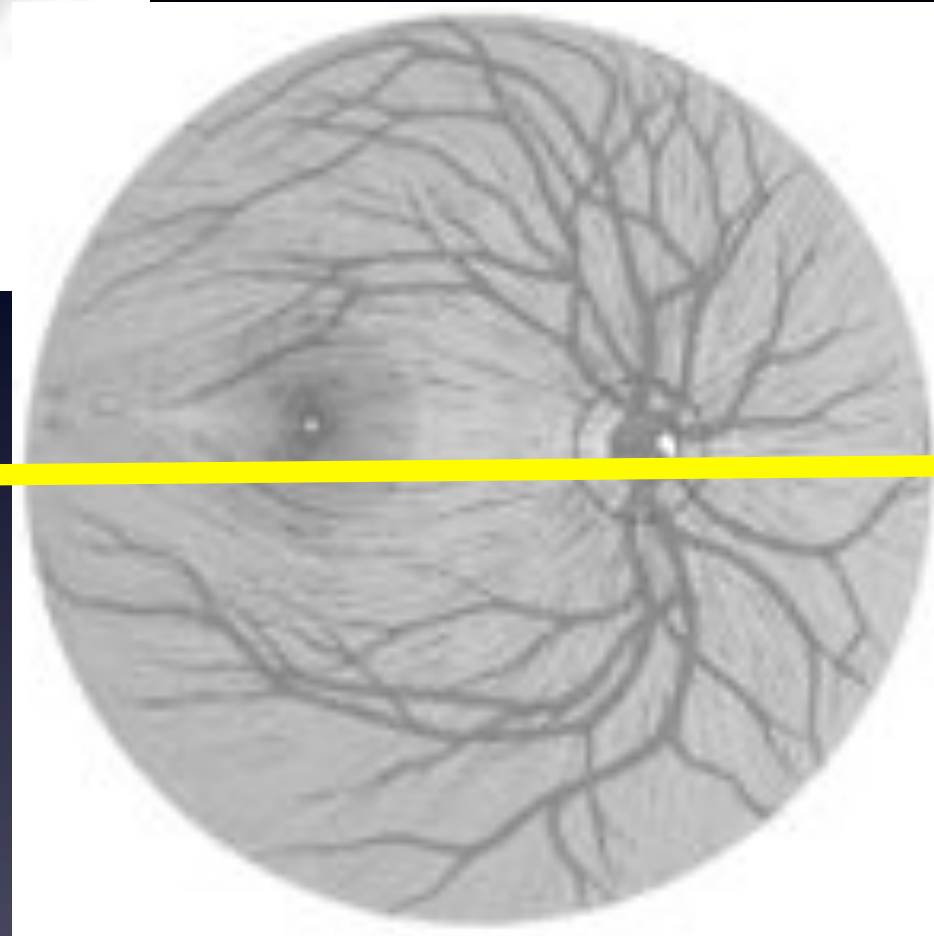
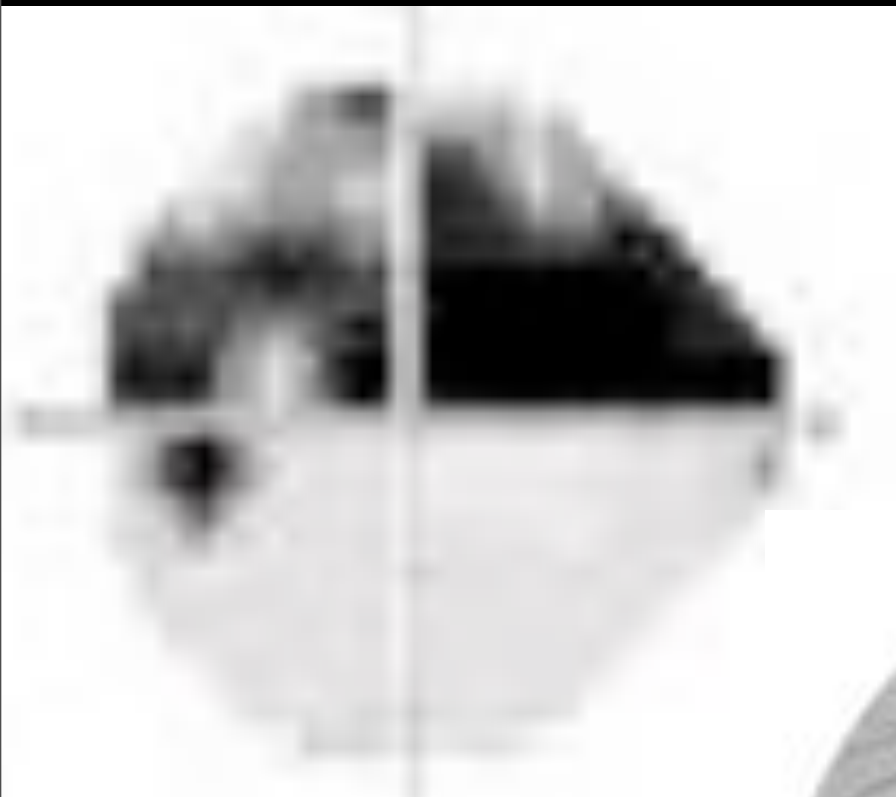
Altitudinal defects

Defects which respect the horizontal midline



Altitudinal defects

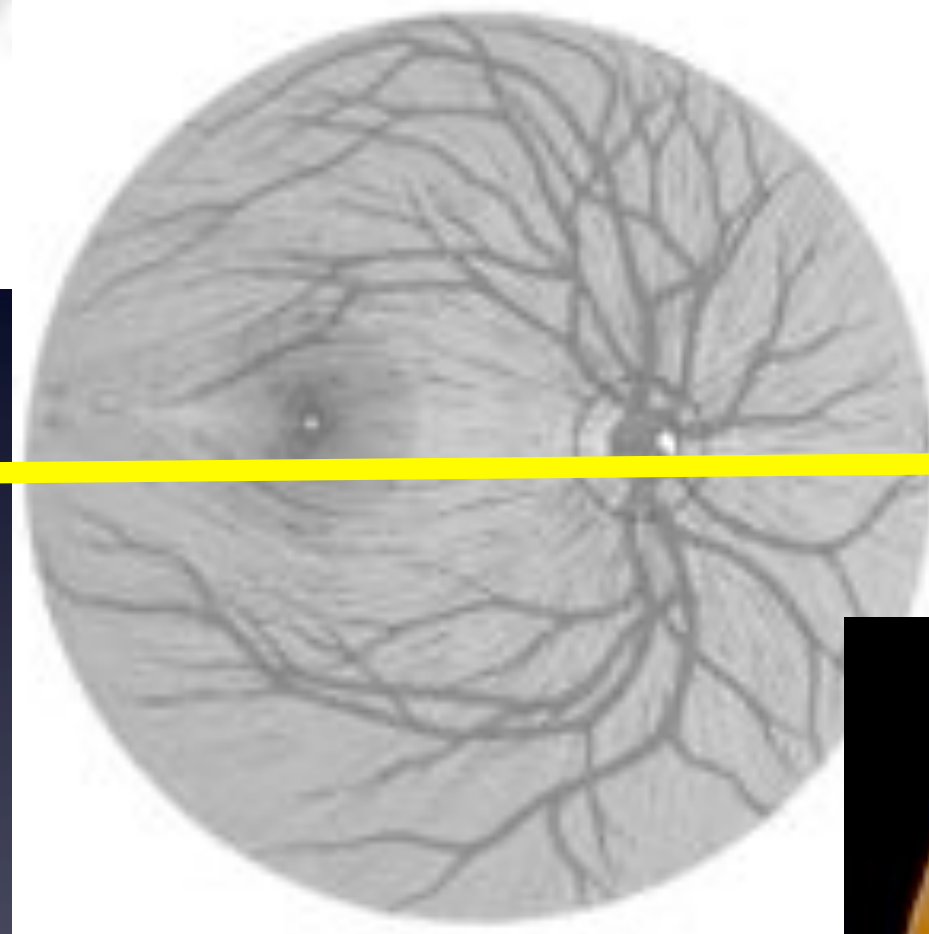
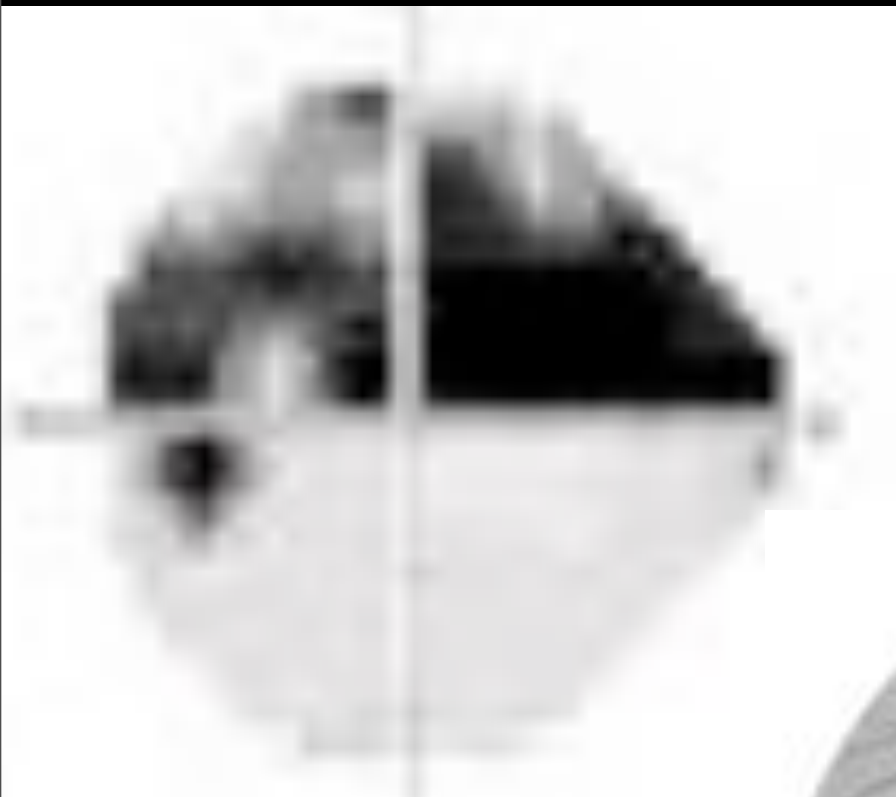
Defects which respect the horizontal midline



Retinal Blood Vessels and
Nerve Fibre Layer
Respect Horizontal
Midline

Altitudinal defects

Defects which respect the horizontal midline

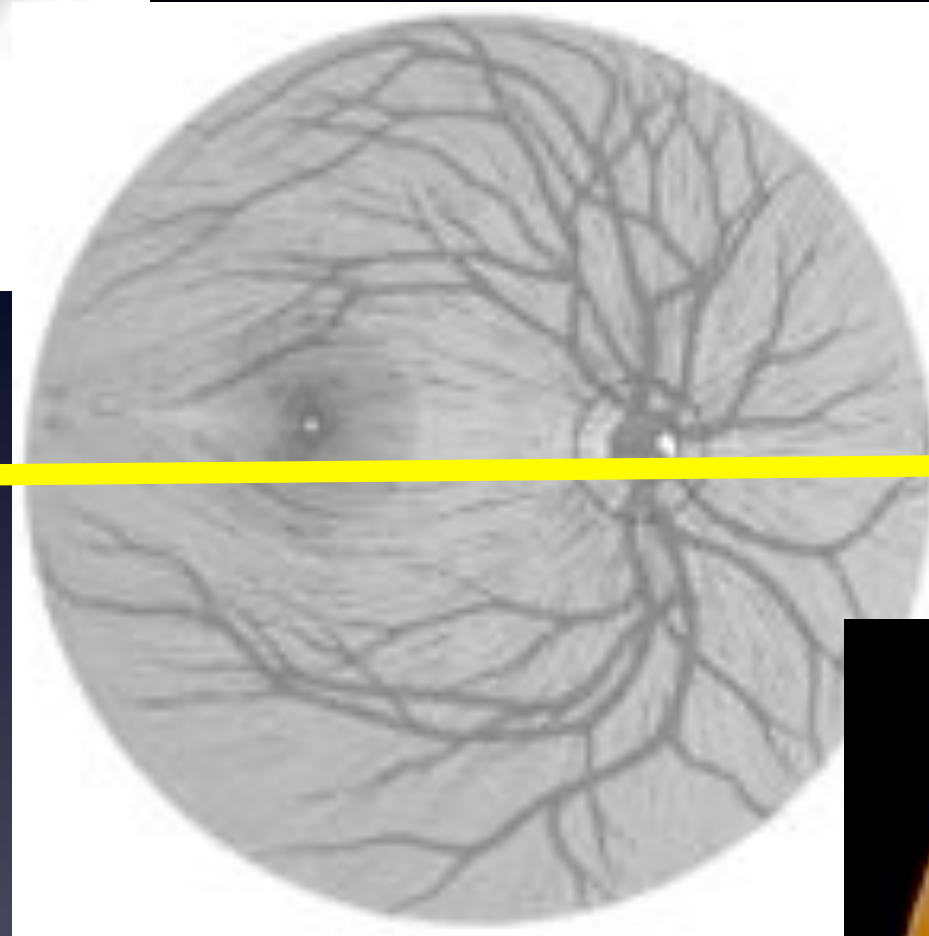
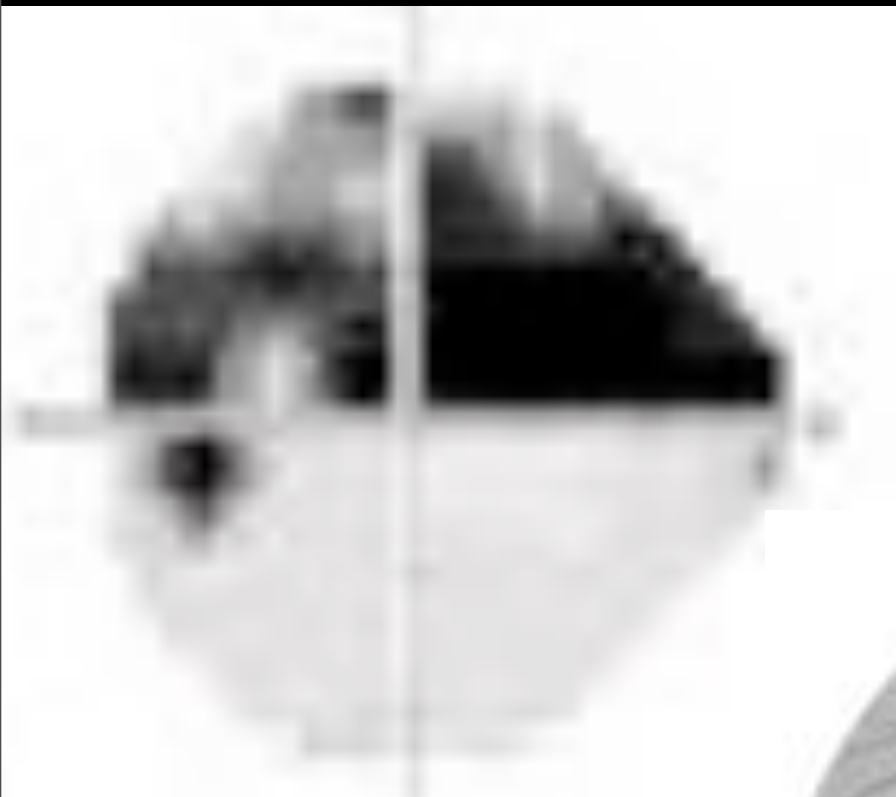


Retinal Blood Vessels and
Nerve Fibre Layer
Respect Horizontal
Midline



Altitudinal defects

Defects which respect the horizontal midline

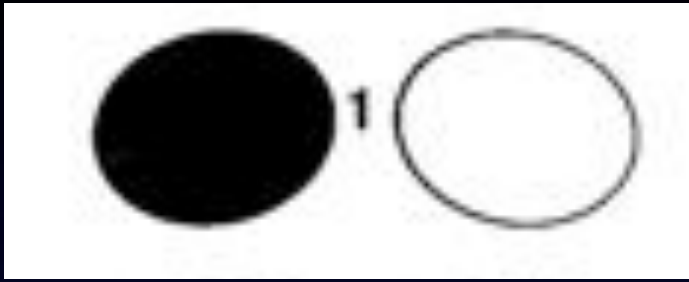


Retinal Blood Vessels and
Nerve Fibre Layer
Respect Horizontal
Midline

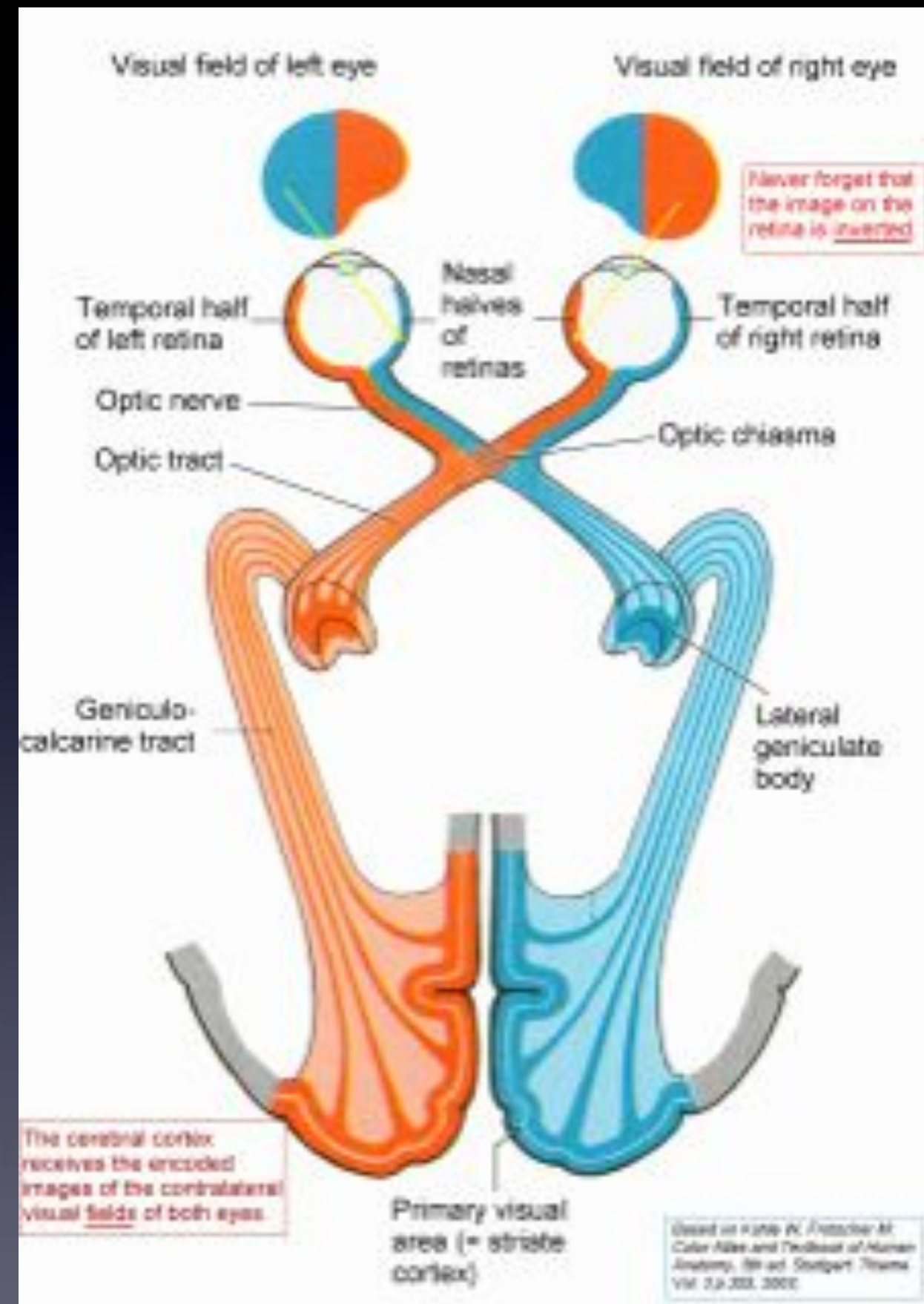
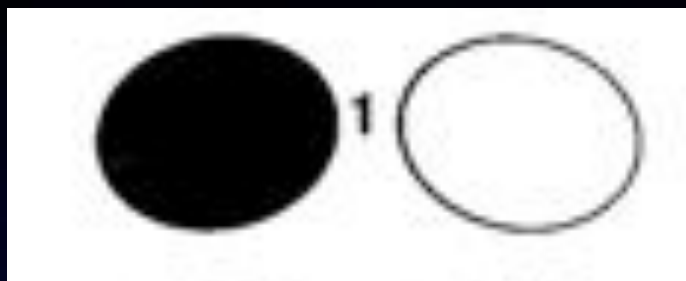


Commonly Retinal Problem

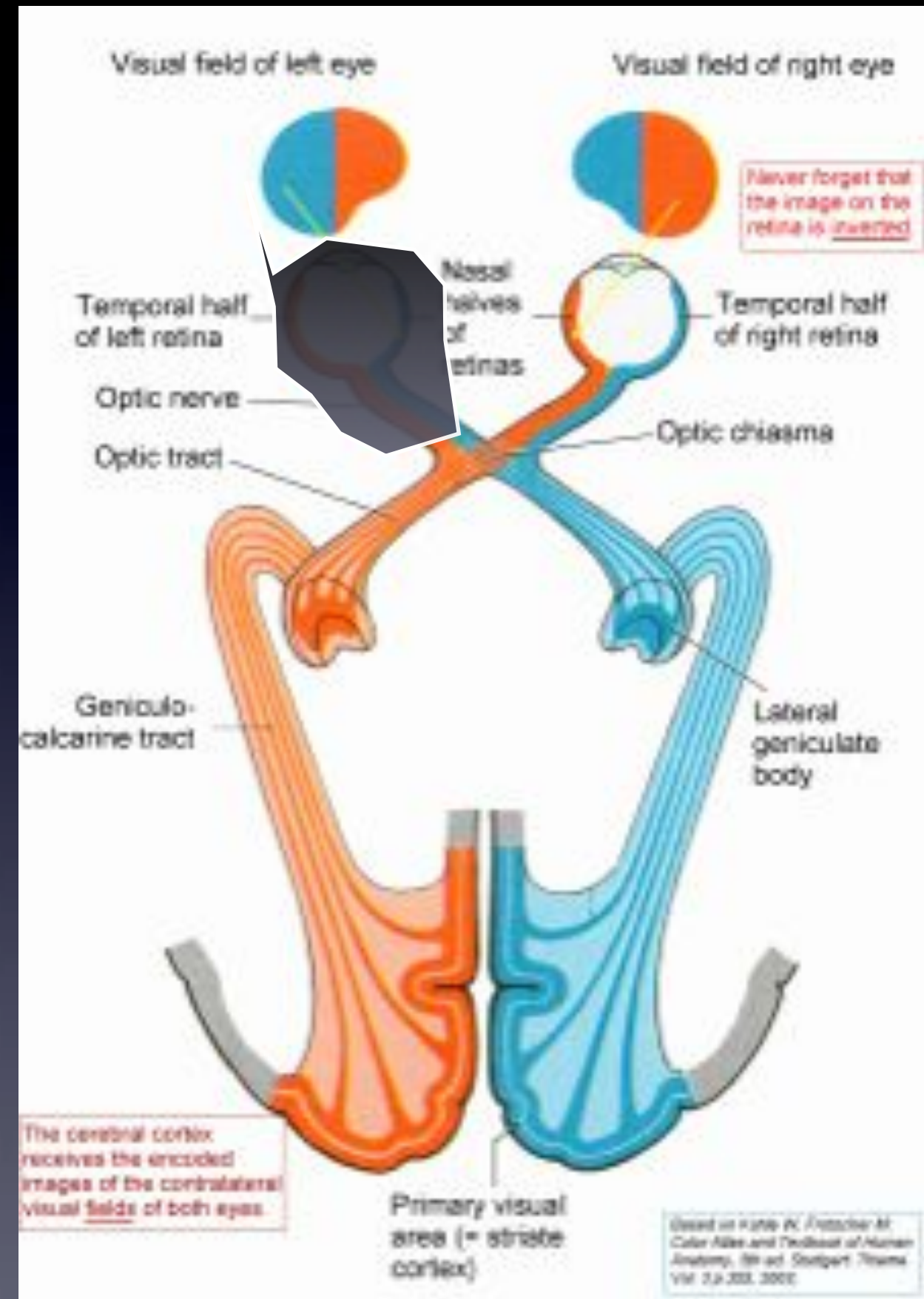
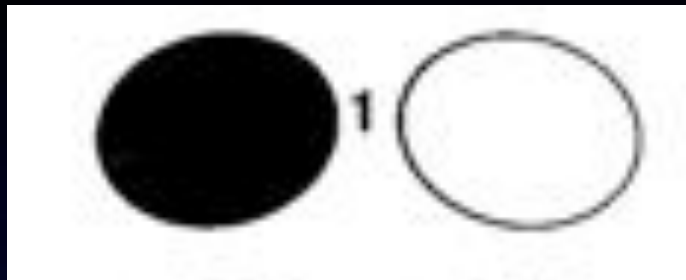
Unilateral Visual Loss



