



Domain 1: Prefit, Preparation, Evaluation

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Learning Objectives

- Apply an analytical approach (S.O.A.P.) method to address a patient's complex vision needs
- Devise an appropriate advance contact lens solution
- Obtain and document the history of patients who have complex ocular conditions that require specialty lenses

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Learning Objectives Cont.

- Assess technical aspects of the patients complex ocular status to determine contact lens options
- Discuss with the patient their needs, expectations, and limitations
- Analyze information and explain lens options to meet patient needs
- Demonstrate knowledge and comprehension of concepts in Domain I

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S.O.A.P.

-  Subjective
-  Objective
-  Assessment
-  Plan

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Subjective Exam

Chief complaint

Previous attempts at resolution



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Objective Exam

Vision

Keratometry/Maps

Manifest refraction

Medications

Slit lamp findings

Other tests



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Assessment

Collect all data from Subjective & Objective Exam

Data should point to potential problem



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Plan

Assessment of data leads to a plan

Severe problems should ALWAYS be referred to the prescribing doctor.




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Impact of Systemic and Anatomical Disorders on the Contact Lens Environment



Buddy Russell
FCLSA

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Patient History

- ROS
- PMHx (DM, SS, RA, OCP, etc)
- POC hx (current or past dx, sx, trauma, eye meds)
- CL Hx

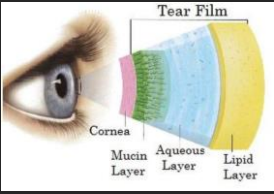


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Tear Film

Classically divided into 3 layers:

- Lipid
- Aqueous
- Mucin

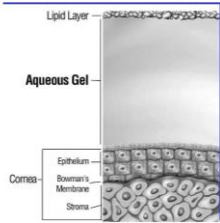


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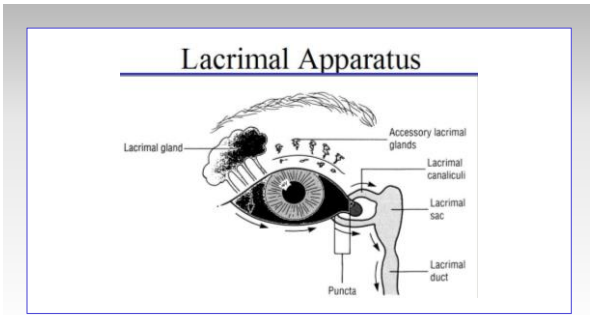
Contemporary Model

Lipid Layer
Aqueous Layer

The Aqueous Gel Layer



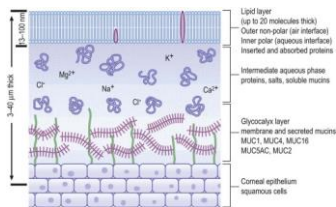
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Tear Film

Principle refracting surface
Bactericidal
Primary oxygen source
Essential nutrients



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- Mucous Layer**
 - Mucopolysaccharide
 - glycoproteins
 - N-Ac-glucosamines
 - sialic acid
 - fucose
 - mannose
 - Galactose
- Aqueous Layer**
 - water 98%
 - solids 2%
 - Inorganics
 - cations
 - Anions
 - Organics
 - glucose
 - urea
 - amino acids
 - Proteins
 - albumin
 - tear prealbumin
 - globulins
 - lysozyme
 - B-lysin
 - lactoferrin
- Lipid Layer**
 - waxes
 - fatty acids
 - cholesterol
 - cholesterol esters
 - lecithin
 - triglycerides



Tear Film Components

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Keratoconjunctivitis Sicca (KCS)

The quality and/or quantity of the pre-corneal tear film is insufficient to ensure the well being of the ocular epithelial surface.

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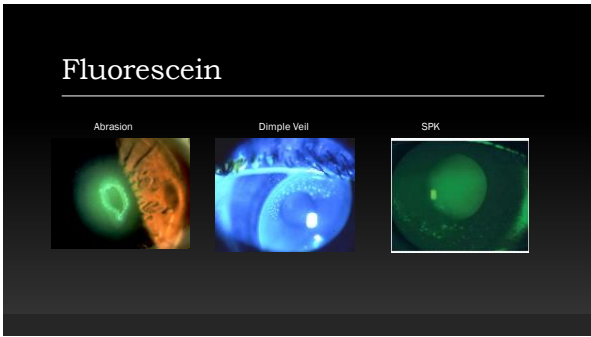
Vital Dyes

Fluorescein

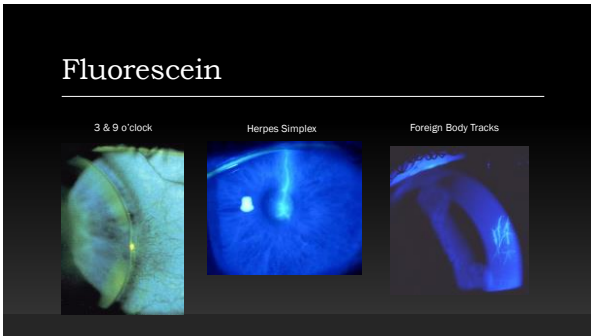
Rose Bengal

Lissamine Green

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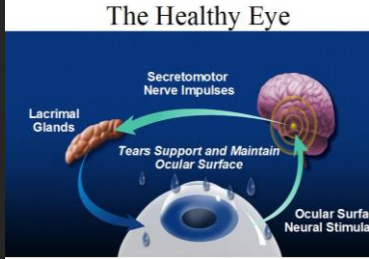
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Vital Stain Characteristics			
Vital Stain	Color	Tissue	Slit Lamp Set-Up
Sodium Fluorescein	Yellow	Cornea	Wratten #12 filter Cobalt light High illumination
Rose Bengal	Red	Conjunctiva	White light High illumination
Lissamine Green	Green	Conjunctiva	White light Low illumination

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Terminology

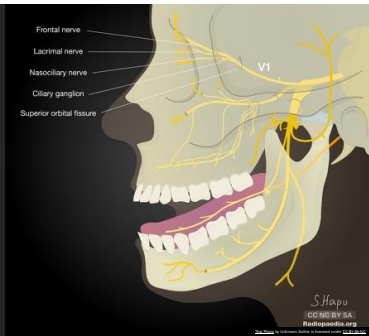
- DED - Dry Eye Disease
- KCS - Keratoconjunctivitis Sicca
- OSD - Ocular Surface Disease



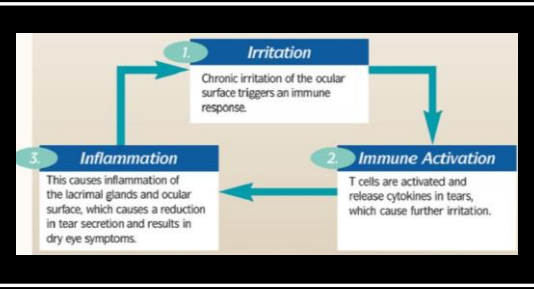
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Reflex Loop

Epithelial disruption leads to stimulation of the ocular surface which sends a message to the trigeminal nerve (CN V), which in turn sends a message to the facial nerve (CN VII) which stimulates the lacrimal gland to produce tears.



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KCS Symptoms

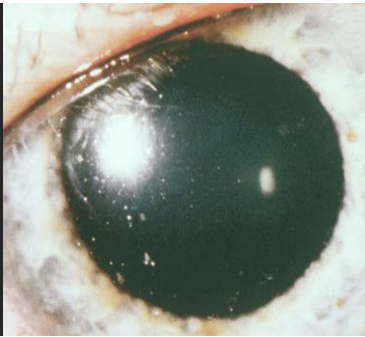
- Dryness
- Burning
- Gritty
- Sandy
- Tearing
- Aching



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KCS Contributors

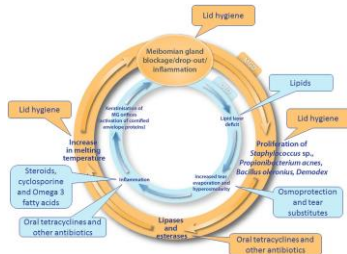
- Systemic diseases
- Medications
- Preservatives
- Allergic reactions
- Environmental