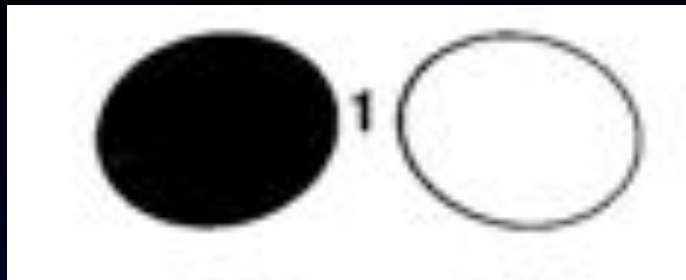
Unilateral Visual Loss



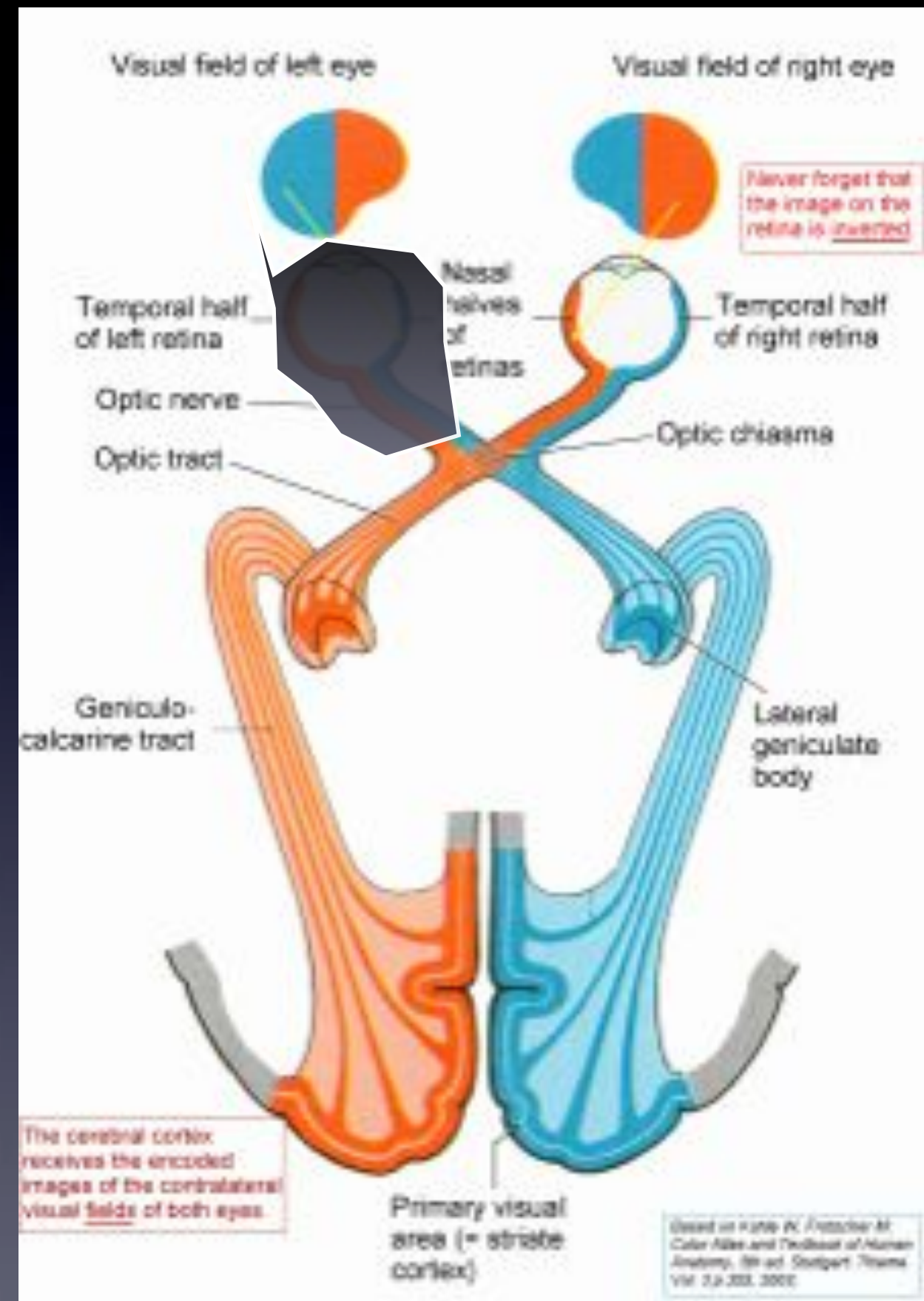
Unilateral Visual Loss



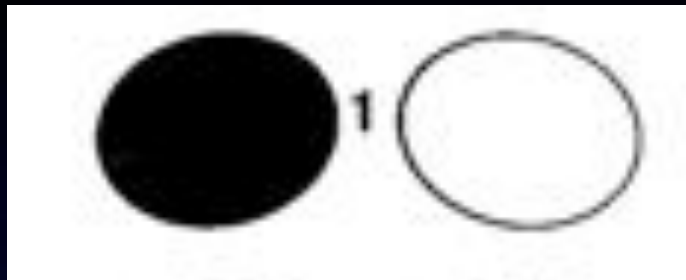
Unilateral Visual Loss



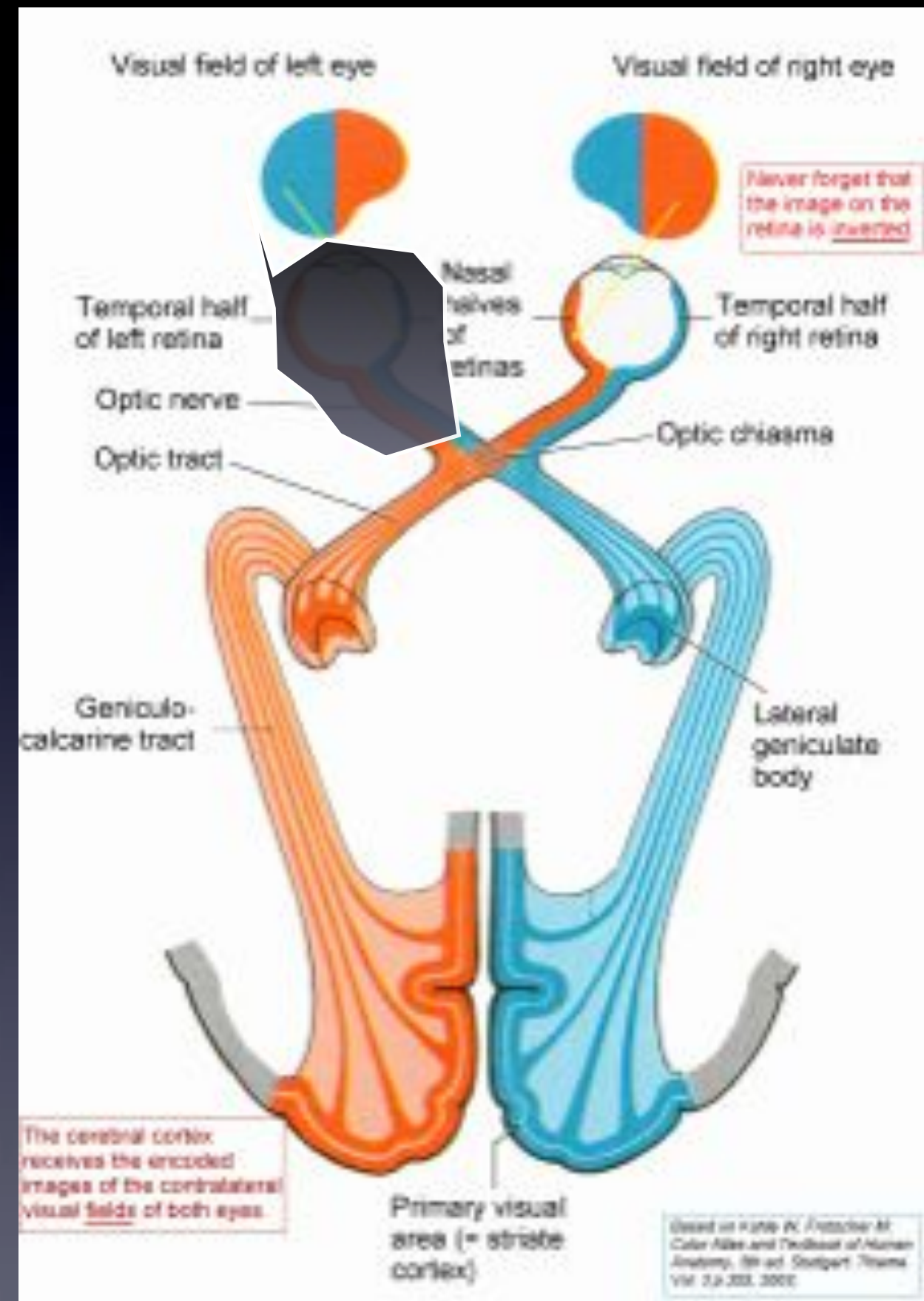
- Major problem with eye or optic nerve



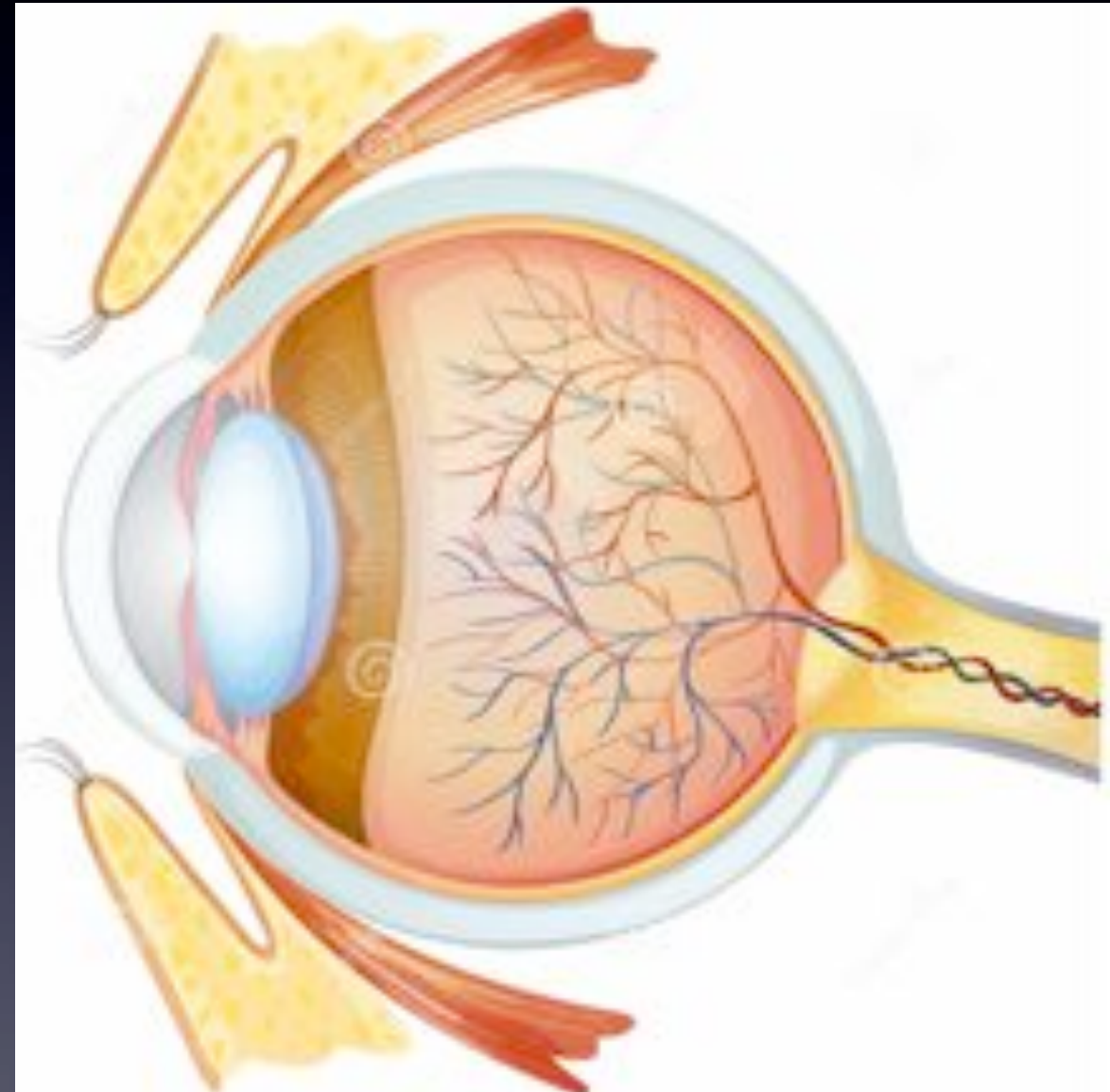
Unilateral Visual Loss



- Major problem with eye or optic nerve
- Prechiasmal Problem

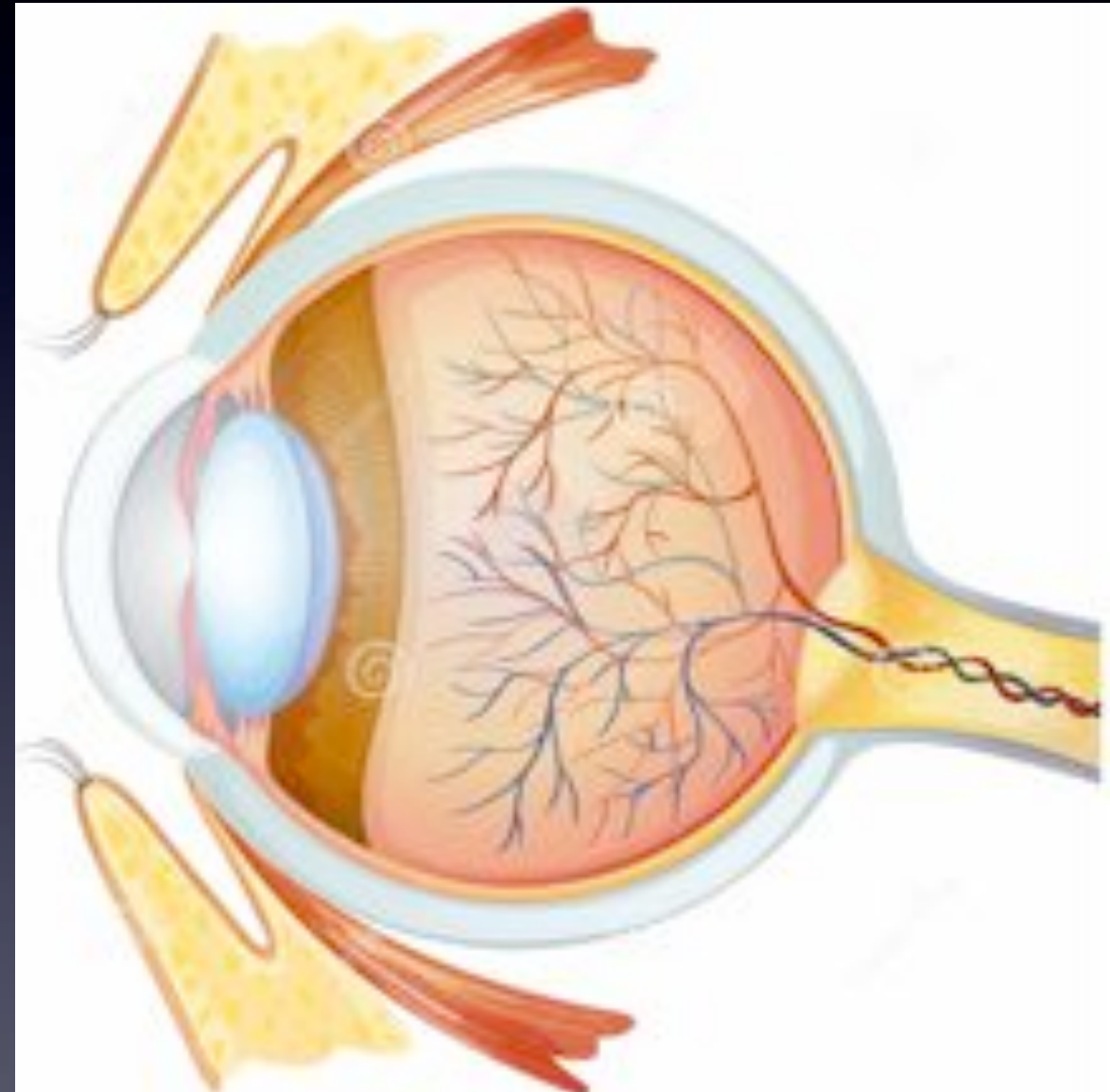


Unilateral Visual Loss



Unilateral Visual Loss

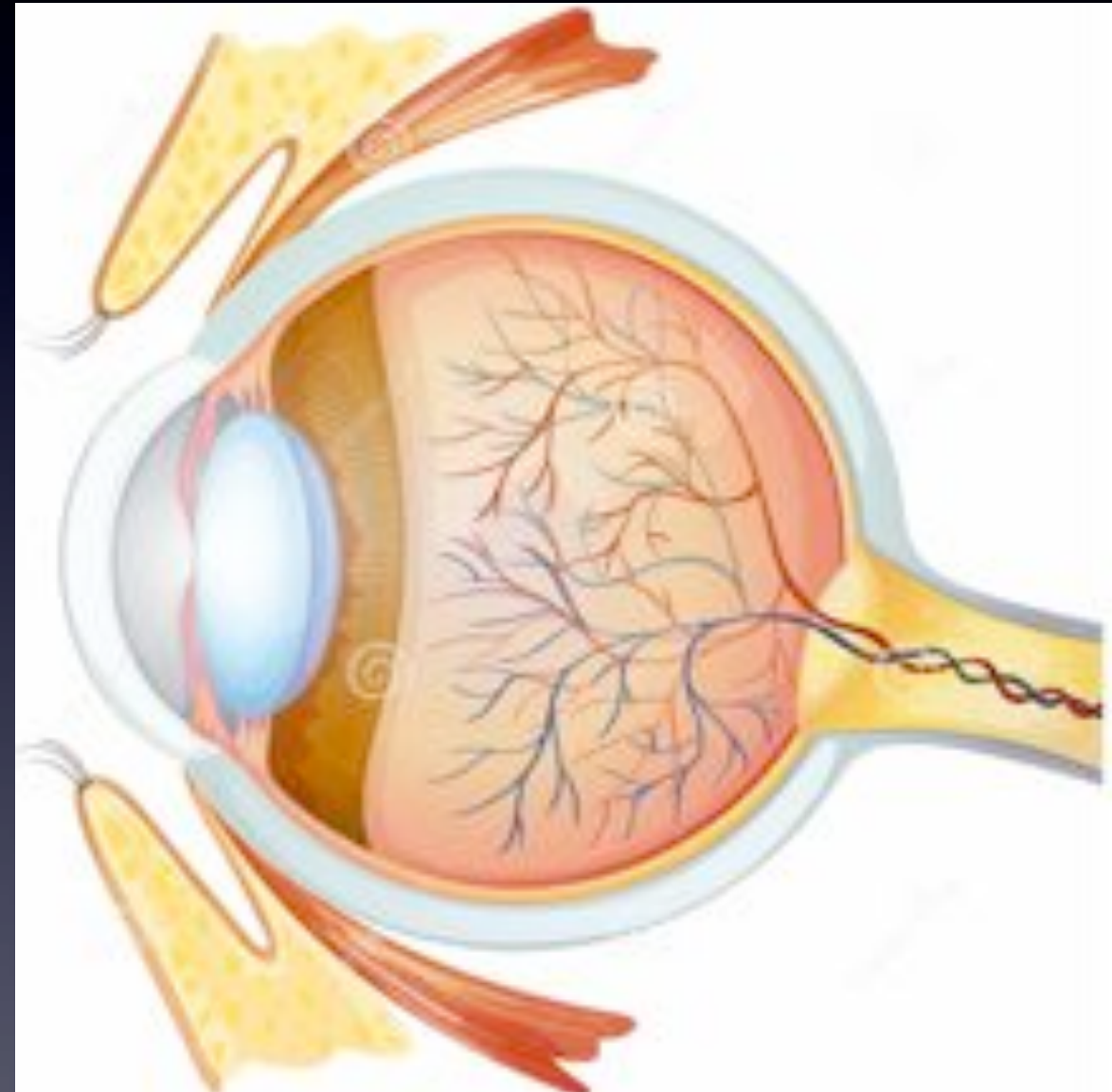
Visual Pathway Interruption



Unilateral Visual Loss

Visual Pathway Interruption

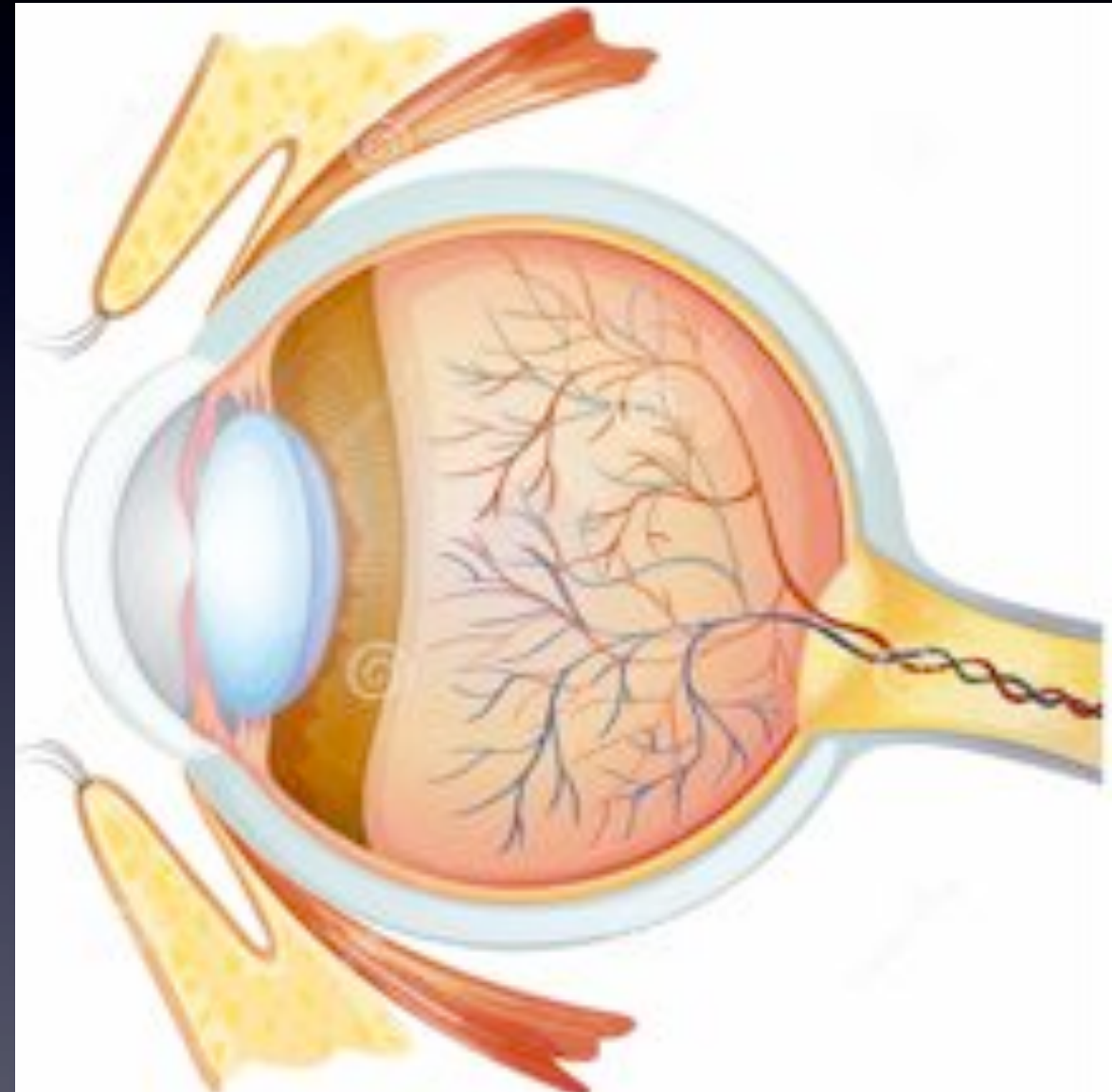
- Corneal Disease



Unilateral Visual Loss

Visual Pathway Interruption

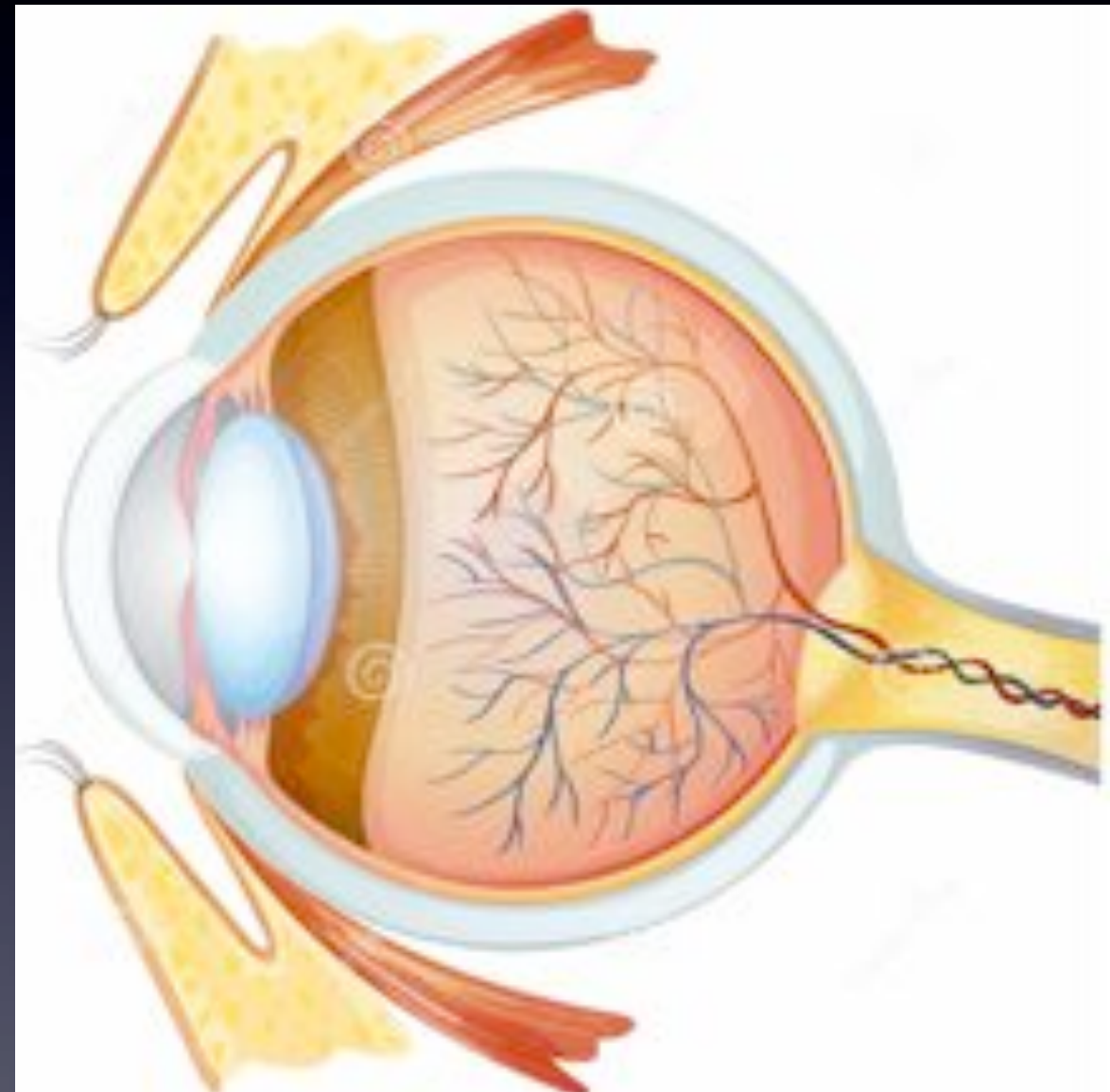
- Corneal Disease
 - Scarring



Unilateral Visual Loss

Visual Pathway Interruption

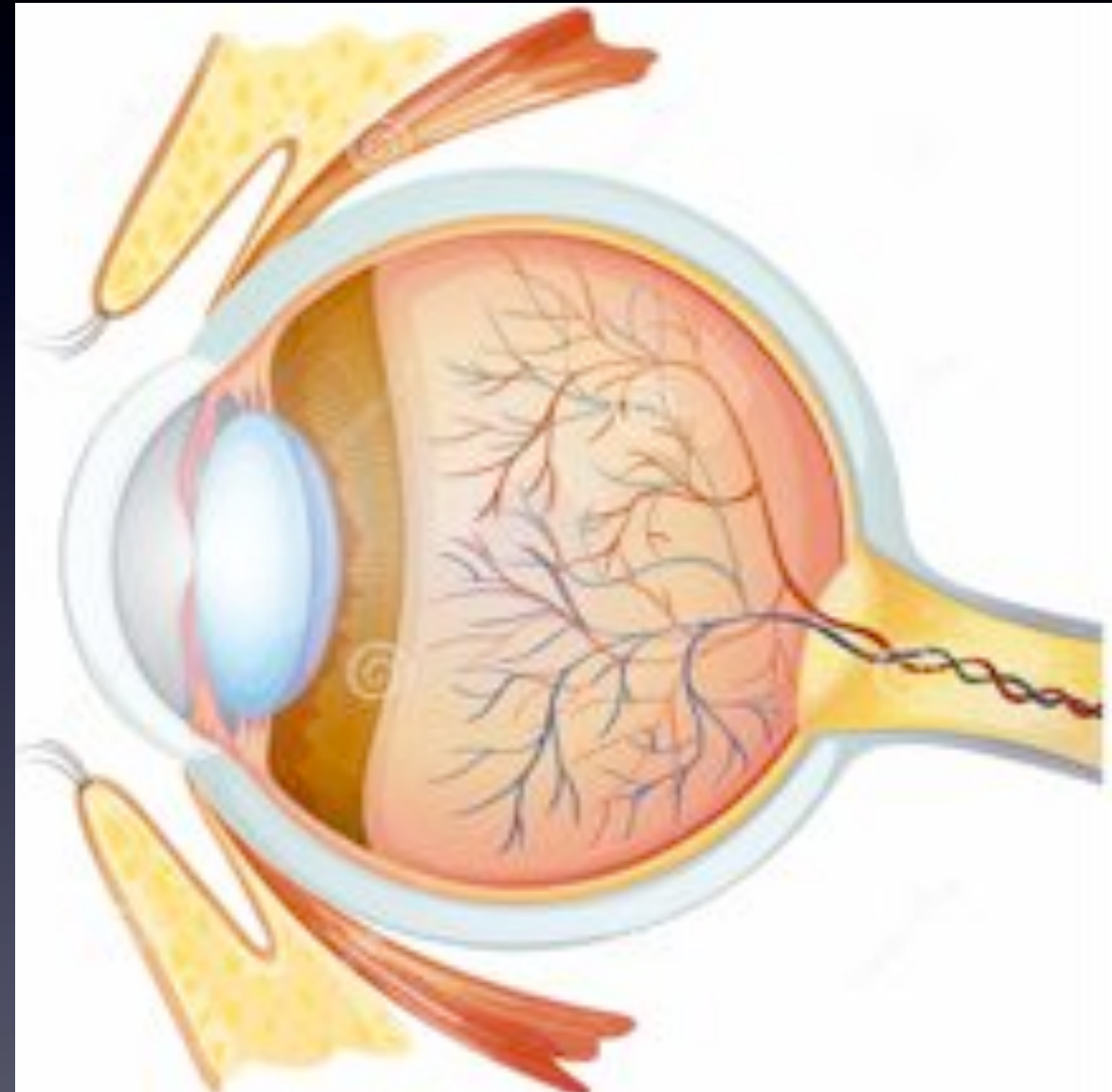
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune



Unilateral Visual Loss

Visual Pathway Interruption

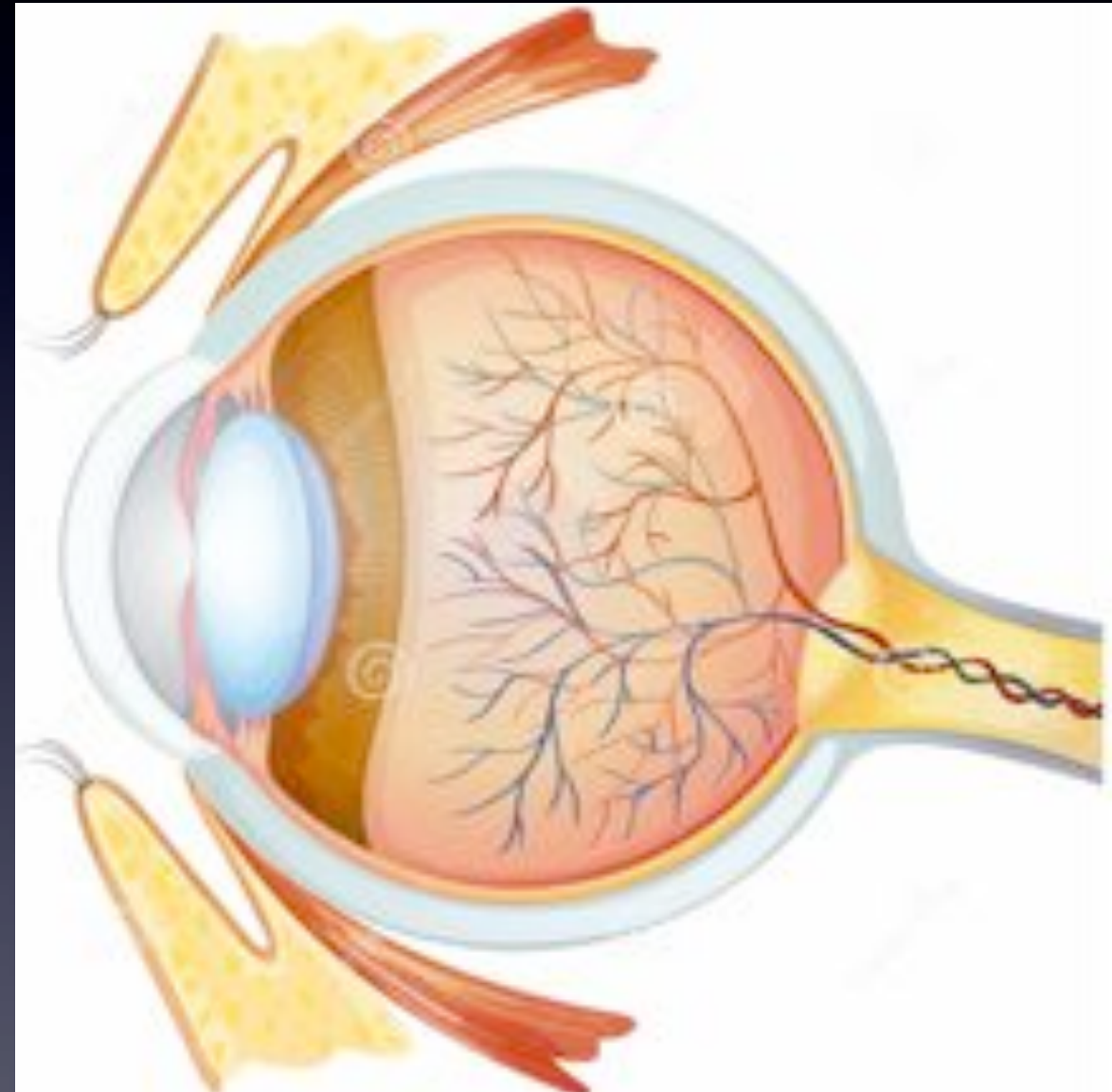
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens



Unilateral Visual Loss

Visual Pathway Interruption

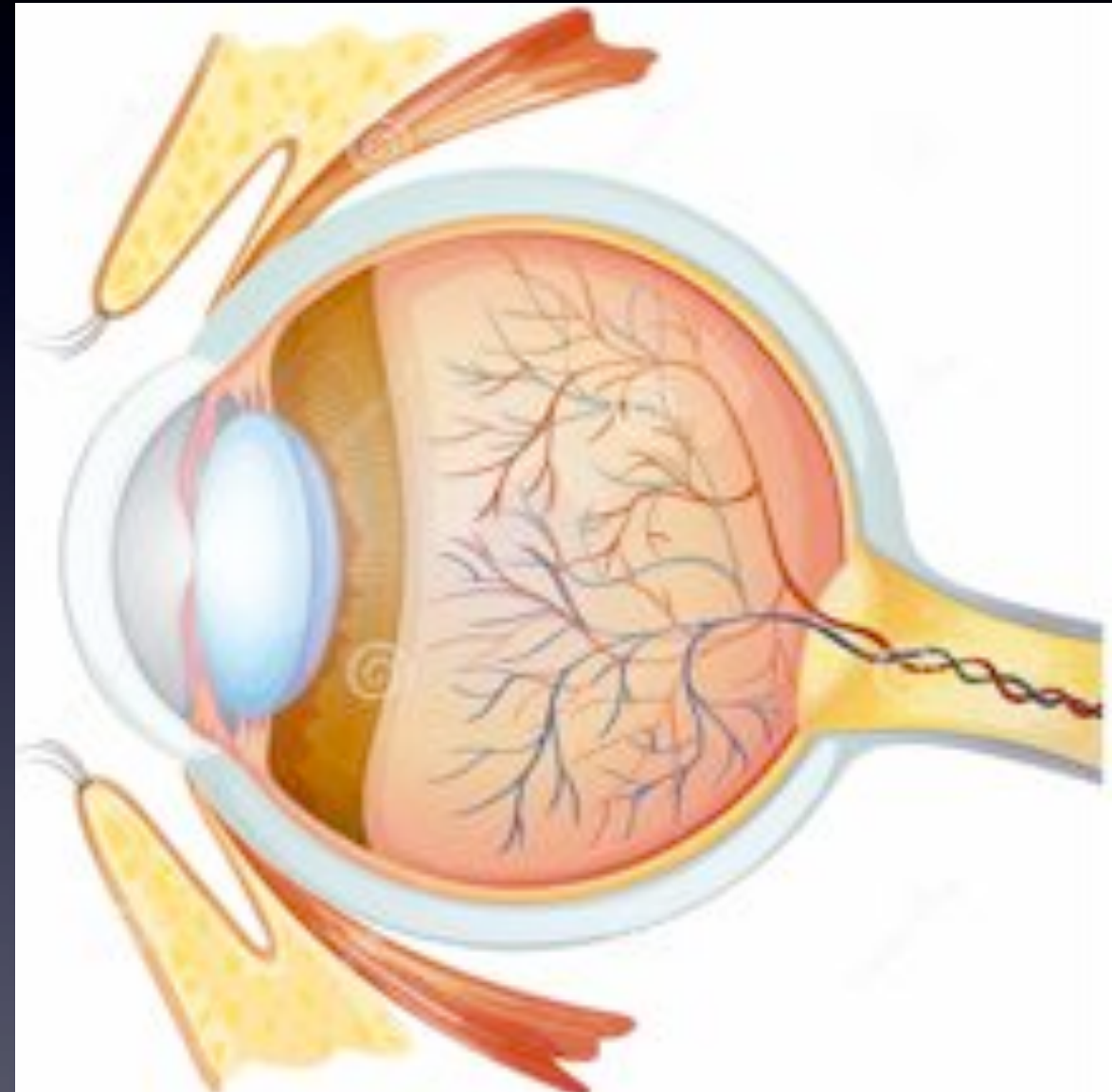
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens
 - Cataract



Unilateral Visual Loss

Visual Pathway Interruption

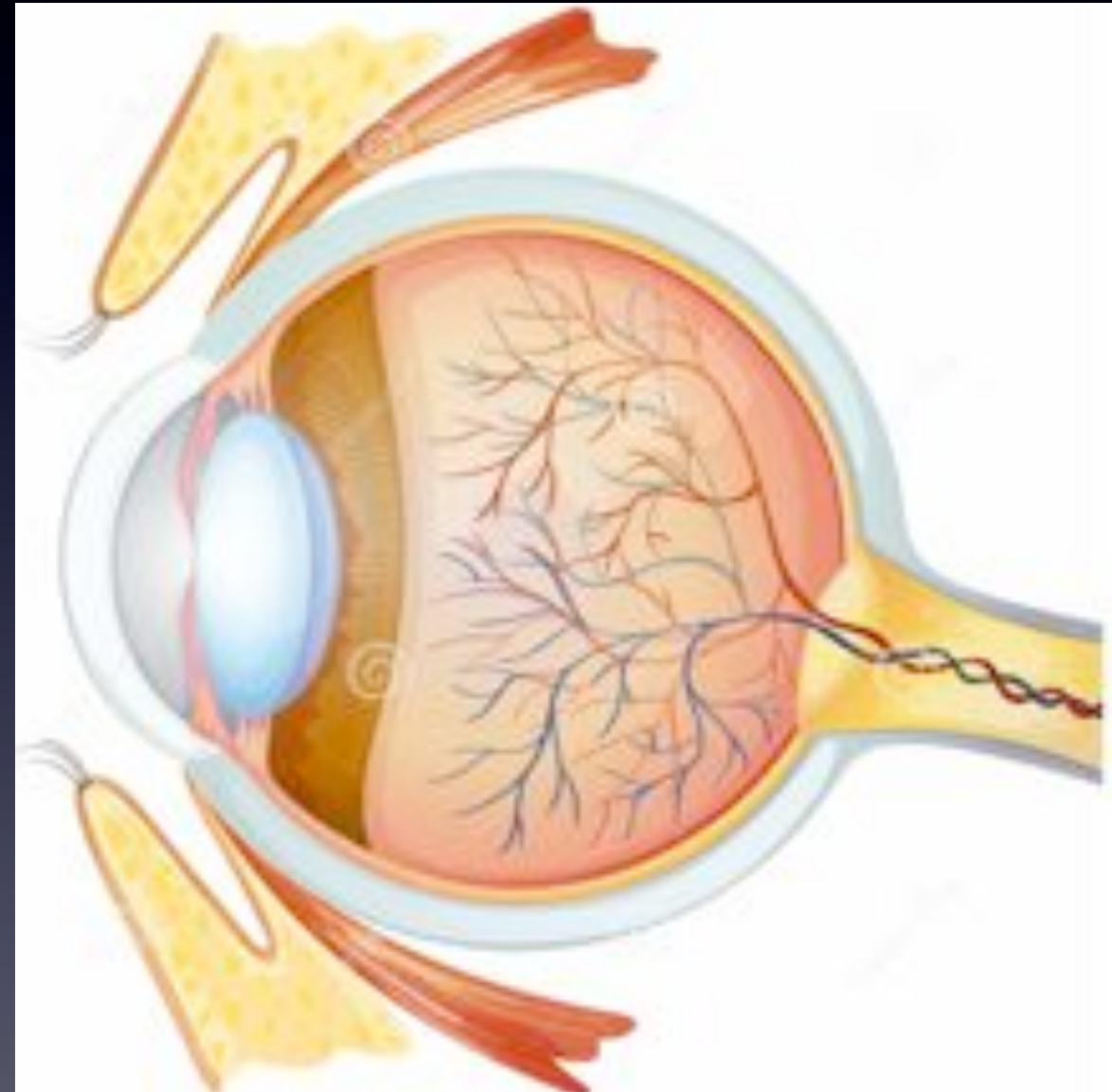
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens
 - Cataract
- Vitreous



Unilateral Visual Loss

Visual Pathway Interruption

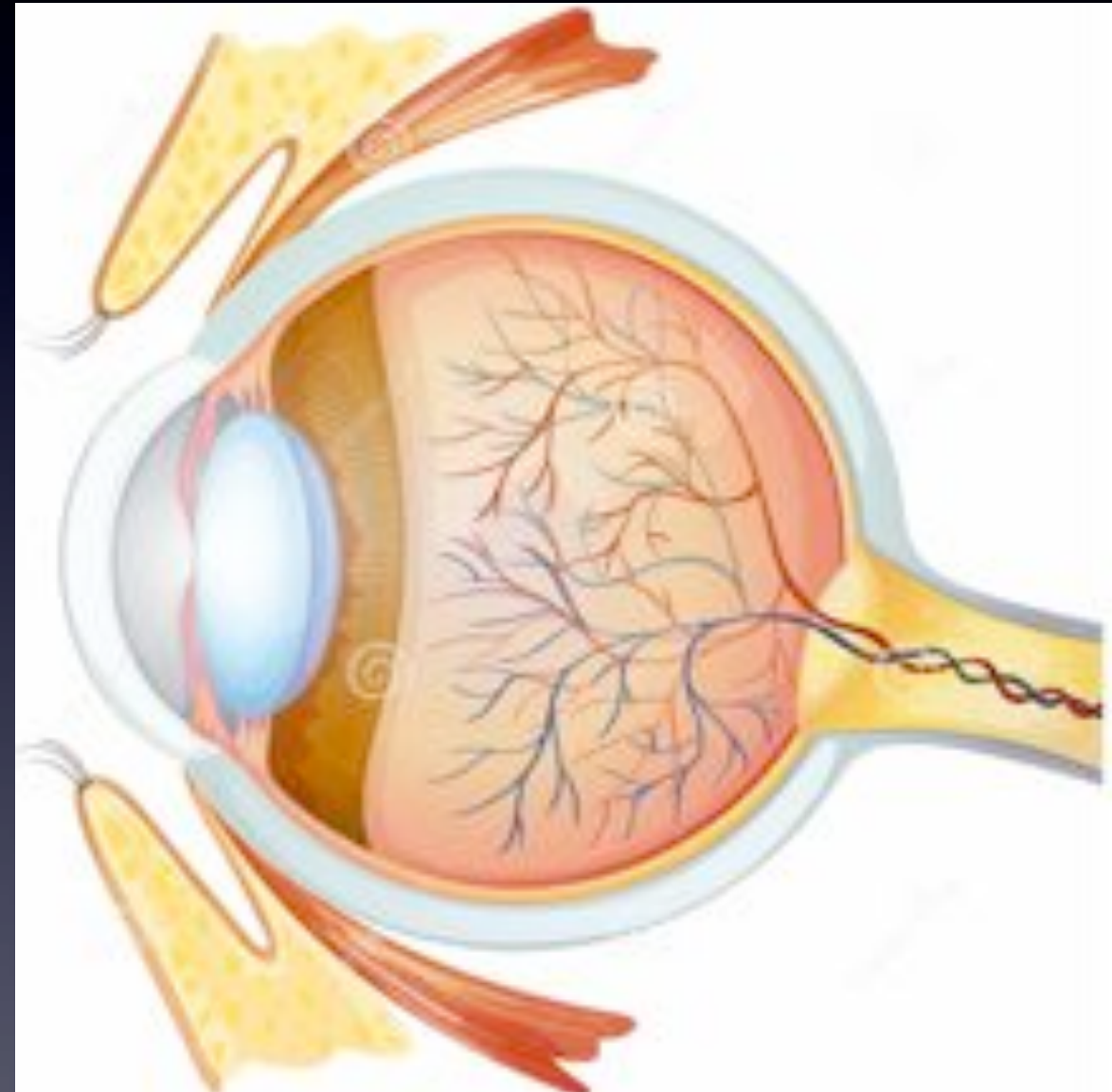
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens
 - Cataract
- Vitreous
 - Haemorrhage



Unilateral Visual Loss

Visual Pathway Interruption

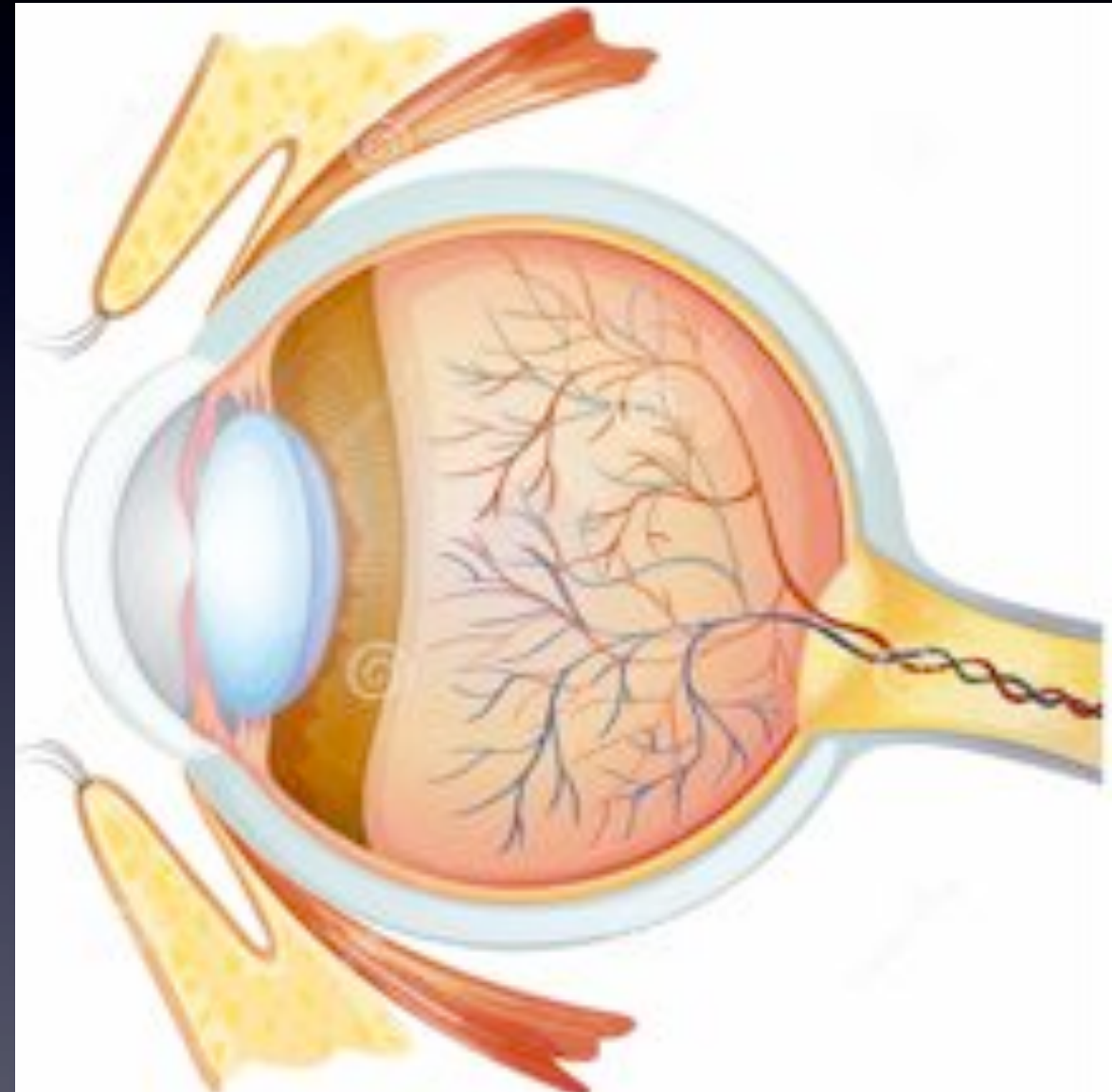
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina