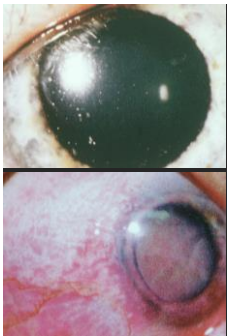
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KCS Divisions

1. Aqueous tear deficiency
2. Mucin deficiency
3. Lipid abnormalities
4. Lid surfacing abnormalities
5. Epitheliopathies



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Aqueous Tear Deficiency (ATD)

- Most common reason for KCS
- Lacrimal gland dysfunction
- Increased osmolarity
- Reported association with CL wear
- Decreased corneal sensation

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Sjogren's Syndrome


Chronic autoimmune disorder
Cell infiltration of lacrimal and salivary glands
KCS & Xerostomia (Primary)
KCS, Xerostomia, & Collagen Vascular disease (Secondary)



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ATD Management

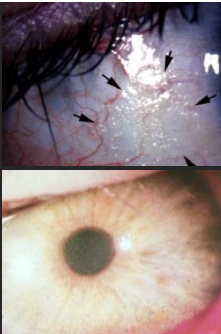
- PFAT
- PF Care systems
- Punctum occlusion
- Diet supplements
- Tarsorrhaphy
- Restasis
- Xiidra
- Blood serum tears
- Scleral Lenses



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Mucin Deficiency

- Vitamin A
- Decreased TBUT
- Conjunctival changes
- Disorders that damage conjunctiva



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Stevens-Johnson Syndrome (SJS)

- Erythema multiforme affects skin and mucous membranes
- Attacks conjunctival with ulcerating lesions
- Extensive scarring and lid deformities



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SJS Management

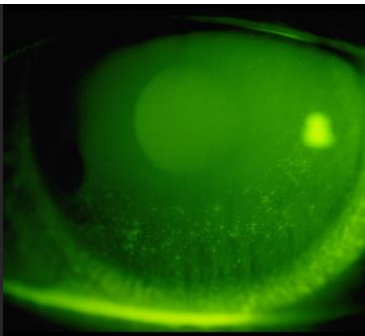
- Extensive lid hygiene
- PFAT
- Oral and topical meds
- GP scleral lens
- Amniotic Membrane (Prokera) Grafting



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Lipid Abnormalities

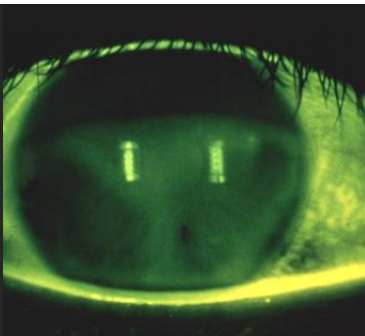
Severe anhidrotic-ectodermal dysplasia (extremely rare)
Changes in composition of meibomian secretions



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Blepharitis


Common/chronic cause of ocular irritation
Under diagnosed reason for CL intolerance
Anterior/Posterior
Staph, Seborrhea, MGD



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Anterior Blepharitis Symptoms


Hard, brittle scales
Matted crust
Chronic papillary reaction
Injection of bulbar & tarsal conjunctiva
Corneal findings



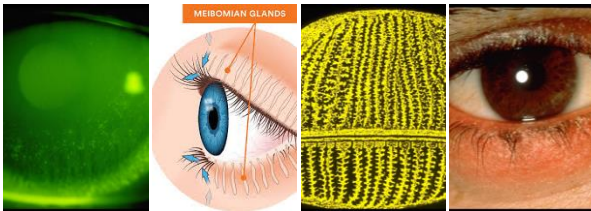
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Posterior Blepharitis Symptoms

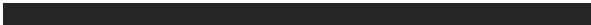
- Burning, FBS, redness
- Recurrent chalazia
- Filmy & fluctuating vision
- Sudsy tears