Unilateral Visual Loss

Visual Pathway Interruption

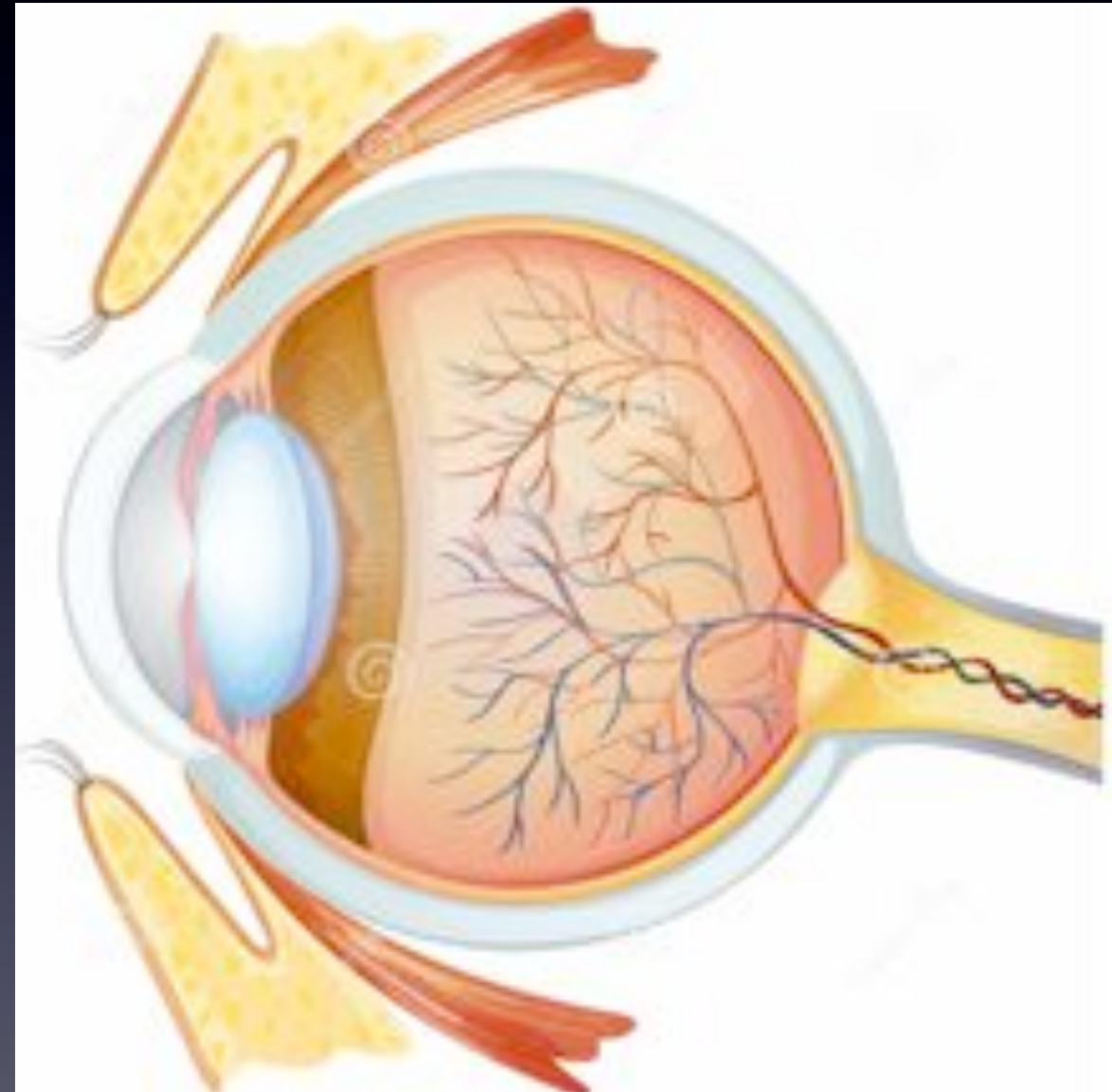
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina
 - Detachment, Vascular Occlusion



Unilateral Visual Loss

Visual Pathway Interruption

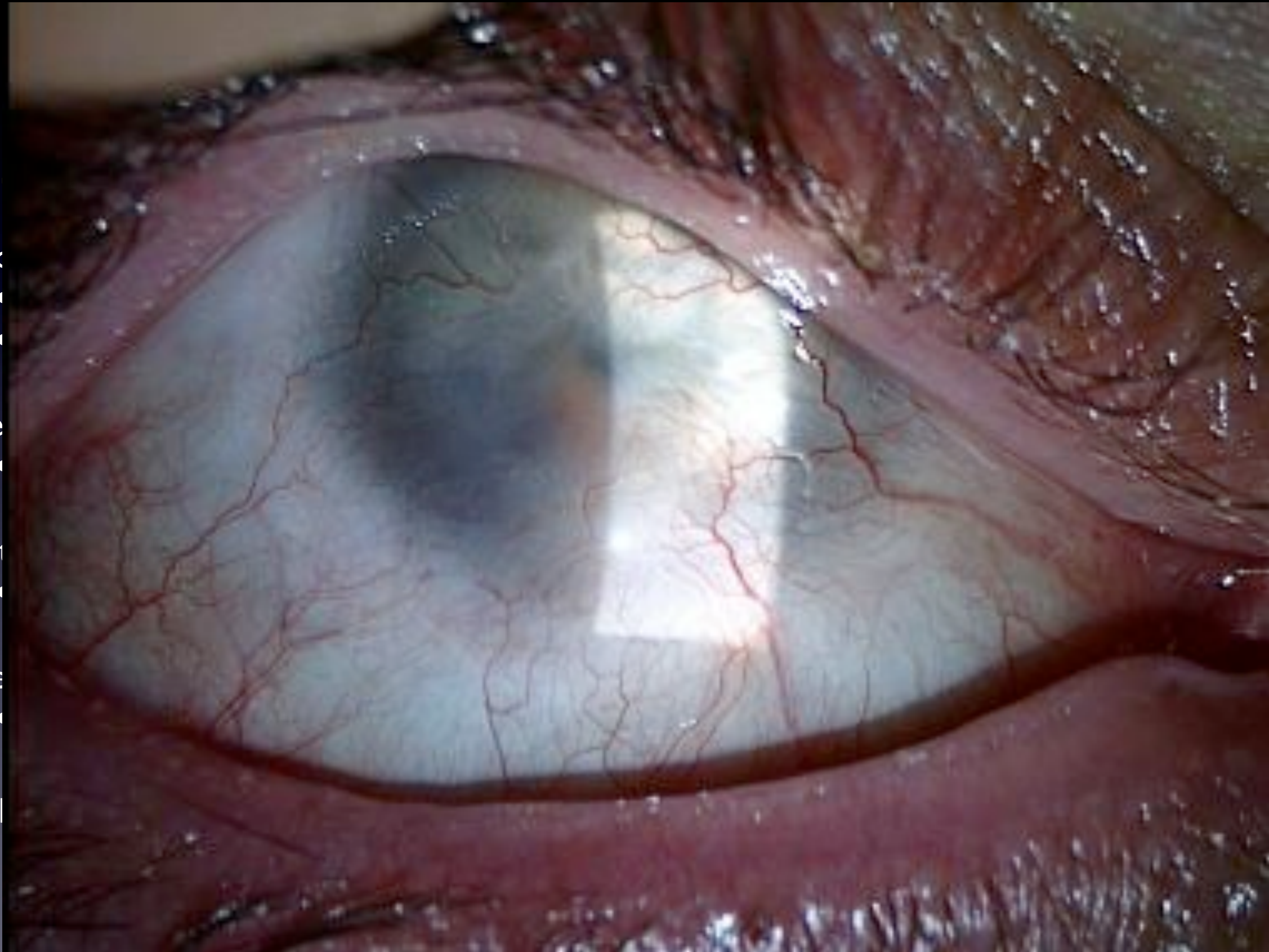
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina
 - Detachment, Vascular Occlusion
- Optic Nerve



Unilateral Visual Loss

Vi

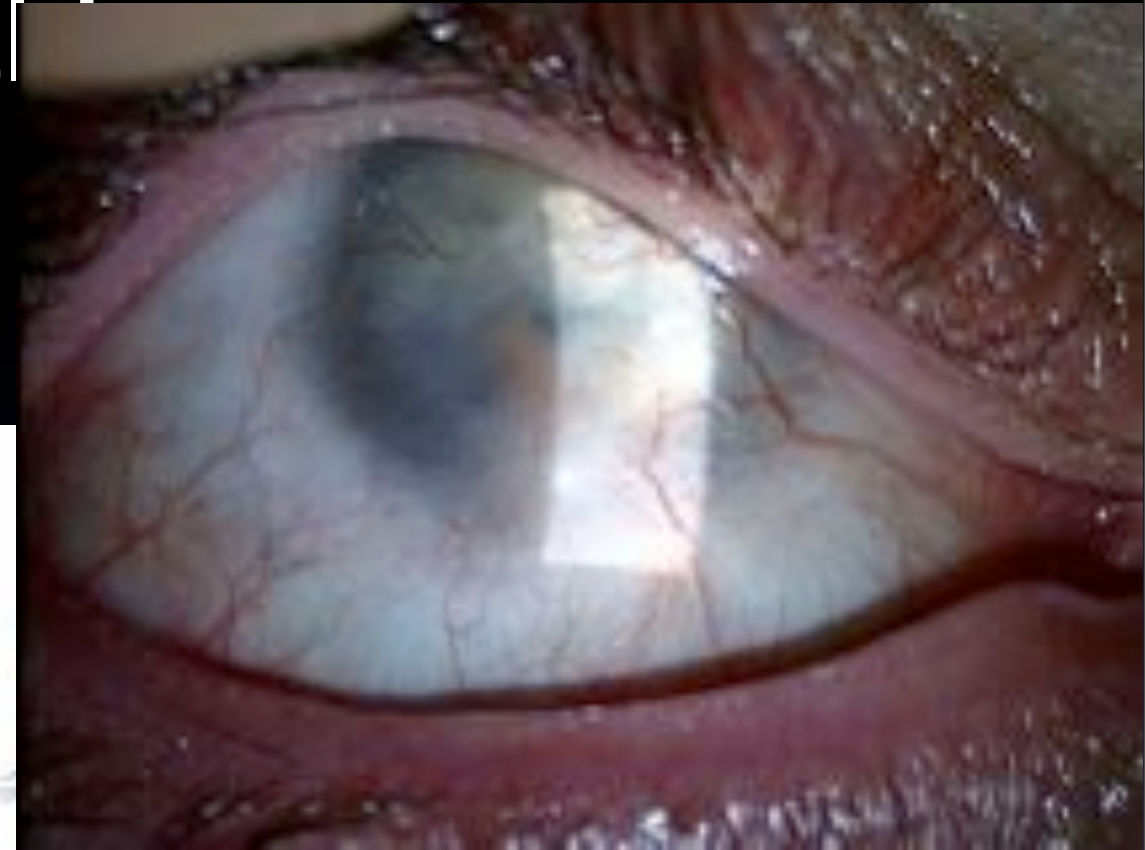
- Co
- Le
- Vi
- Re
- O



Unilateral Visual

Visual Pathway Interruption

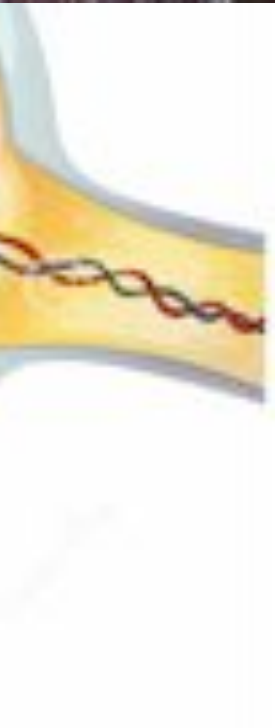
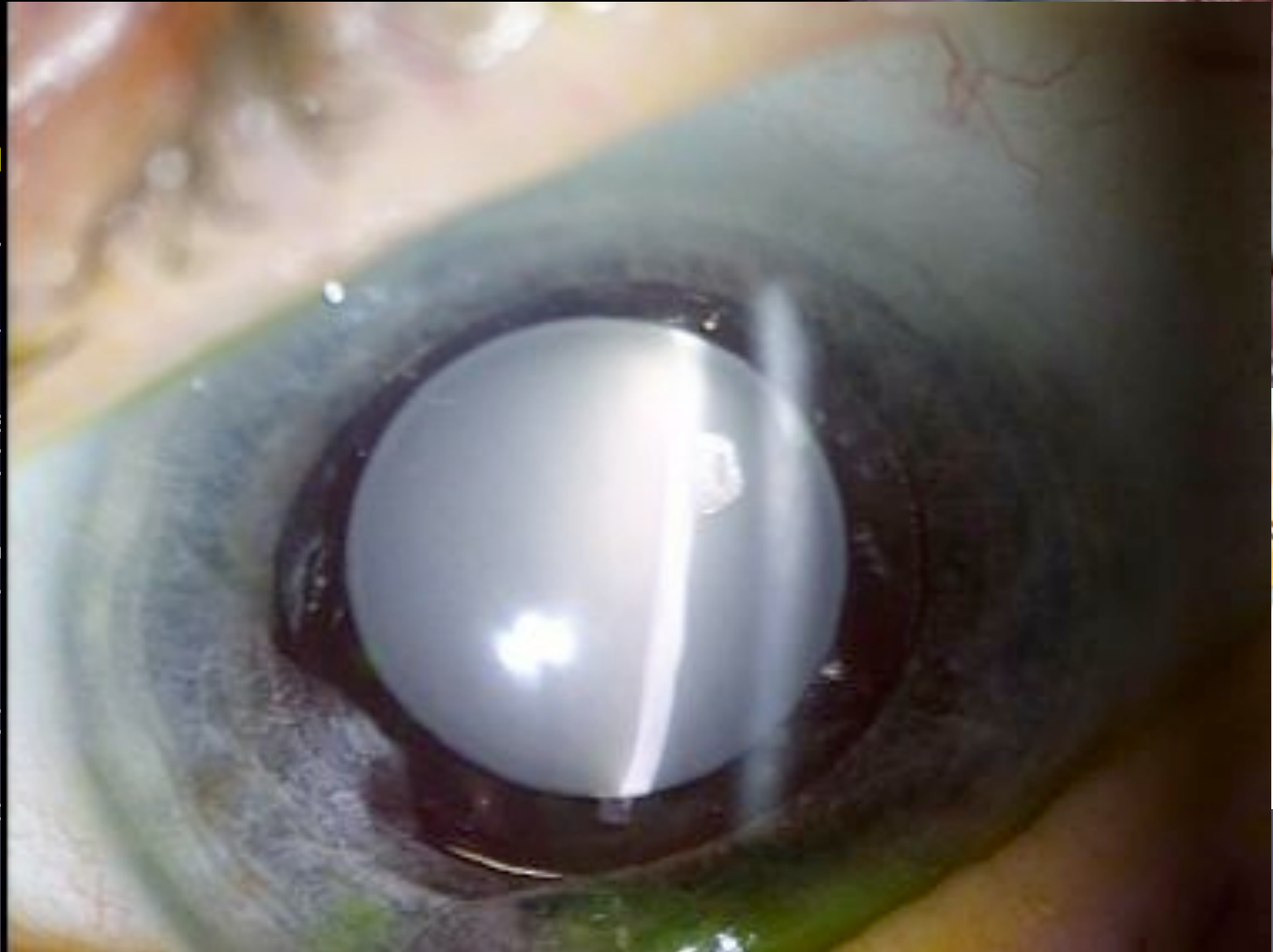
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina
 - Detachment, Vascular Occlusion
- Optic Nerve



Unilateral Visual

Visual

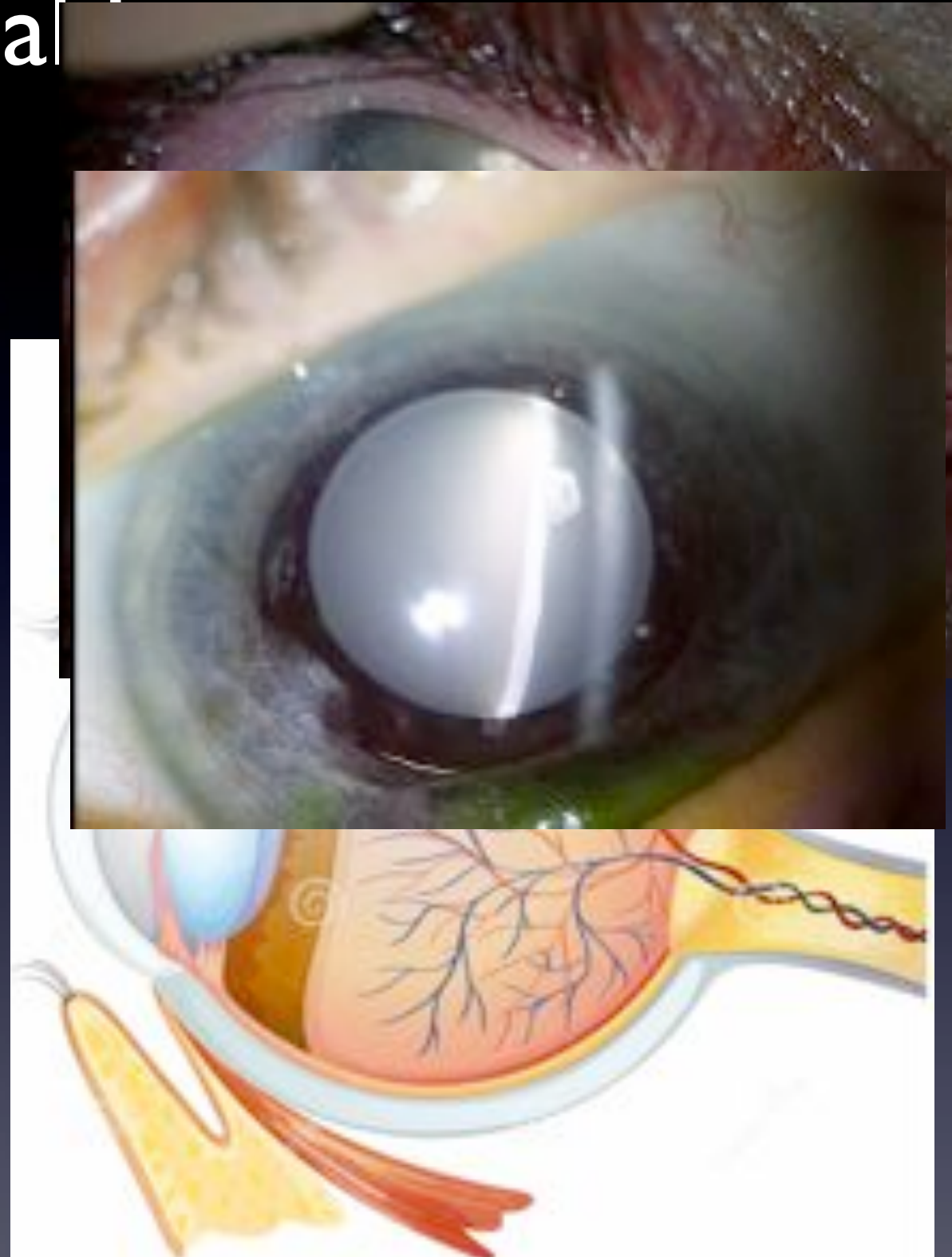
- Cornea
- Sclera
- Iris
- Lens
- Ciliary muscles
- Vitreous body
- Fovea
- Retina
- Dura
- Optic nerve



Unilateral Visual

Visual Pathway Interruption

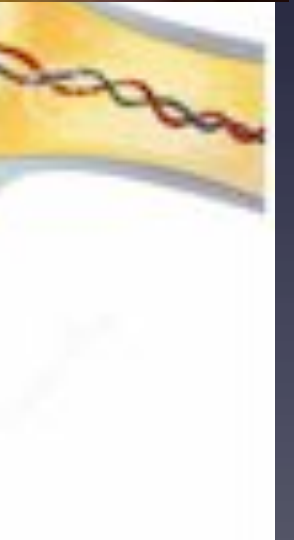
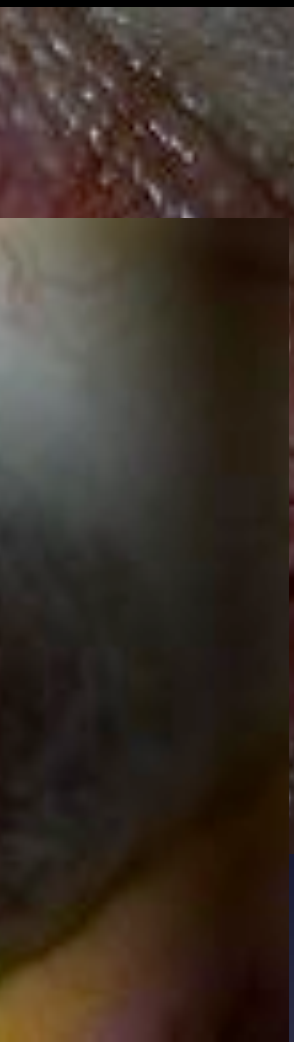
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmune
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina
 - Detachment, Vascular Occlusion
- Optic Nerve



Unilateral Visual

Visual

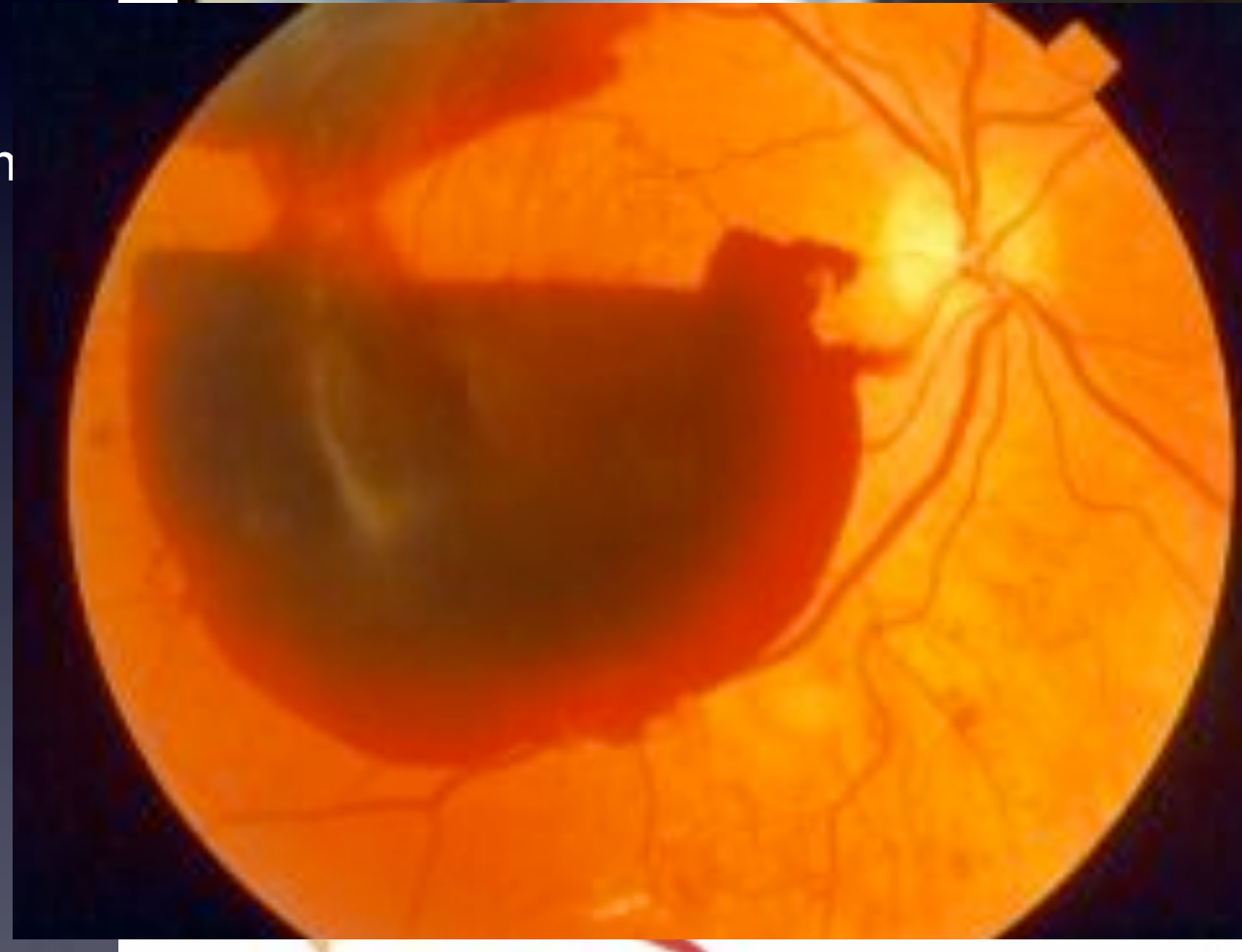
- Cornea
 - Scarring
 - Infection
- Lens
 - Cataract
- Vitreous
 - Hemorrhage
- Retina
 - Detachment
- Optic Nerve