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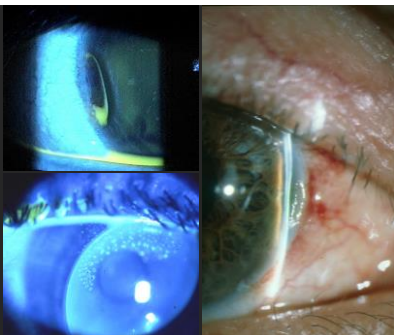
Meibomian Gland Dysfunction



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Lid Surfacing Abnormalities

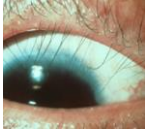
- Lid resurfaces by blinking
- Fresh mucin is distributed
- Loss of contact to cornea = dry
- Dellen



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Lid Pathology

Distachiasis can be congenital or acquired where an extra row of lashes emerge from the meibomian glands.



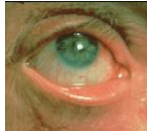
Trichiasis is an acquired condition in which the lashes emerge from their normal anterior origin and curve backwards.



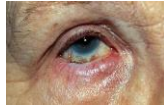
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Lid Pathology

Ectropion is where the lower lid everts outward, causing the lower lid is unable to support the lacrimal lake.



Entropion is the inward rotation of the lid margin, causing the lashes to rub against the globe.



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Lid Pathology

Floppy Lid Syndrome (FLS) is characterized by a rubbery, floppy, easily everted upper lid.



Lash Ptosis is characterized by the downward angle of the eyelashes of the upper eyelid and has been associated with FLS.



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Lid Pathology

Lagophthalmos is the inability to completely close the eyes during a blink.



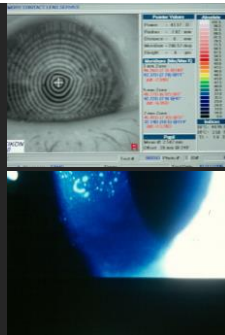
Ptosis is the drooping of the upper eyelid and can be congenital or acquired.



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Epitheliopathies

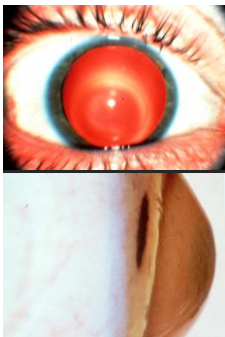
Intact tear film dependent on smooth epithelial surface
Cornea and conjunctiva
Elevated or depressed areas can lose wettability
Predisposed to dry areas



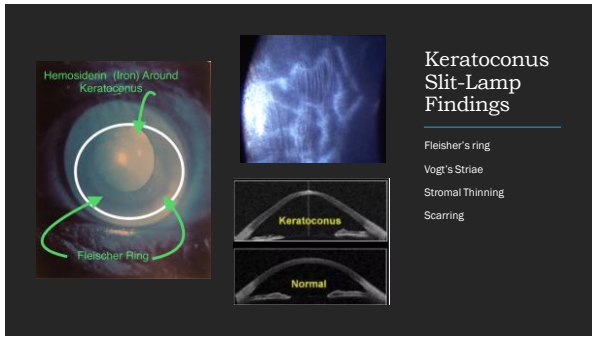
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Keratoconus

Non-inflammatory
Multifactorial
Thinning mechanism
Irregular astigmatism



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Keratoconus Slit-Lamp Findings

- Hemosiderin (Iron) Around Keratocentus
- Fleischer Ring
- Fleisher's ring
- Vogt's Striae
- Stromal Thinning
- Scarring

Keratoconus

Normal

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Systemic Disorders

- Sjogren's Syndrome
- Steven's-Johnson Syndrome
- Rheumatoid Arthritis
- Diabetes Mellitus
- Thyroid disease
- Respiratory disorders