Unilateral Visual

Visual Pathway Interruption

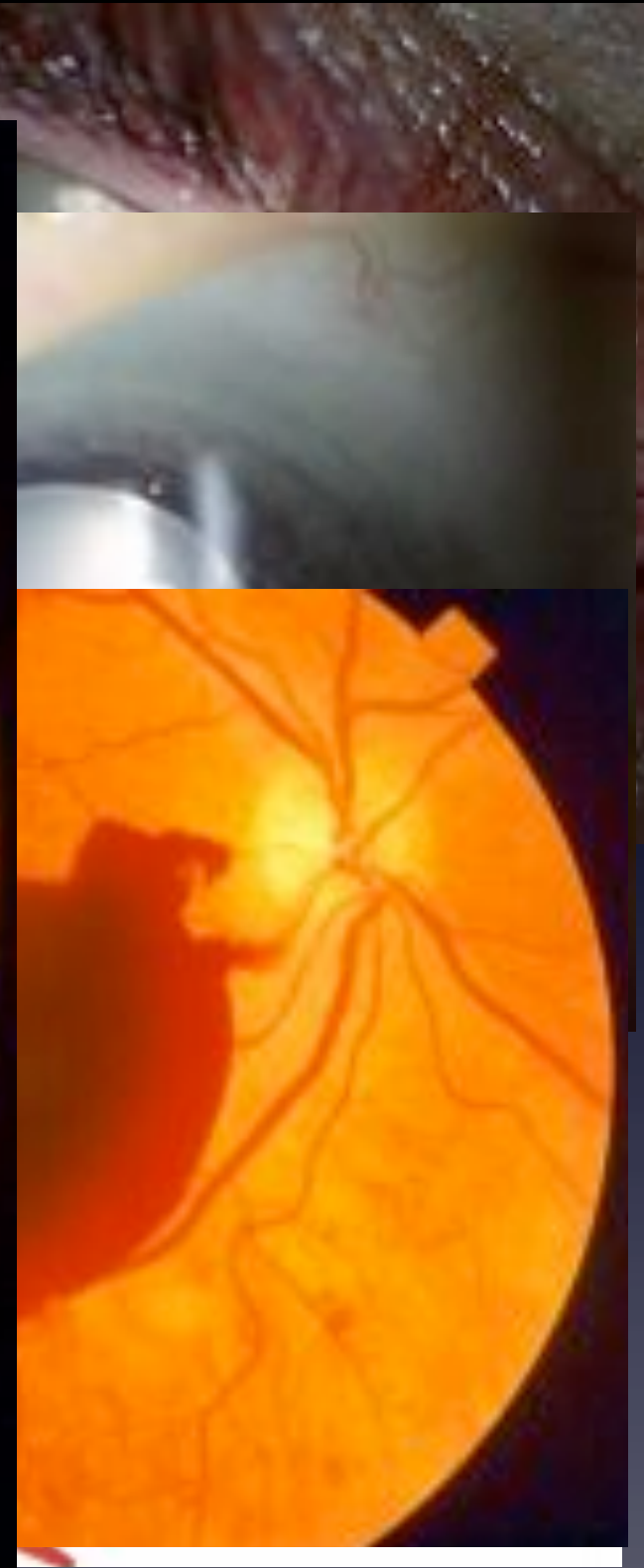
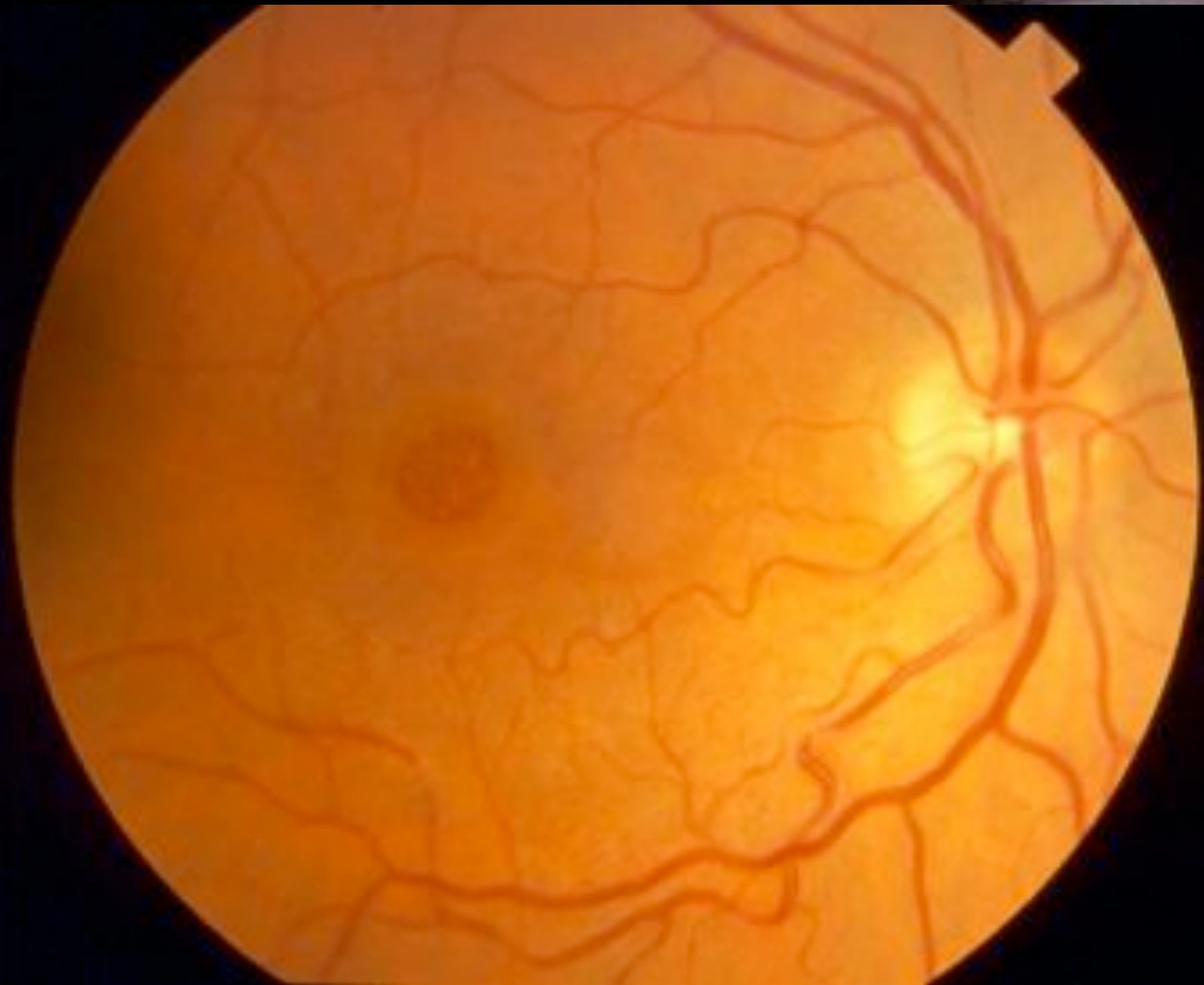
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmun
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina
 - Detachment, Vascular Occlusion
- Optic Nerve



Unilateral Visual

Visual

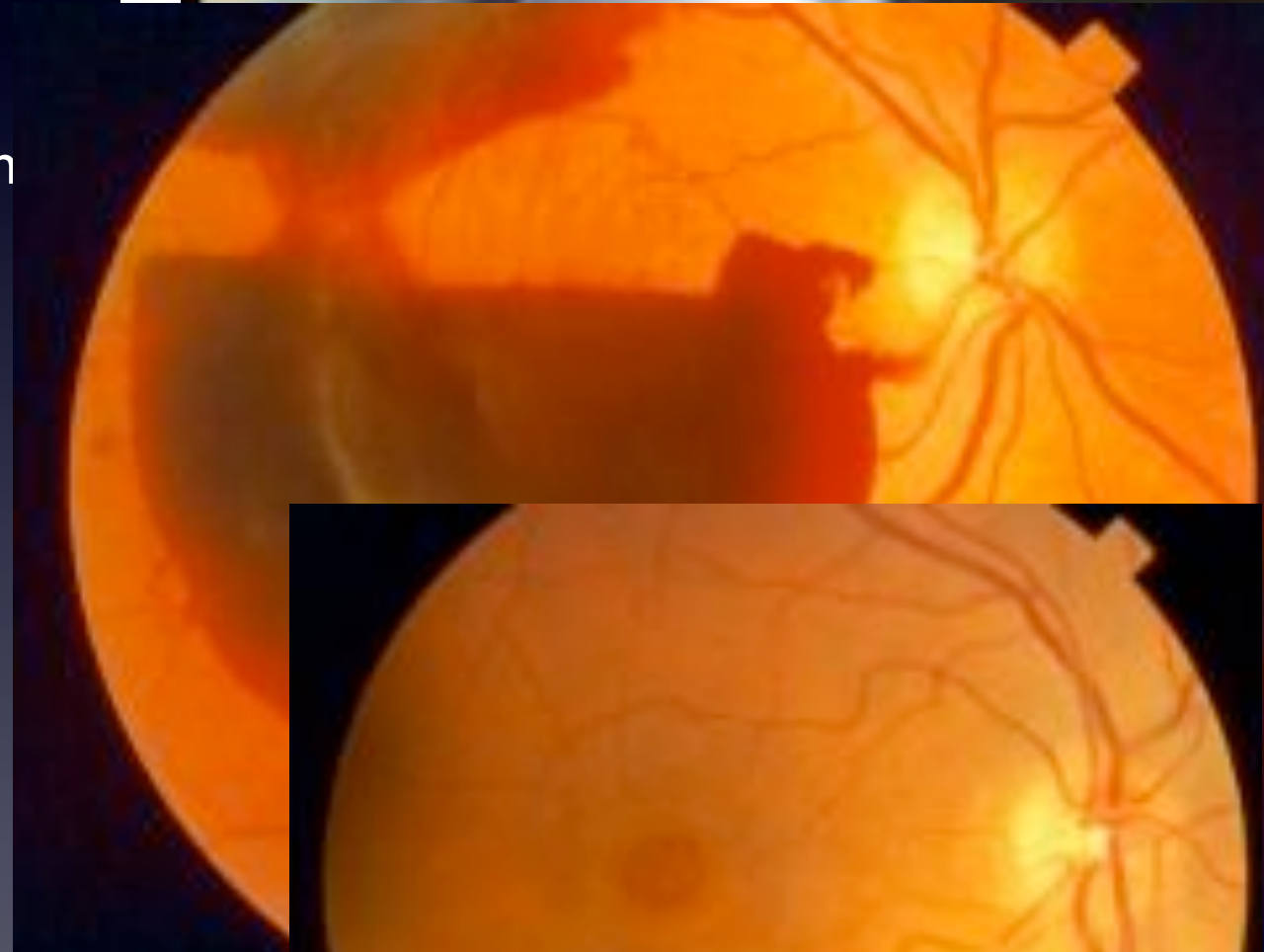
- Cornea
 - Scarring
 - Inflammation
- Lens
 - Cataract
- Vitreous
 - Hemorrhage
- Retina
 - Detachment
- Optic nerve



Unilateral Visual

Visual Pathway Interruption

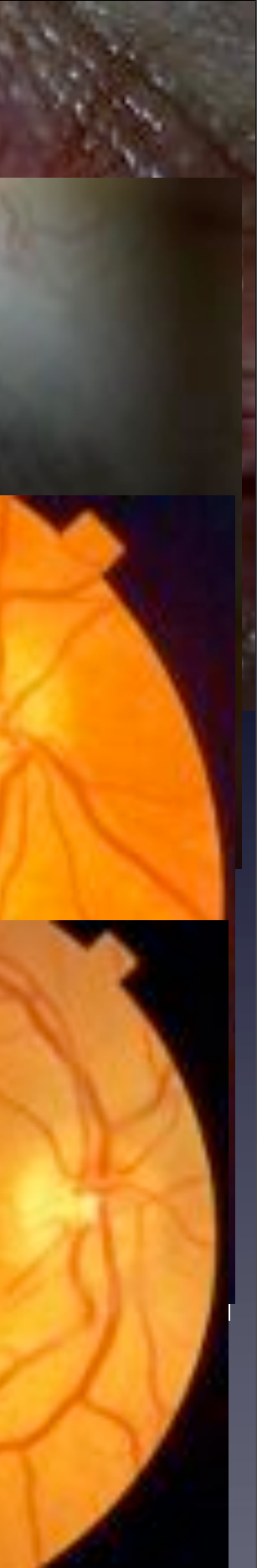
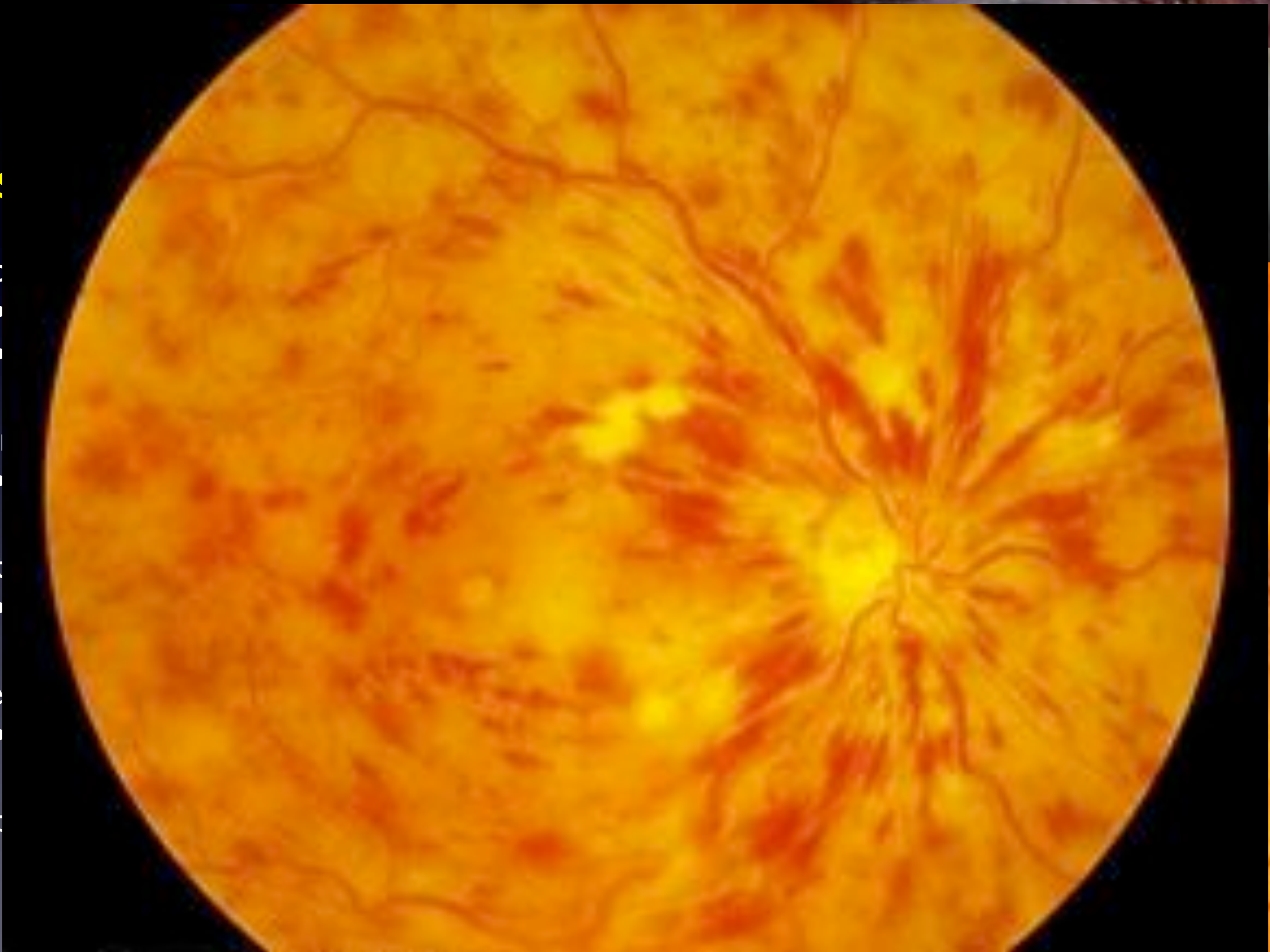
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmun
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina
 - Detachment, Vascular Occlusion
- Optic Nerve



Unilateral Visual

Vis

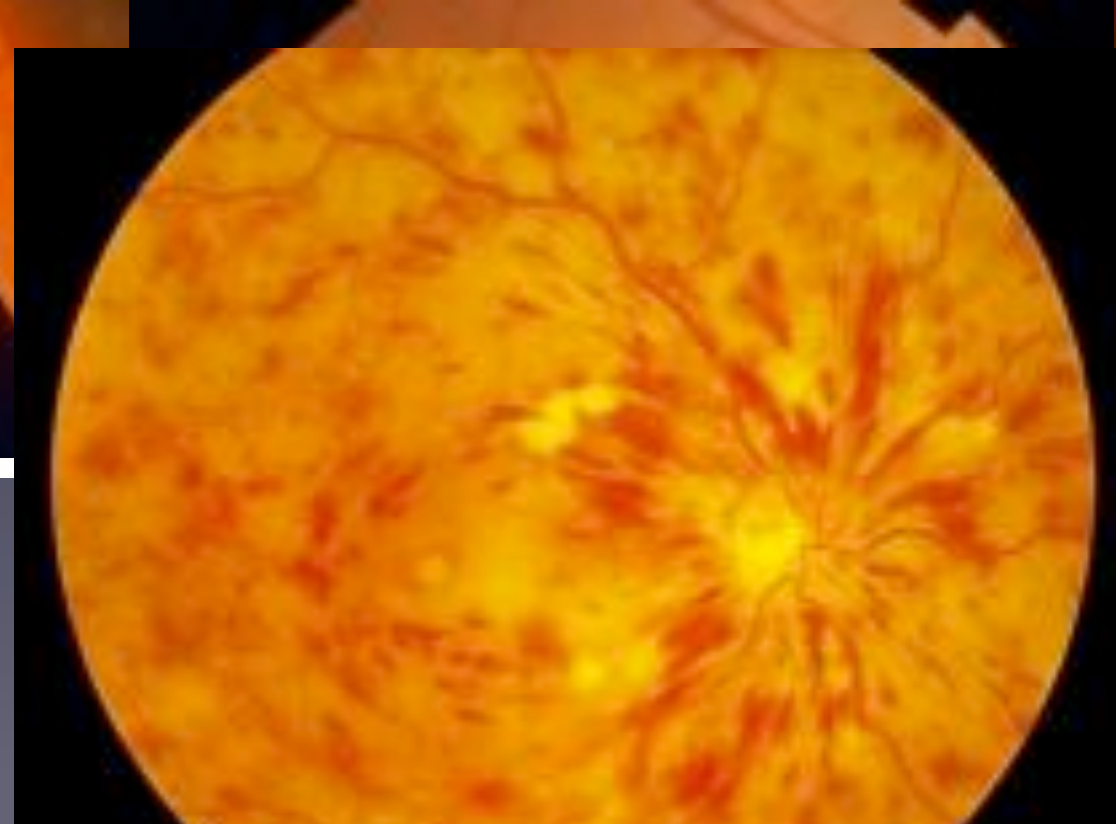
- Co
-
-
- Le
-
- Vit
-
- Re
-
- Op



Unilateral Visual

Visual Pathway Interruption

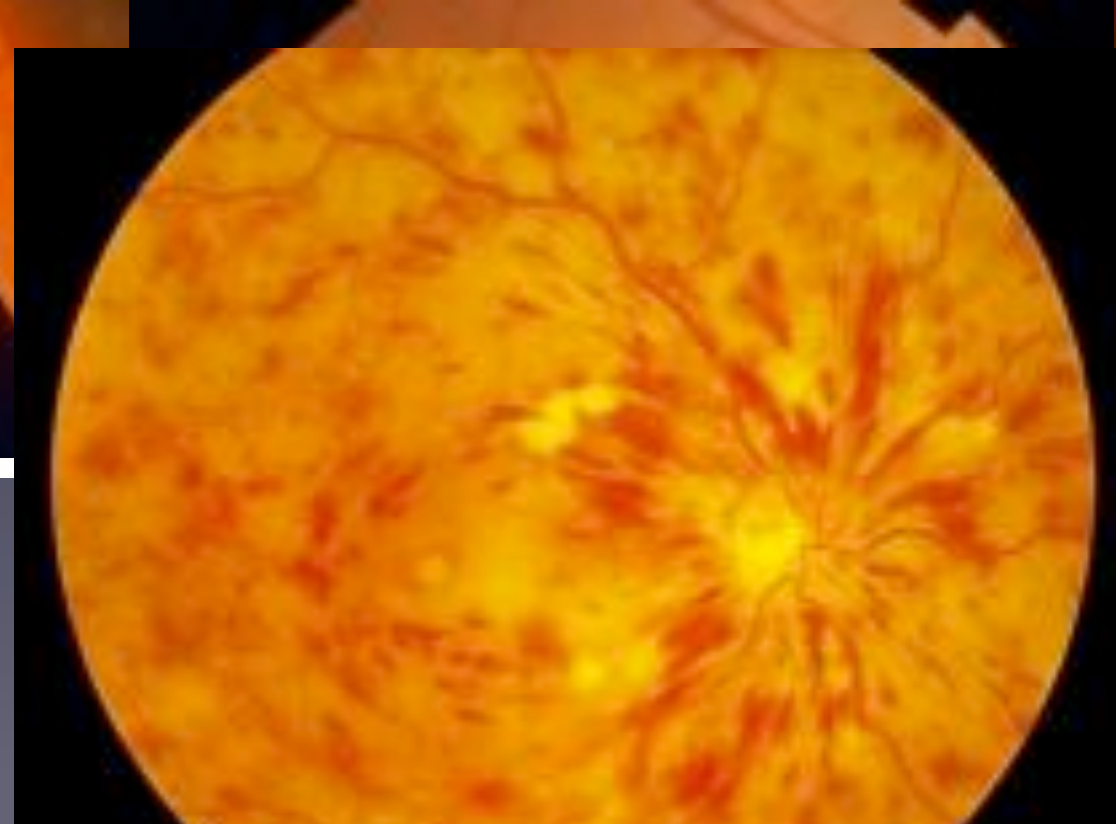
- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmun
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina
 - Detachment, Vascular Occlusion
- Optic Nerve



Unilateral Visual

Visual Pathway Interruption

- Corneal Disease
 - Scarring
 - Inflammation - (Keratitis)- Infective/ Autoimmun
- Lens
 - Cataract
- Vitreous
 - Haemorrhage
- Retina
 - Detachment, Vascular Occlusion
- Optic Nerve

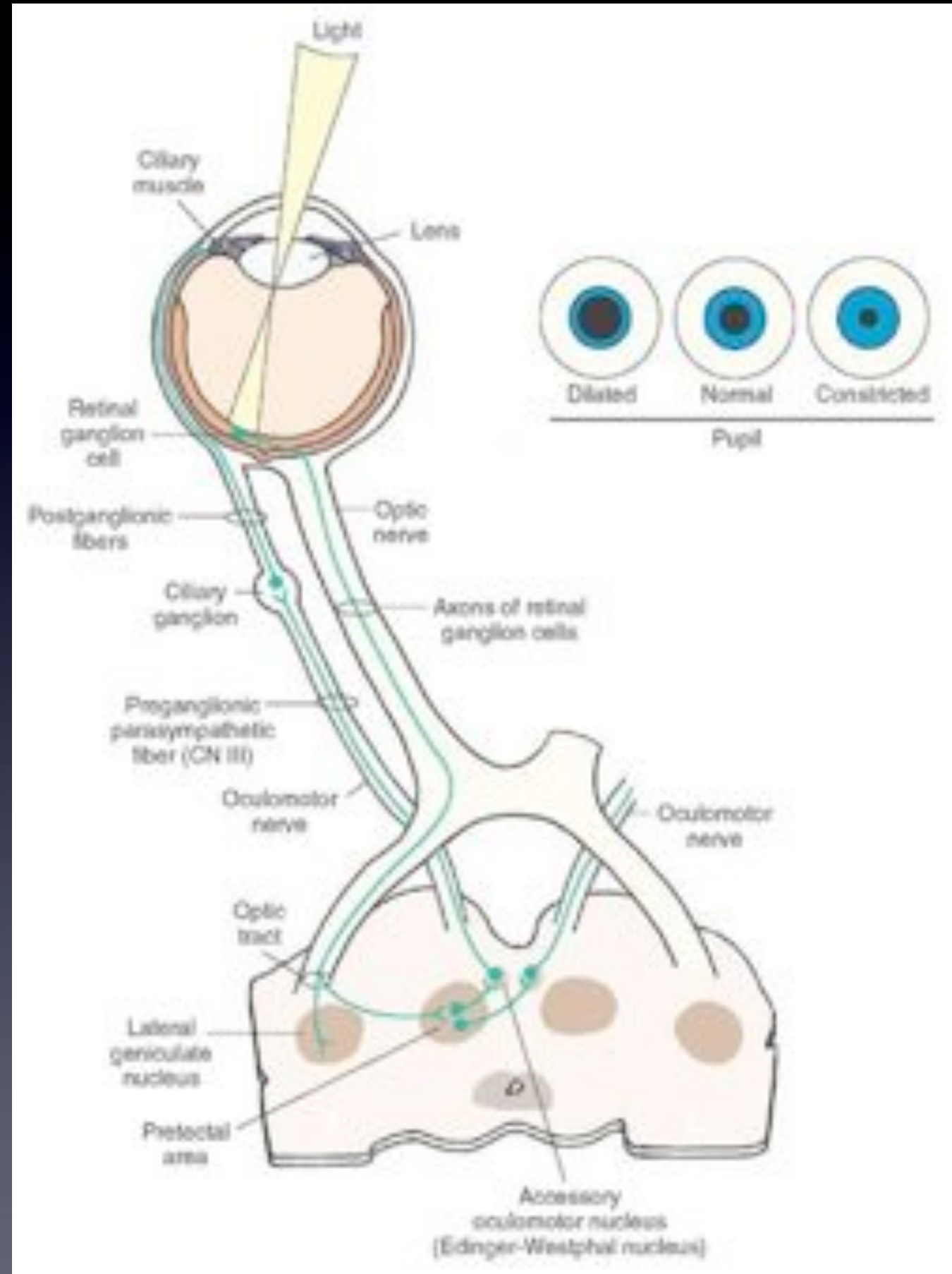


Optic Nerve Problems

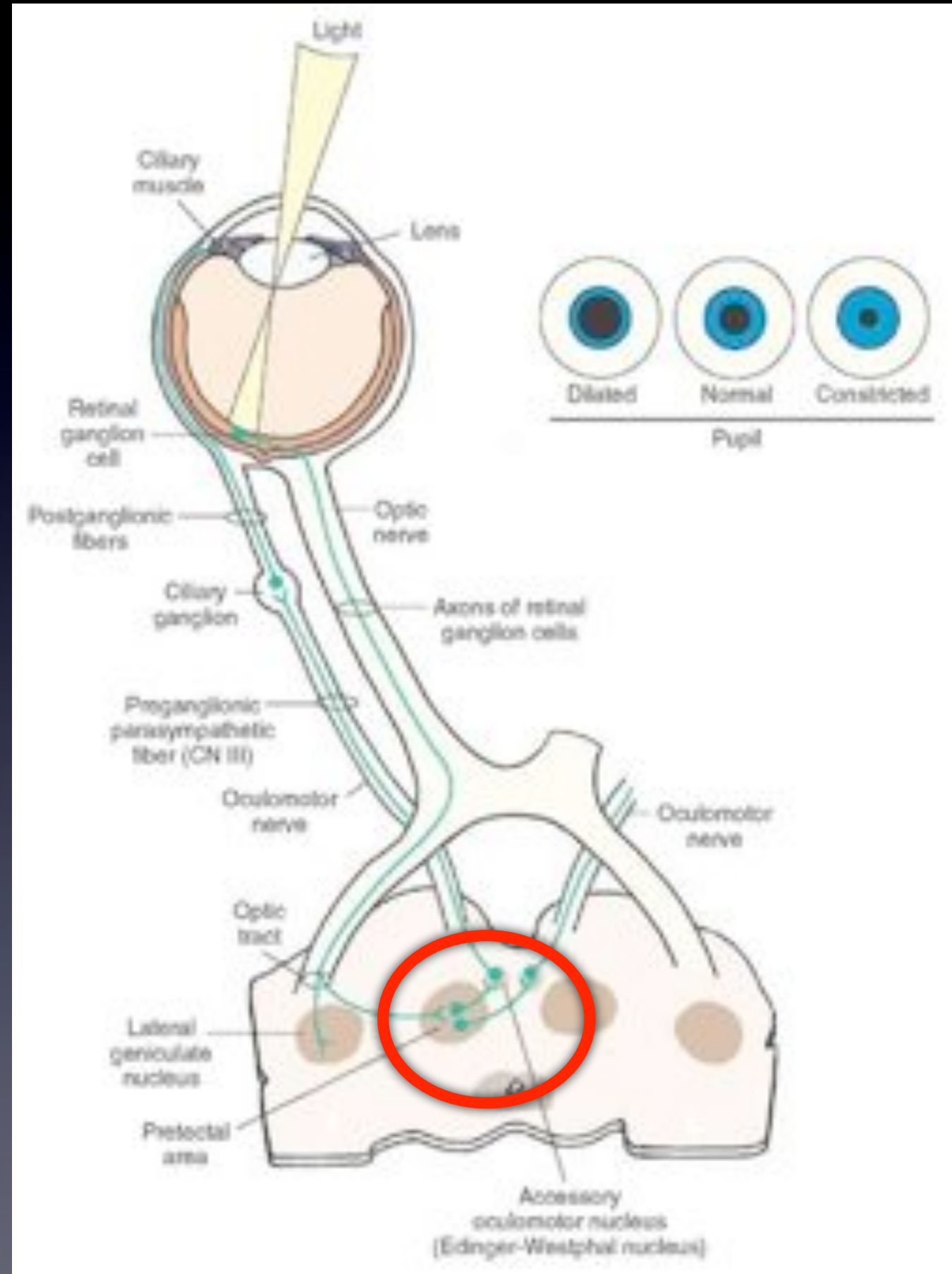
- Anterior Neuropathy- visible on fundoscopy
- Posterior Neuropathy e.g. retrobulbar neuritis in MS
 - Nothing seen on fundoscopy

Pupil Reflex Pathway

Pupil Reflex Pathway

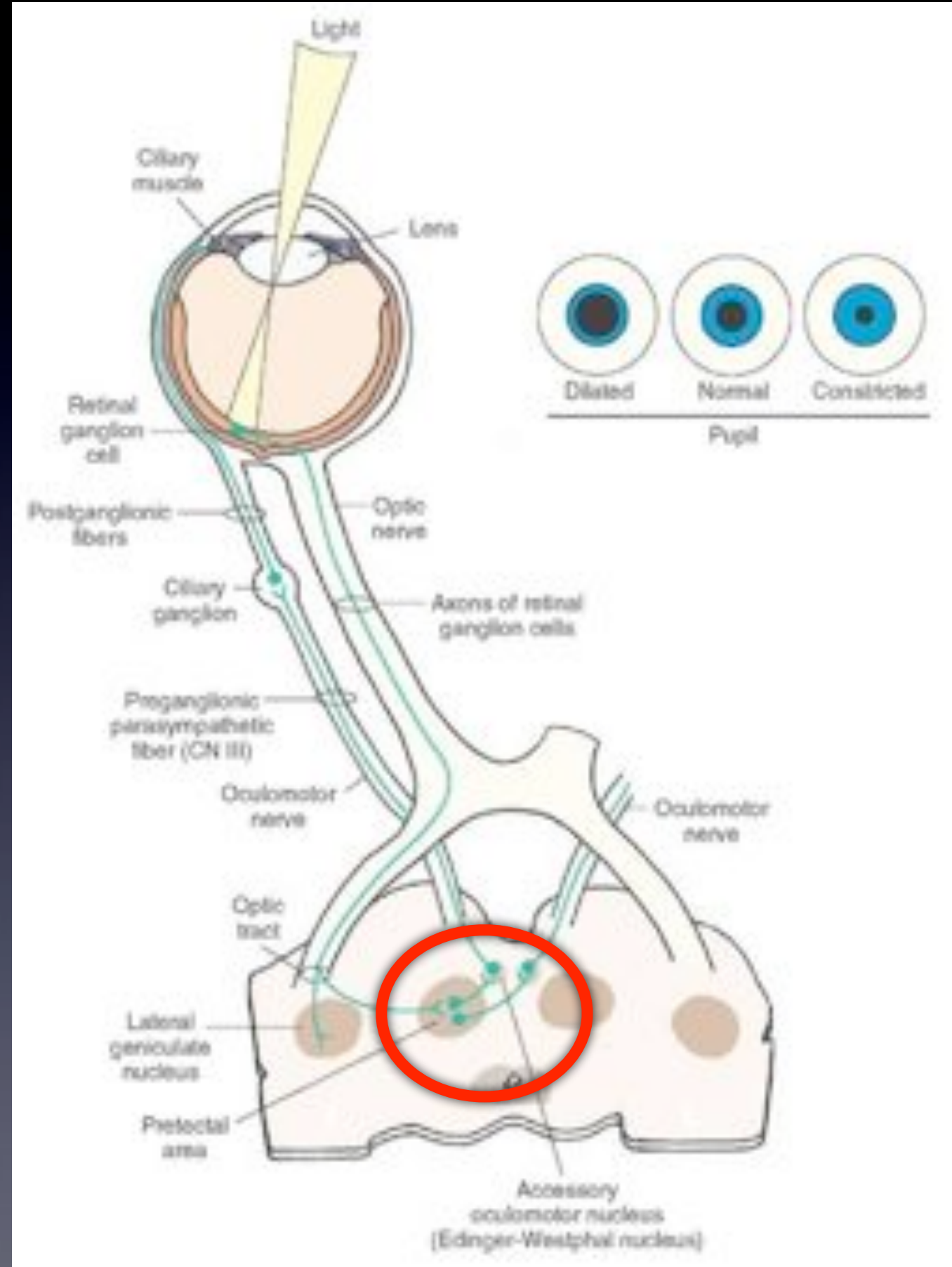


Pupil Reflex Pathway



Pupil Reflex Pathway

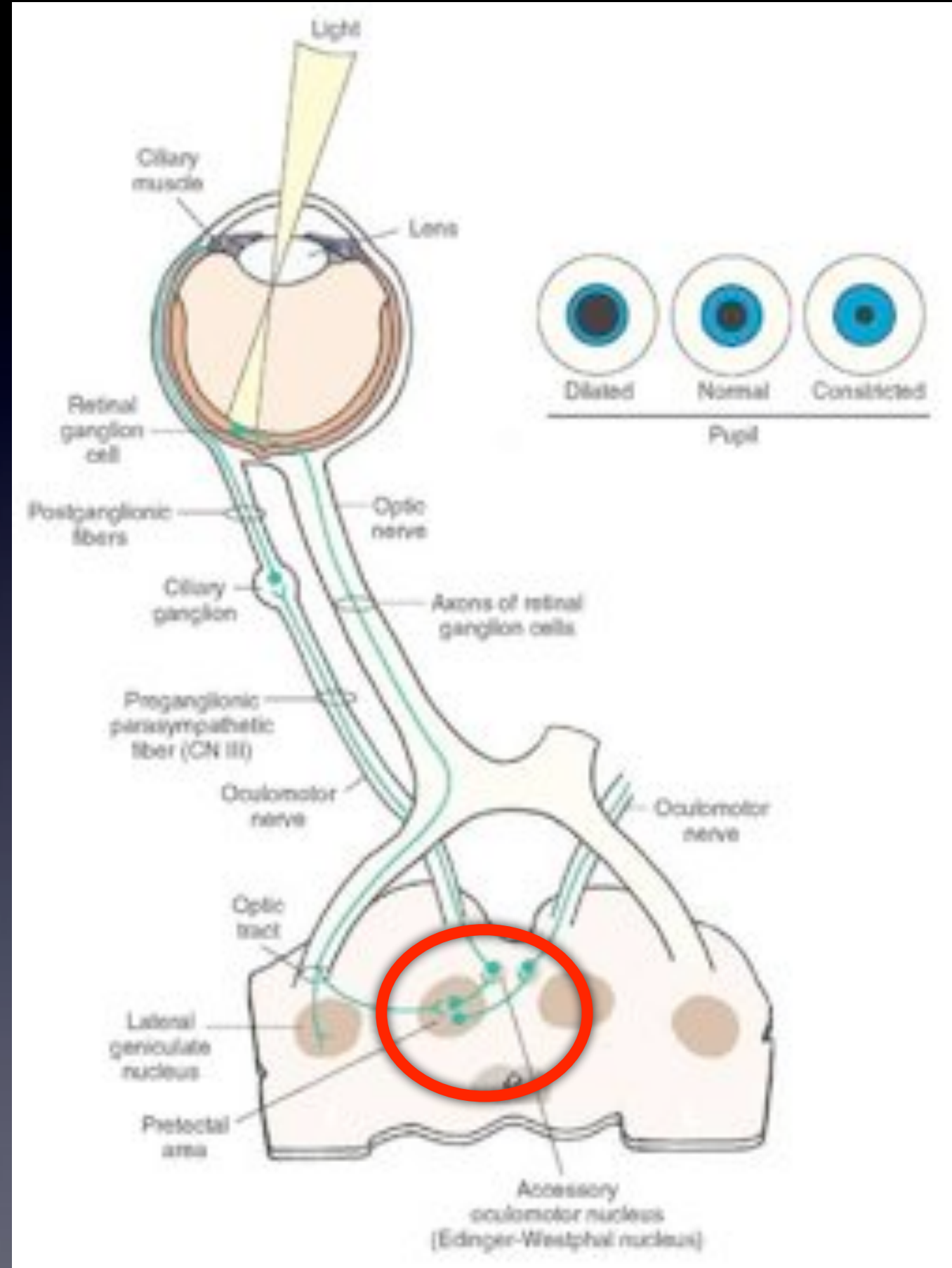
Afferent Pathway



Pupil Reflex Pathway

Afferent Pathway

Efferent pathway

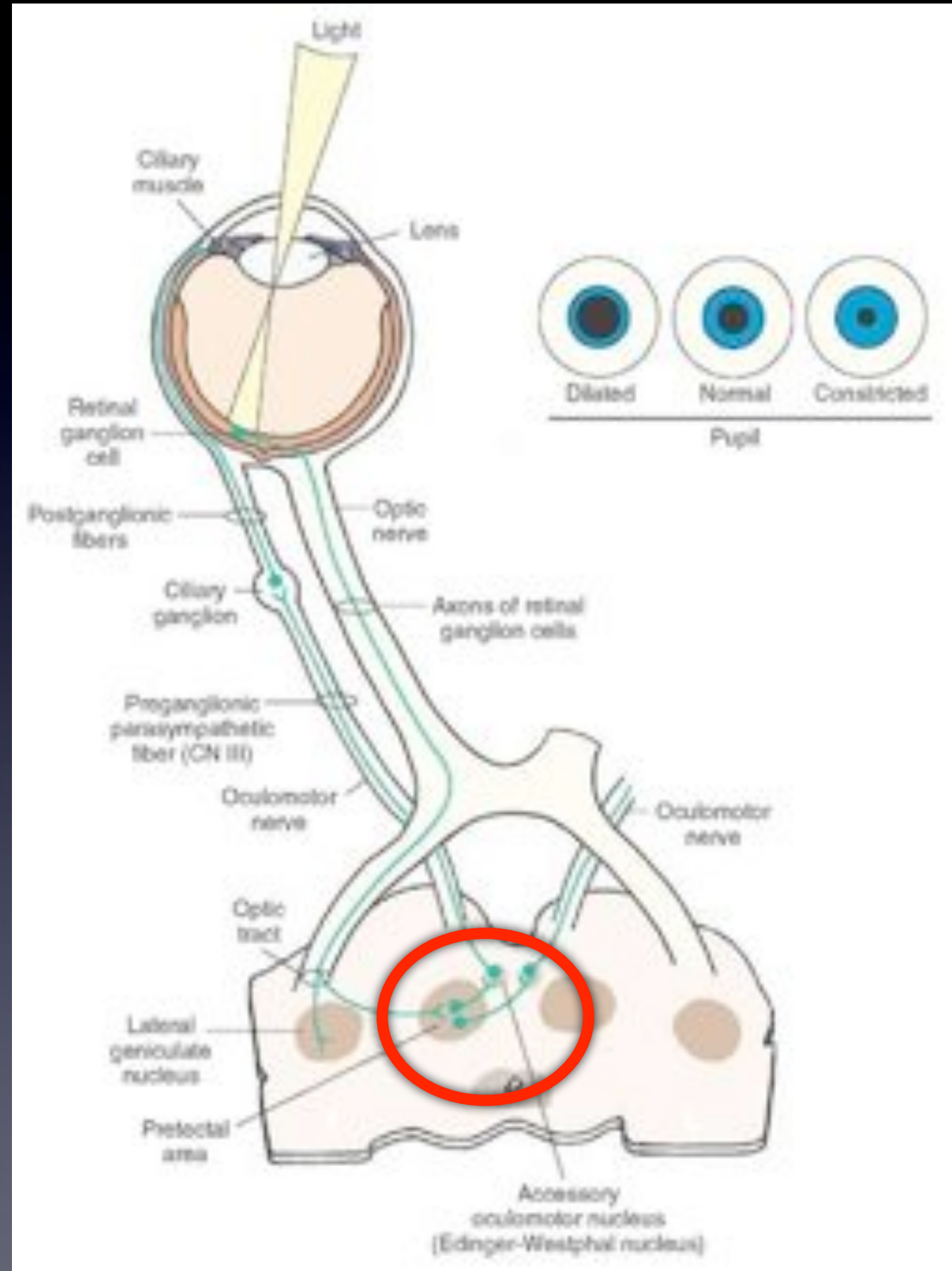


Pupil Reflex Pathway

Afferent Pathway

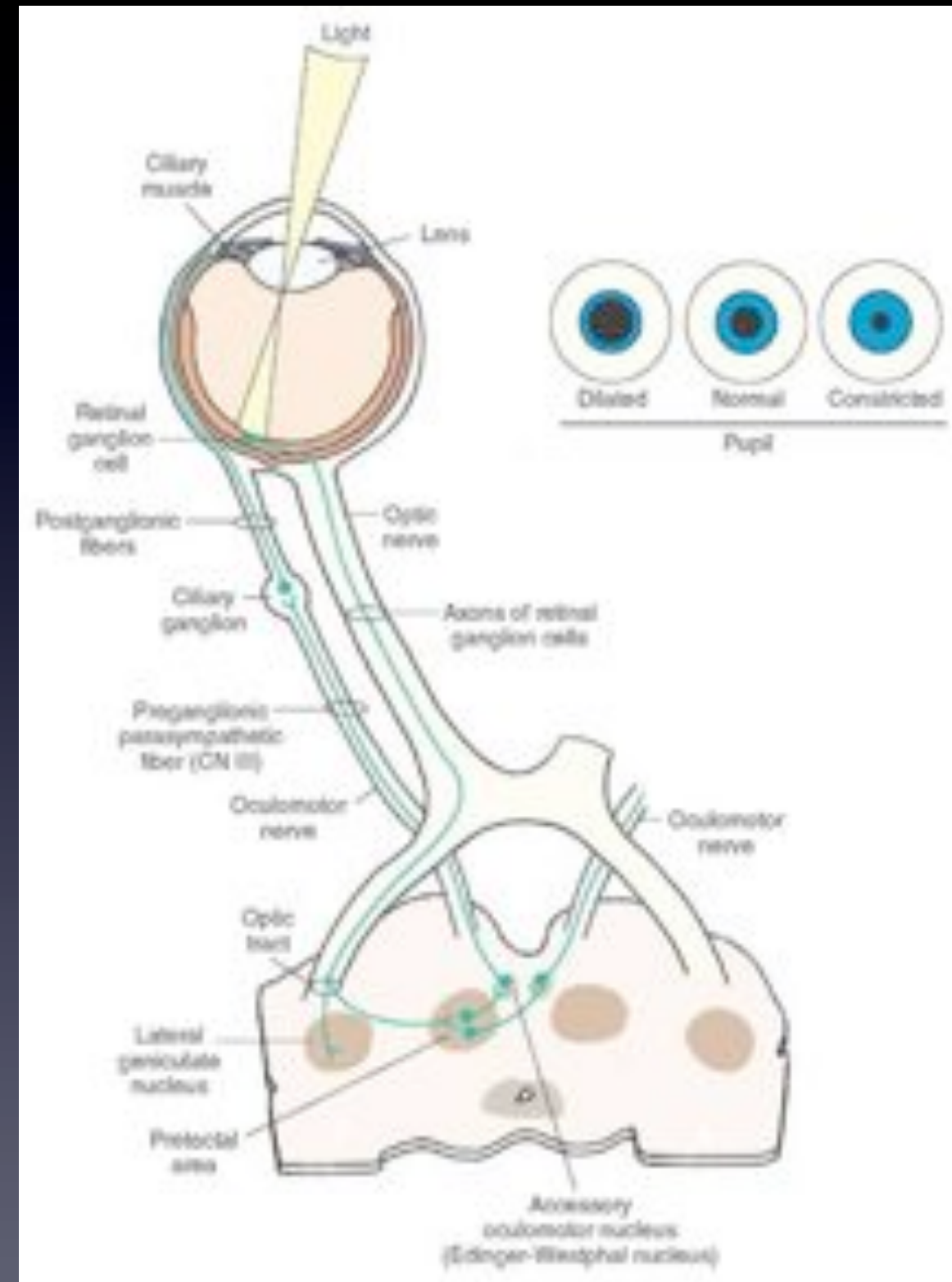
Efferent pathway

Each Afferent Pathway
Stimulates Bilateral
Efferent Pathways

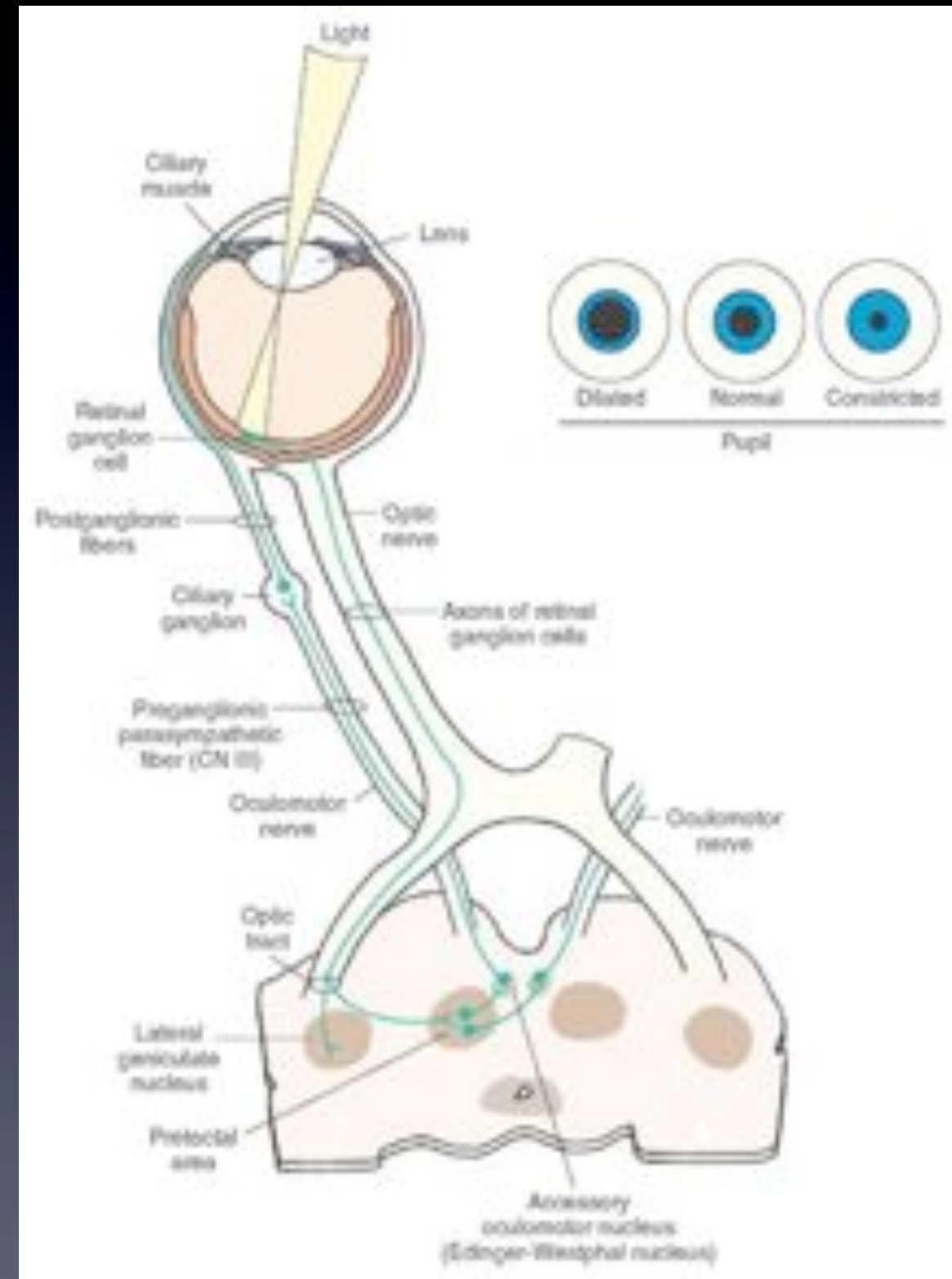
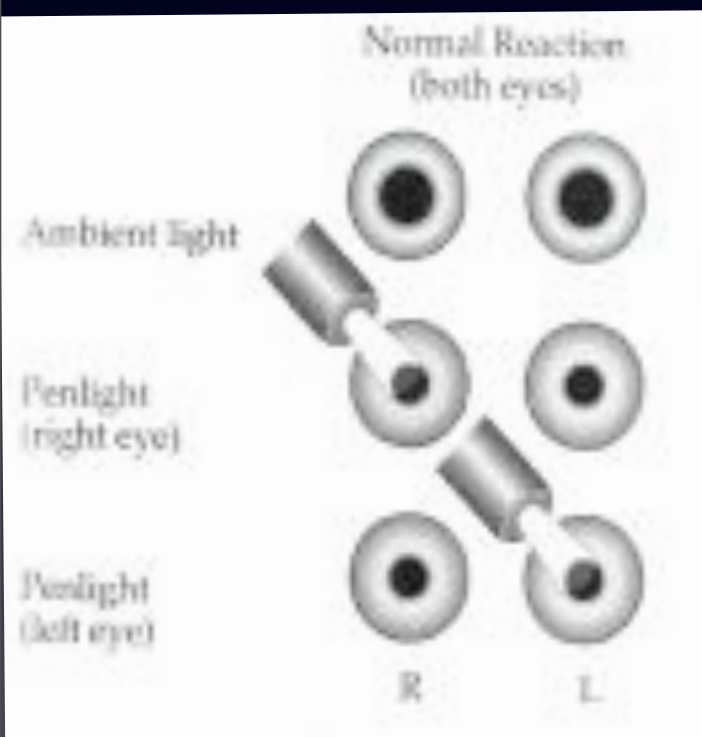


Efferent vs Afferent defect

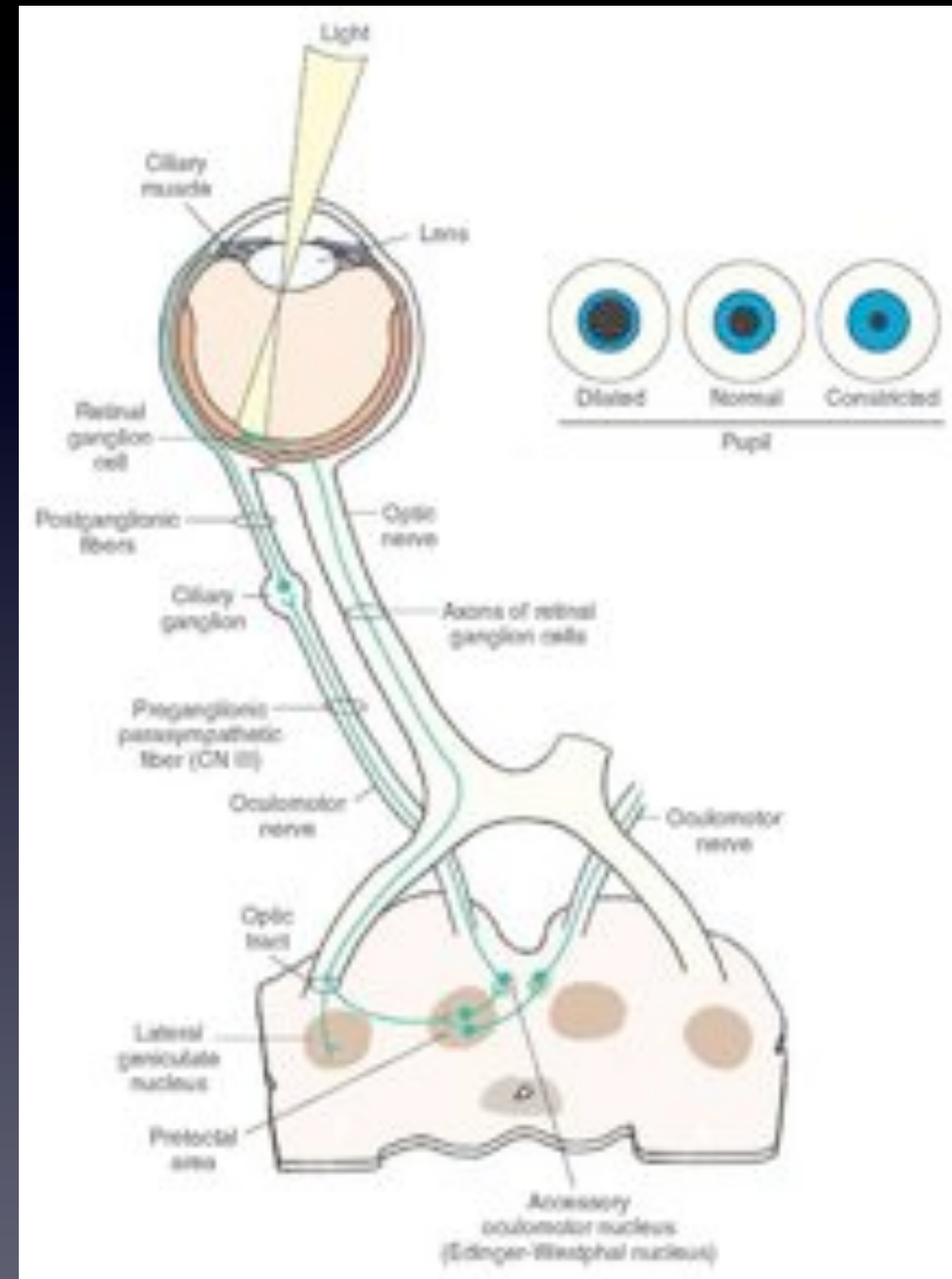
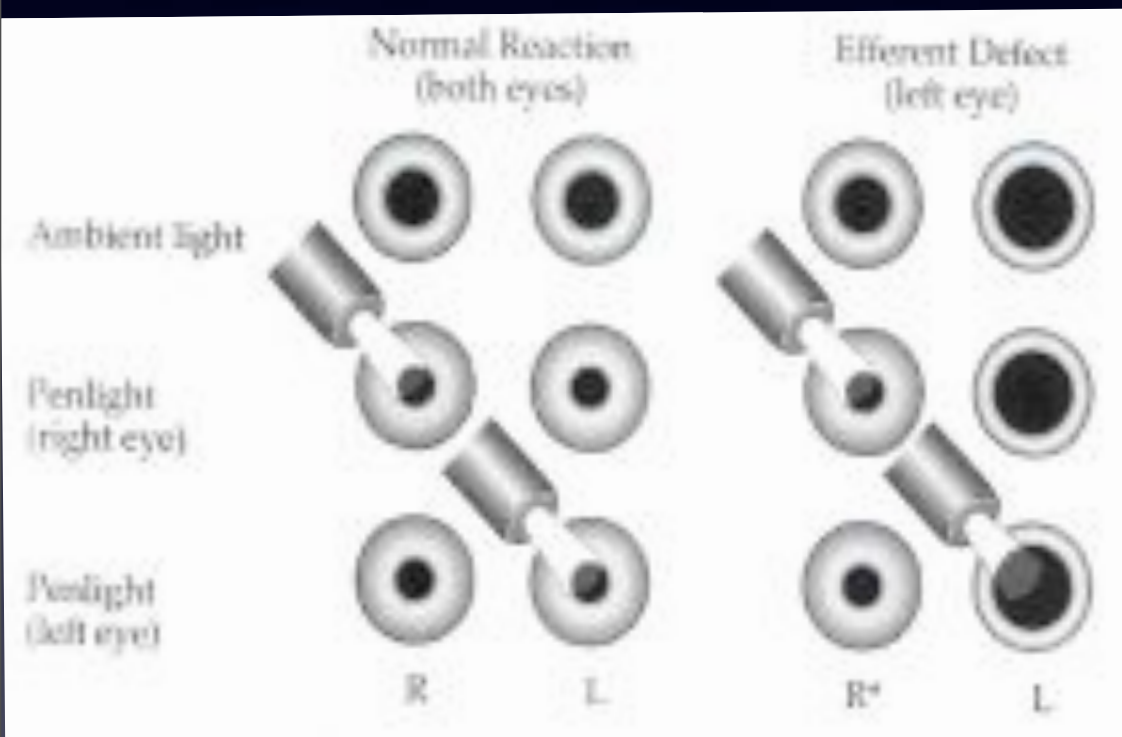
Efferent vs Afferent defect



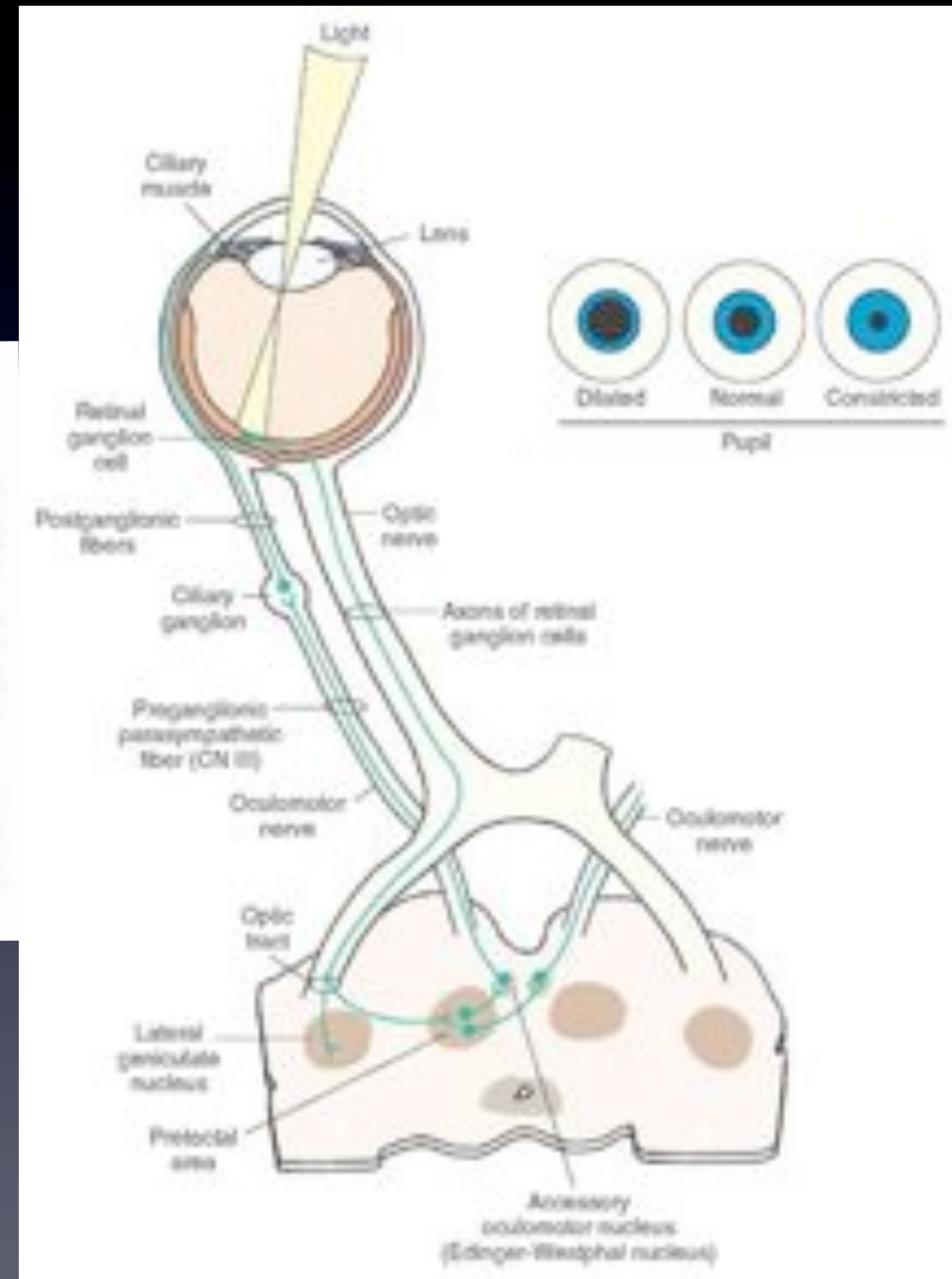
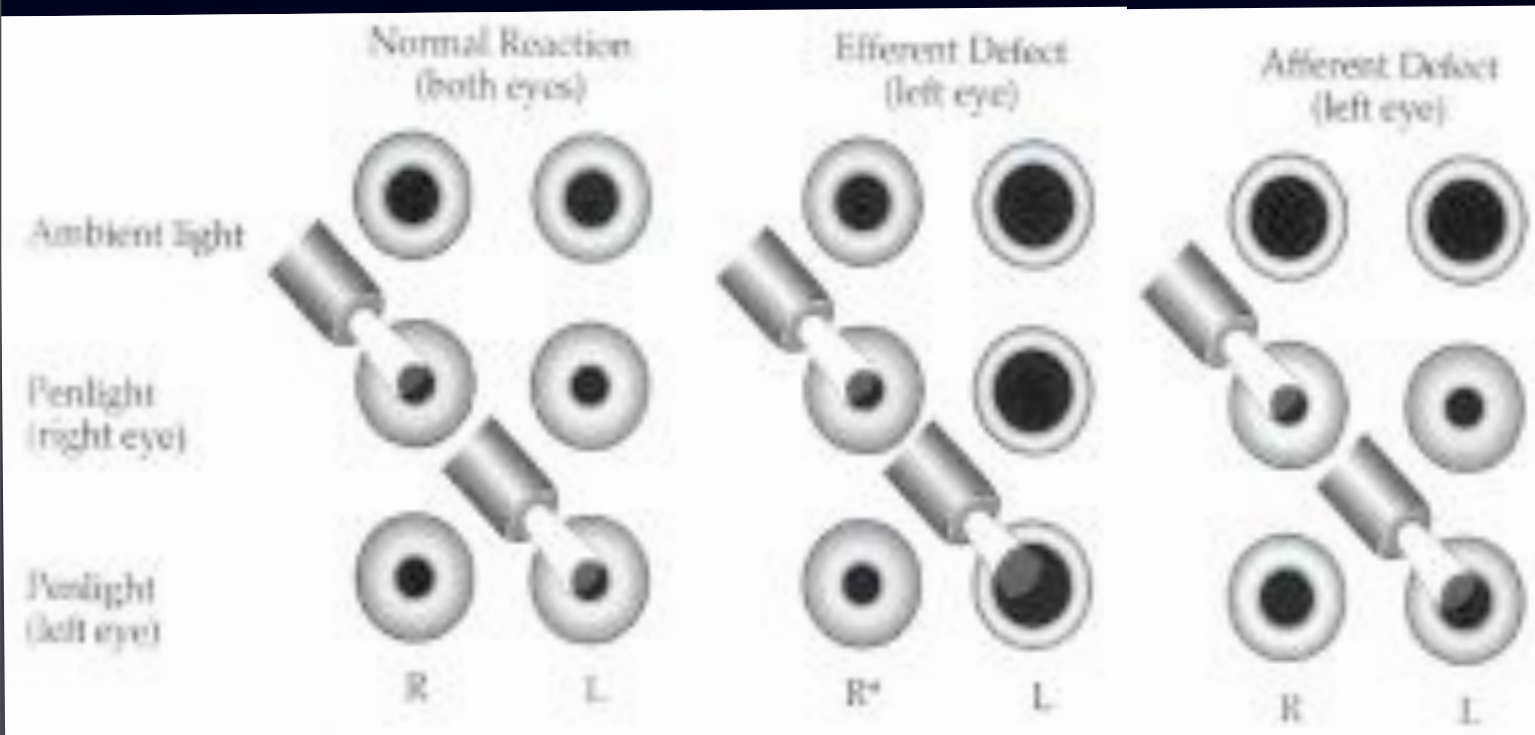
Efferent vs Afferent defect



Efferent vs Afferent defect



Efferent vs Afferent defect



Optic Nerve Problems

- Anterior Neuropathy visible on fundoscopy
- Posterior Neuropathy e.g. retrobulbar neuritis in MS
- Nothing seen on fundoscopy

Swinging Light Test - Right Relative Afferent Pupil Defect

Comparing the left and right afferent pathways and their ability to drive both efferent pathways



Swinging Light Test - Right Relative Afferent Pupil Defect

Comparing the left and right afferent pathways and their ability to drive both efferent pathways

Looks for subtle RAPD



Swinging Light Test - Right Relative Afferent Pupil Defect



Comparing the left and right afferent pathways and their ability to drive both efferent pathways

Looks for subtle RAPD
Relative afferent pupillary defect

Swinging Light Test - Right Relative Afferent Pupil Defect



Comparing the left and right afferent pathways and their ability to drive both efferent pathways

Looks for subtle RAPD
Relative afferent pupillary defect

Compares amplitude and speed of conduction (latency) of both optic nerves

Swinging Light Test - Right Relative Afferent Pupil Defect



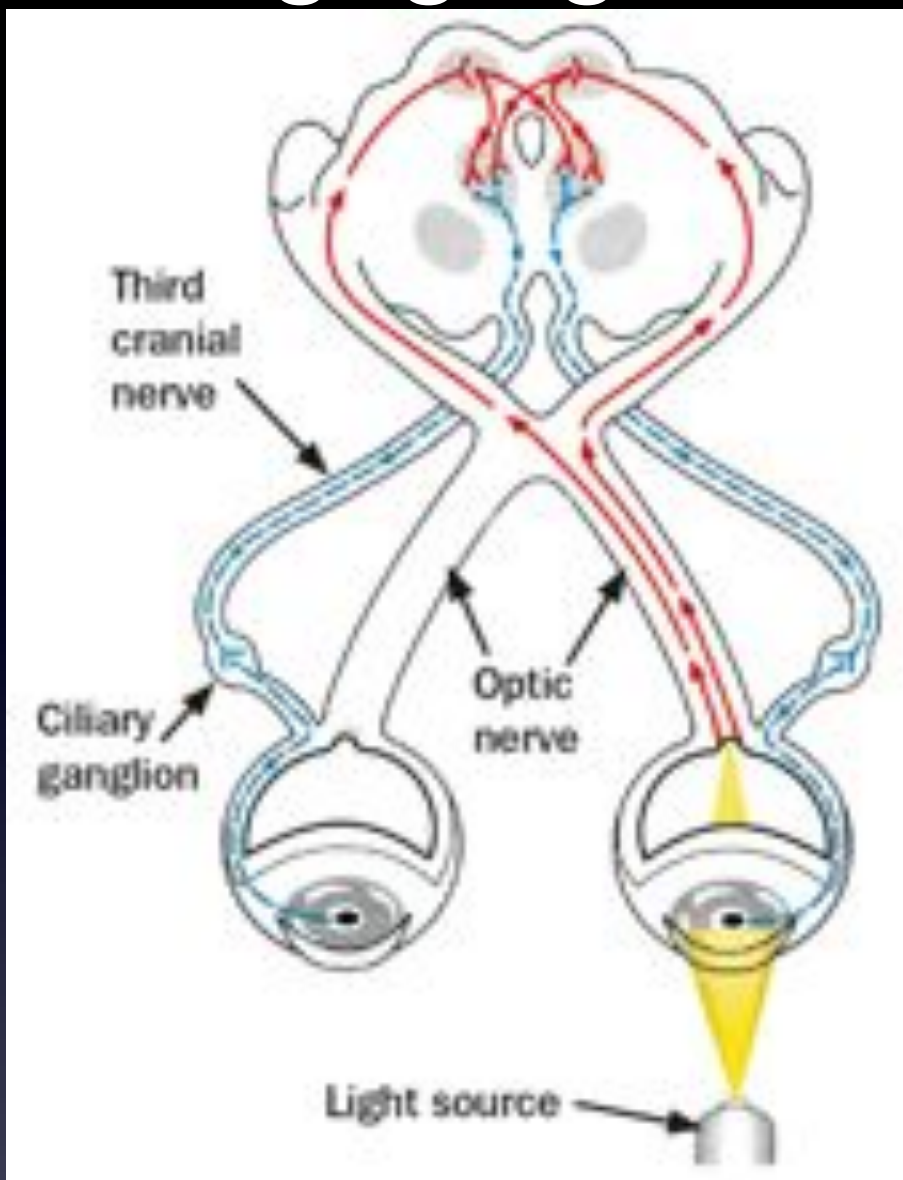
Comparing the left and right afferent pathways and their ability to drive both efferent pathways

Looks for subtle RAPD
Relative afferent pupillary defect

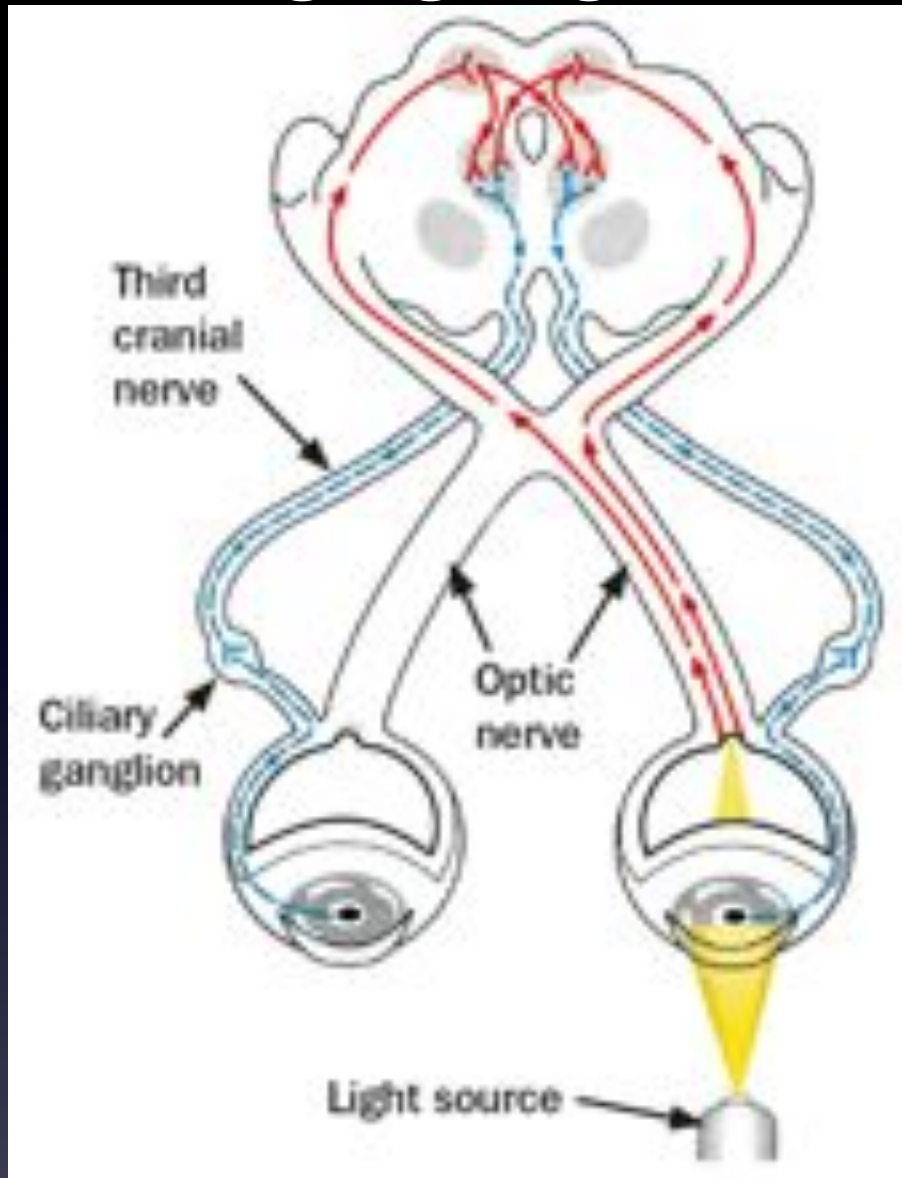
Compares amplitude and speed of conduction (latency) of both optic nerves

Recurrent Retrobulbar Neuritis in MS

Swinging Light Test - Right Relative Afferent Pupil Defect

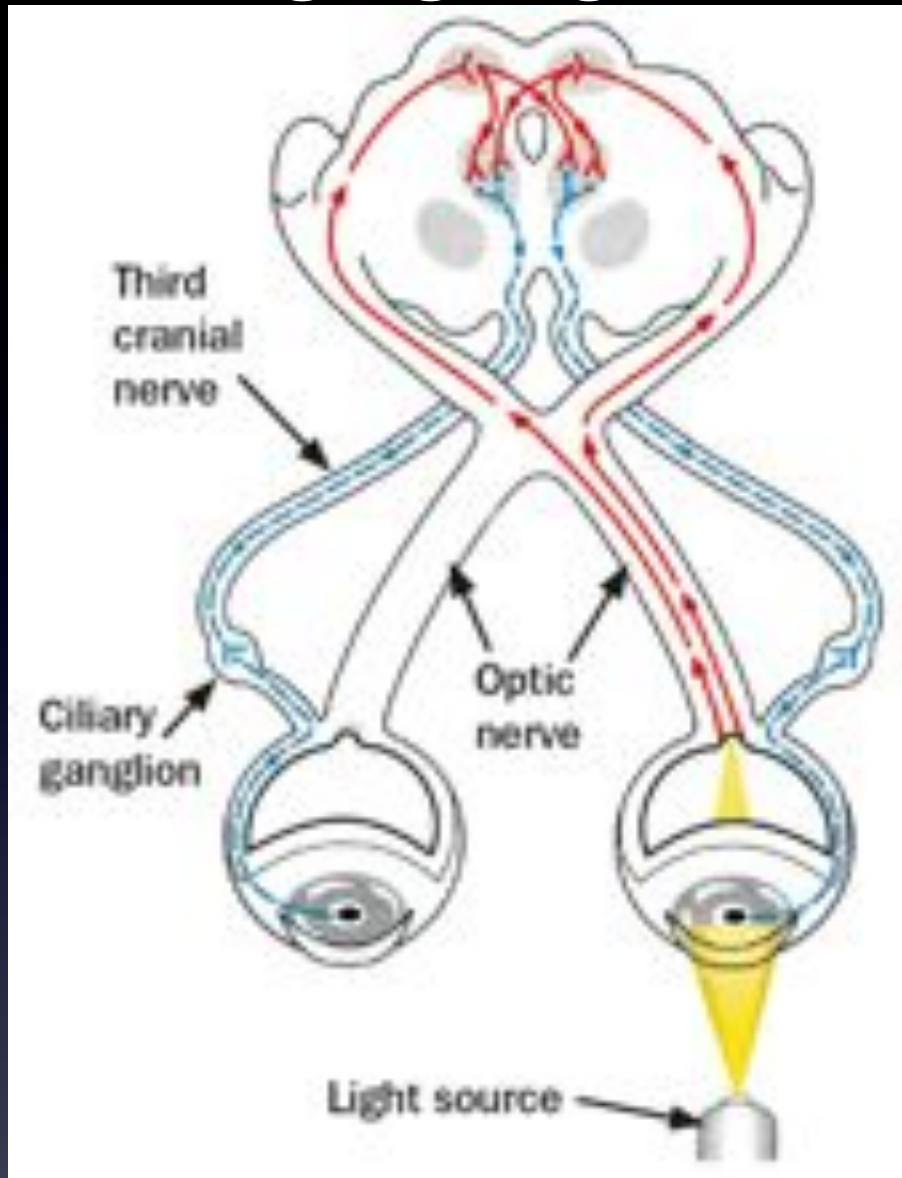


Swinging Light Test - Right Relative Afferent Pupil Defect



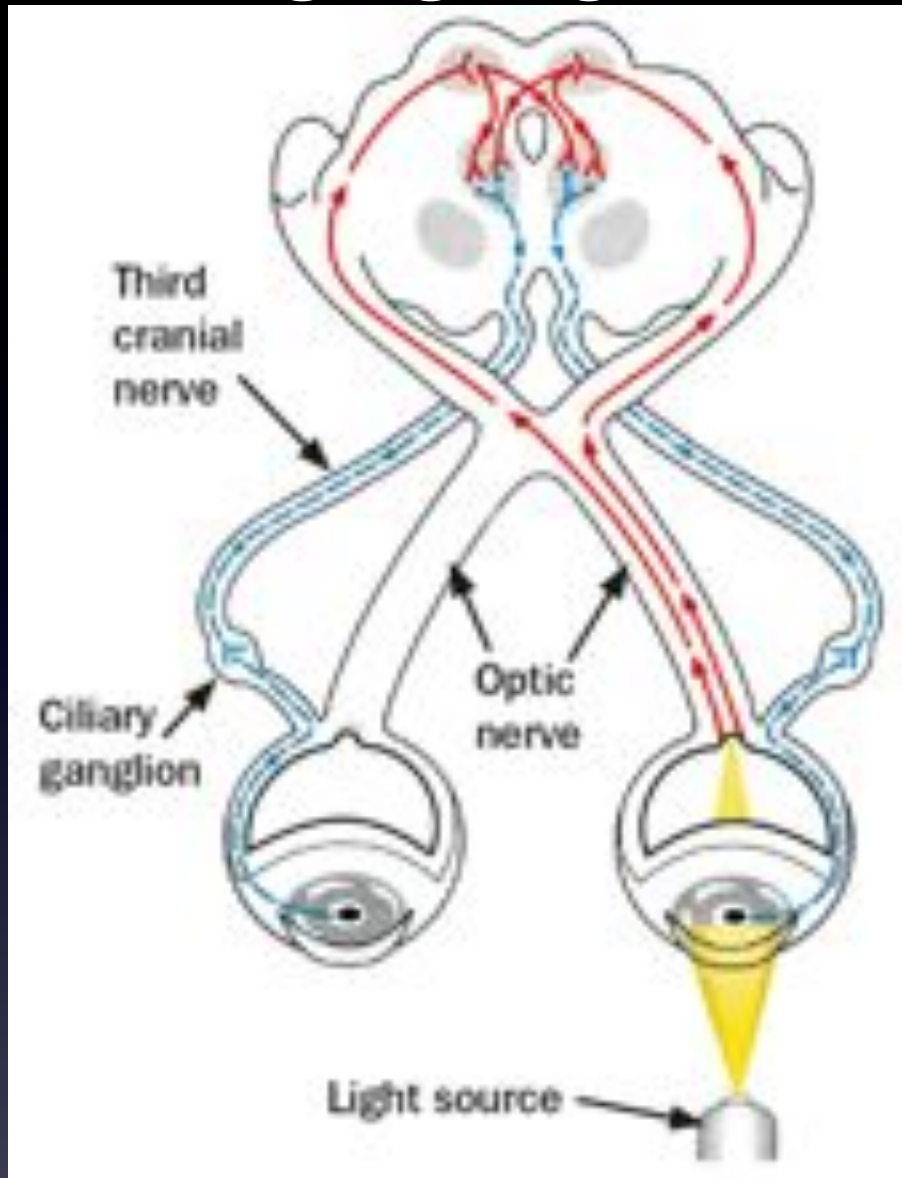
- Right Optic Nerve damaged
- Right nerve conduction speed and number of working nerve fibres reduced

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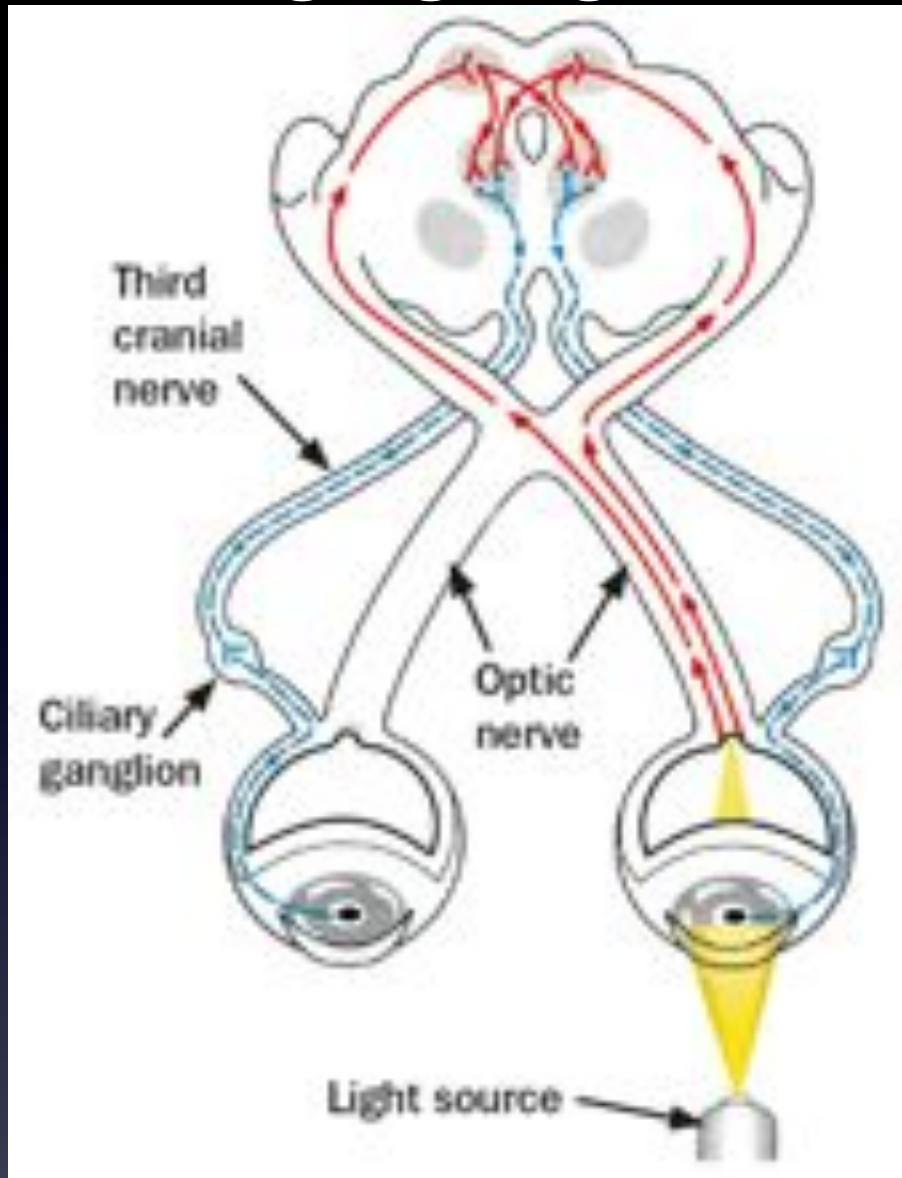
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- Rate of pupil constriction dependent on efferent pathway activity

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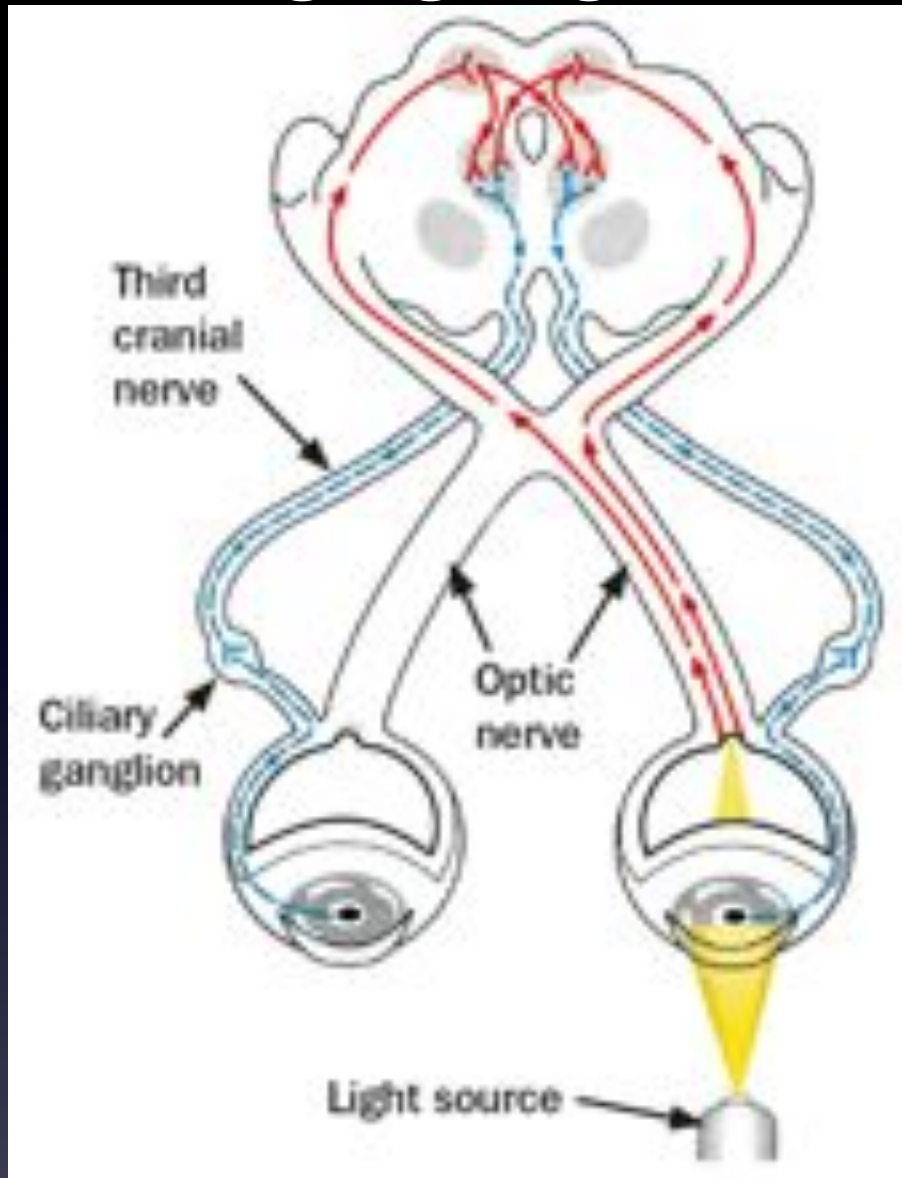
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Swinging Light Test - Right Relative Afferent Pupil Defect



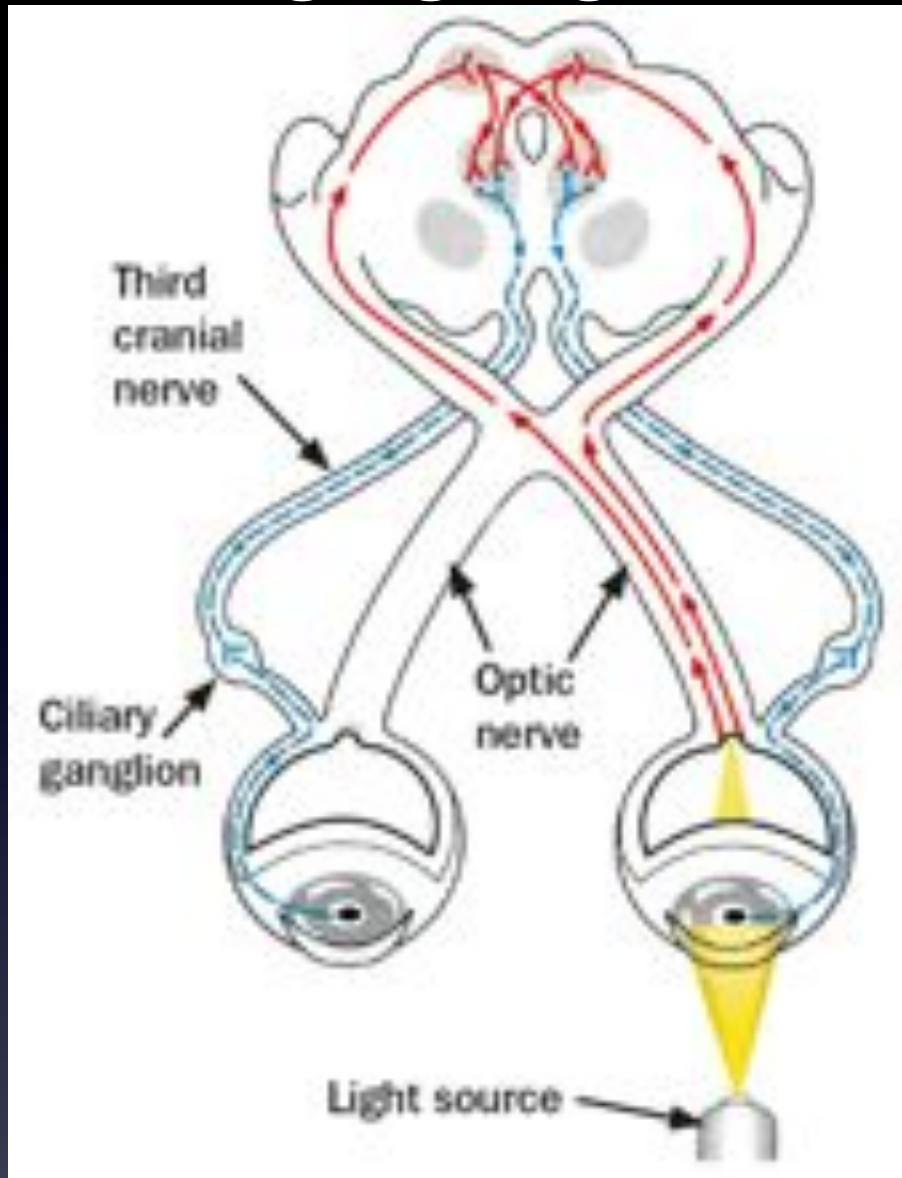
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Swinging Light Test - Right Relative Afferent Pupil Defect



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- Rate of pupil constriction dependent on efferent pathway activity
- Shine light in right, both pupils constrict but very slowly and not as much
 - *reduced and less frequent optic nerve neuronal activity to stimulate efferent pathway*
- Shine light in left, both pupils constrict fully but quickly

Swinging Light Test - Right Relative Afferent Pupil Defect



- Right Optic Nerve damaged
- Right nerve conduction speed and number of working nerve fibres reduced
- Rate of pupil constriction dependent on efferent pathway activity
- Shine light in right, both pupils constrict but very slowly and not as much
 - *reduced and less frequent optic nerve neuronal activity to stimulate efferent pathway*
- Shine light in left, both pupils constrict fully but quickly
 - *maximal optic nerve neuronal activity stimulating efferent pathway*

Anterior Ischaemic Optic Neuropathy



Anterior Ischaemic Optic Neuropathy

- Presentation:



Anterior Ischaemic Optic Neuropathy

- Presentation:
- Unilateral Vision Loss



Anterior Ischaemic Optic Neuropathy

- Presentation:
- Unilateral Vision Loss
- Acute Optic Nerve Swelling



Anterior Ischaemic Optic Neuropathy

- Presentation:
- Unilateral Vision Loss
- Acute Optic Nerve Swelling
- Afferent Pupillary Defect



Anterior Ischaemic Optic Neuropathy



Anterior Ischaemic Optic Neuropathy

Anterior Ischaemic Optic Neuropathy

Type			

Anterior Ischaemic Optic Neuropathy

Type	Arteritic	

Anterior Ischaemic Optic Neuropathy

Type	Arteritic	Non Arteritic

Anterior Ischaemic Optic Neuropathy

Type	Arteritic	Non Arteritic
Pathology		

Anterior Ischaemic Optic Neuropathy

Type	Arteritic	Non Arteritic
Pathology	Autoimmune Giant Cell Arteritis	

Anterior Ischaemic Optic Neuropathy

Type	Arteritic	Non Arteritic
Pathology	Autoimmune Giant Cell Arteritis	Thrombotic due to arteriosclerosis

Anterior Ischaemic Optic Neuropathy

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Clinical Course		

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Treatment	Urgent Immunosuppression	Treat Risk Factors

Age

- Symptoms- jaw claudication, insomnia, weight loss, PMR symptoms
- Signs
- Bloods – ESR and CRP, Platelets, Anaemia, cholesterol, lipids, HBA1C
- Temporal artery biopsy- normal result within 7 days of starting immunosuppression
- **Temporal Arteritis/GCA is an emergency! if suspected treat first, temporal artery biopsy later**

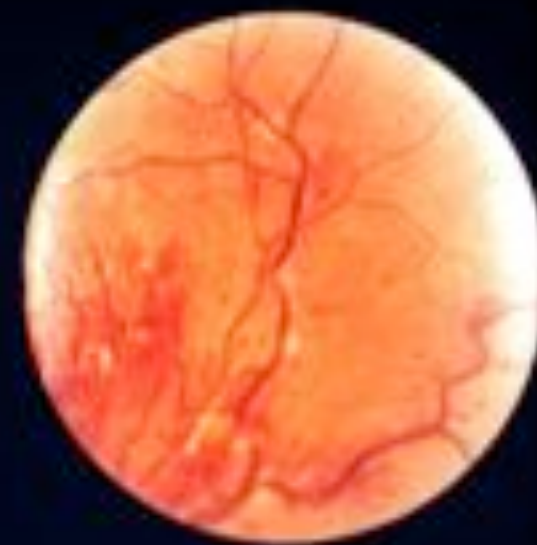
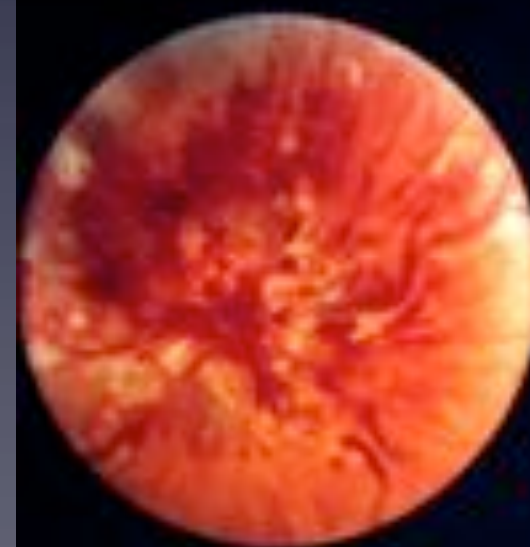
Retinal Detachment



Mr Raj

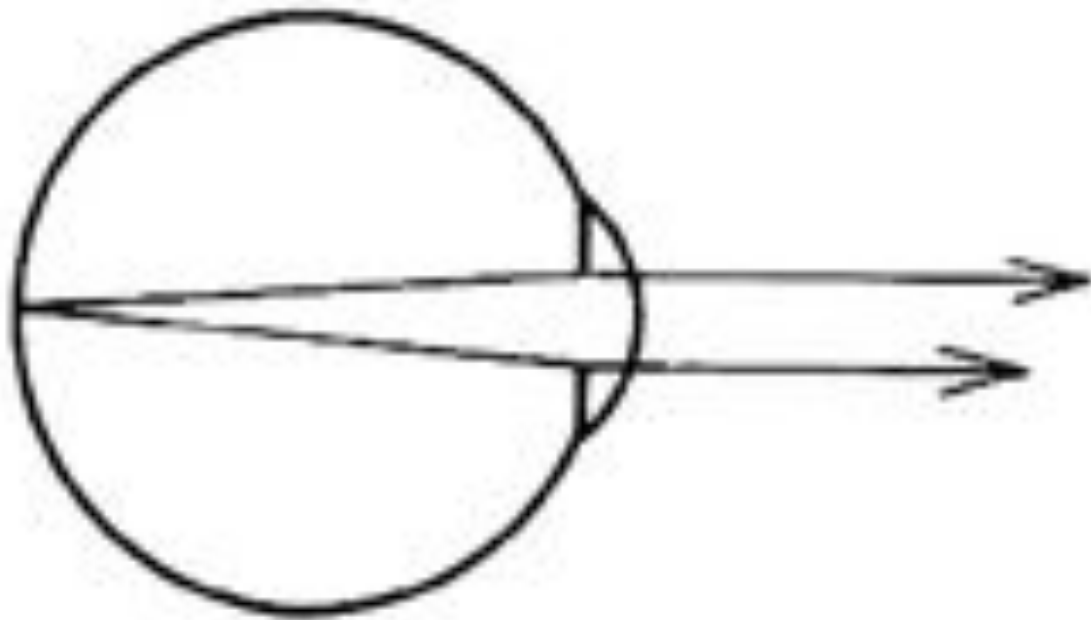
Painful

- Painless
- Systemic disease
- Hypertension
- Age
- Diabetes
- RAPD?

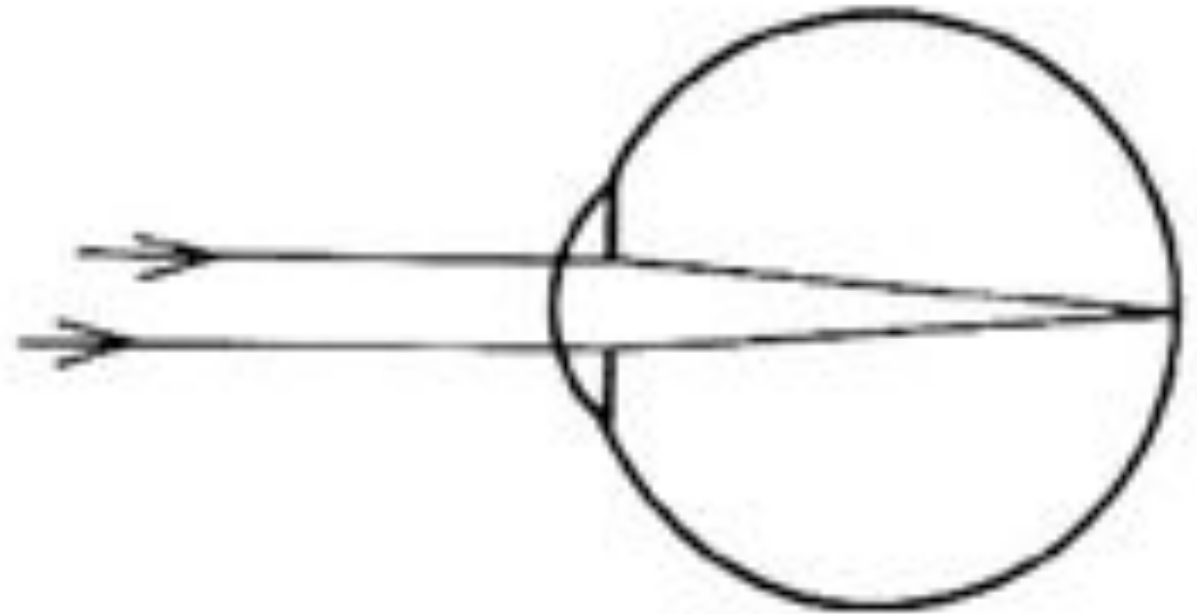


Mr Raj

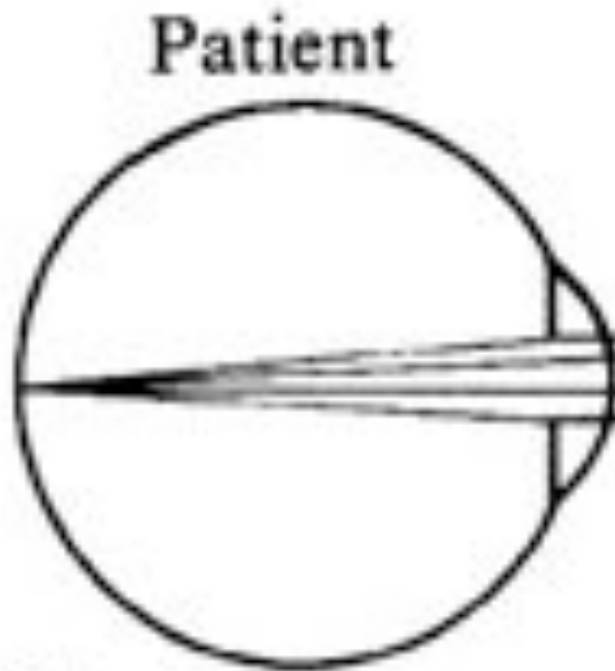
Direct Ophthalmoscope Tips



Patient
(emmetropic)

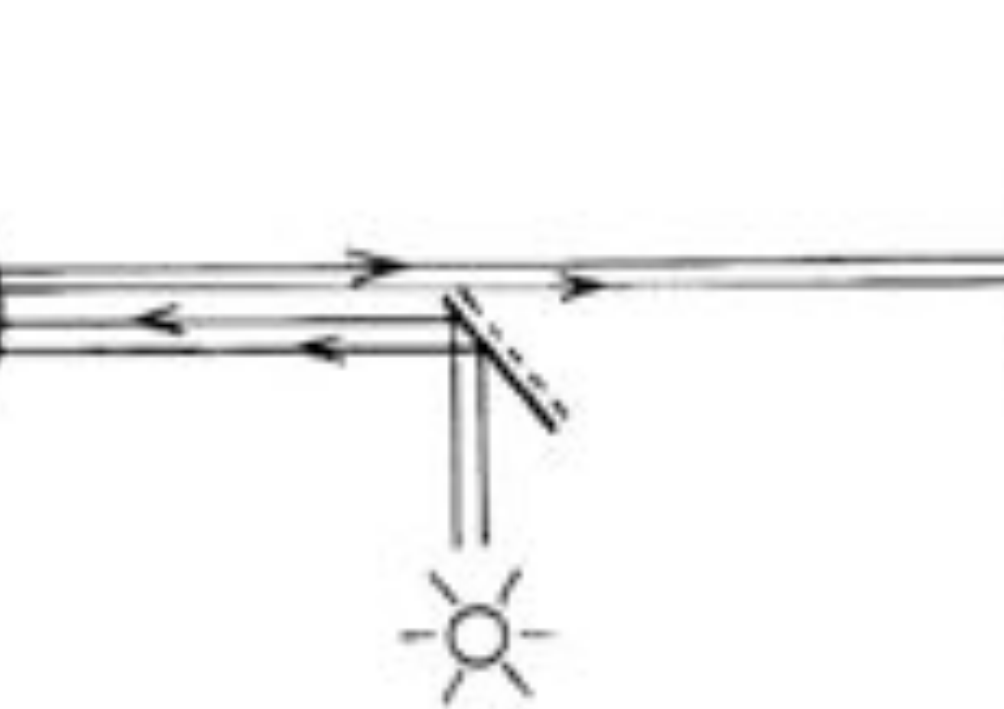


Observer
(emmetropic)



Patient

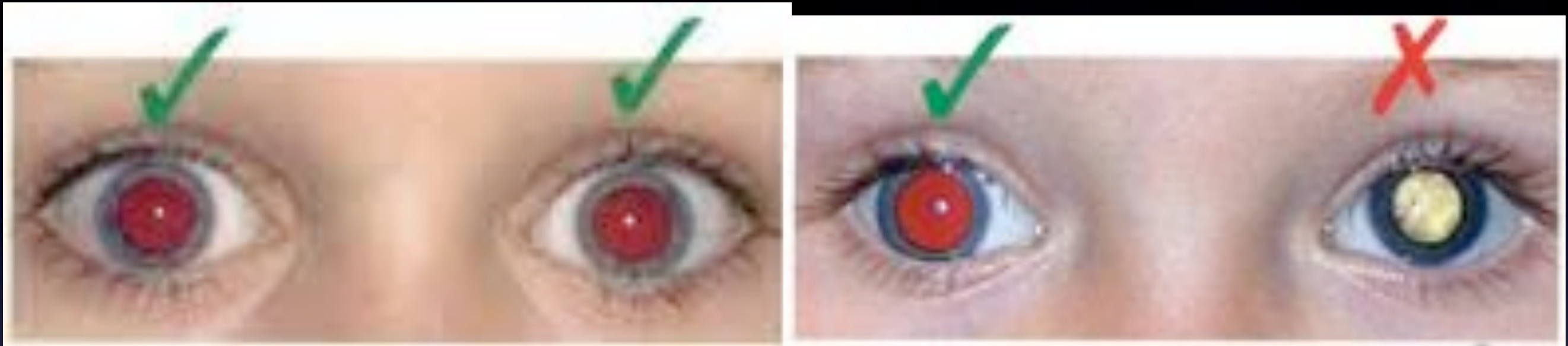
c



Observer



Leucocoria



Refer to eye CAS SOS



Possibility of retinoblastoma



Mr Raj

Thanks
Videos Source: www.optic-disc.org

Mr David Cheung

www.mrdavidcheung.com