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Inflammatory Disorders - RA

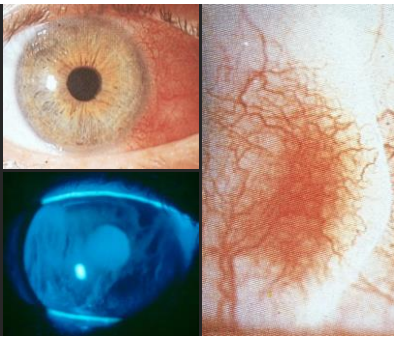
Autoimmune disorder
Chronic/progressive



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Inflammatory Disorders - RA

- KCS
- Episcleritis
- Scleritis




The image block contains three photographs. The top-left shows a normal human eye with a clear iris and pupil. The top-right shows episcleritis, characterized by redness and swelling of the episcleral vessels. The bottom-left shows scleritis, with a blue-tinted sclera and visible blood vessels. The bottom-right shows a close-up of the sclera with a dense network of red, inflamed blood vessels.

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Scleritis

Necrotizing scleritis is most destructive form

- ~40% of patients diagnosed with this form suffer permanent vision loss
- ~29% die within 5 years due to complication of vasculitis



The image shows a close-up of an eye with scleritis. The sclera is significantly red and swollen, with a prominent network of blood vessels visible on its surface. The pupil is partially visible on the left side of the frame.


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Endocrine Disorders - Diabetes Mellitus (DM)

Pancreas produces insufficient or no insulin

The pancreas is responsible for absorption of glucose into cells for energy

Type I or Type II

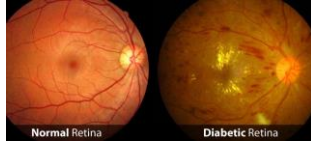


The image shows a close-up of an eye with a greenish iris. There are several small, dark, irregular spots (floaters) visible in the vitreous humor in front of the retina. The sclera appears slightly red and inflamed.

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Endocrine Disorders - DM

- Diabetic retinopathy
- Crystalline lens changes
- Rubeosis
- Corneal changes



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Endocrine Disorders – Thyroid Disease

Regulates metabolism
 Chemical activity in cells that releases energy from nutrients to create proteins
 Hyperthyroidism
 Hypothyroidism



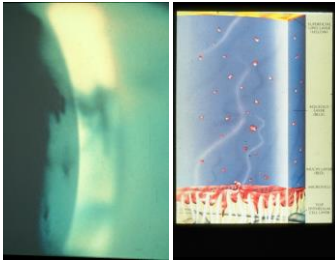
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Endocrine Disorders – Grave's Disease

- Lid retraction
- Infrequent/incomplete blink
- Lagophthalmos
- Motility restrictions
- Binocular diplopia
- Optic nerve damage



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Endocrine Disorders - Reproductive

High & low levels
Conflicting data

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Respiratory Disorders

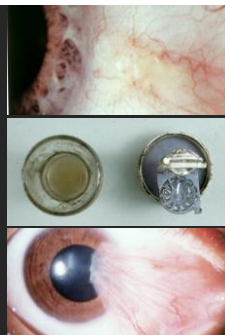
Rhinitis
Asthma
Sinusitis



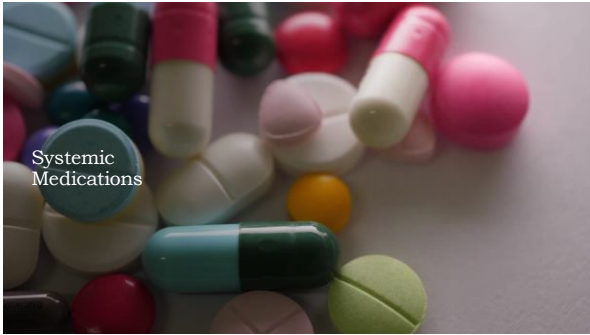
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Environmental Factors – Air Quality

Humidity
Wind
Dust
Smoke
Air travel
Allergens



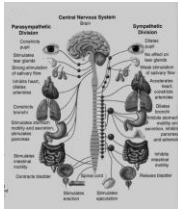
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Autonomic Nervous System

Parasympathetic
- "rest and digest"
- cholinergic



Sympathetic
- "fight or flight"
- adrenergic

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Autonomic Nervous System

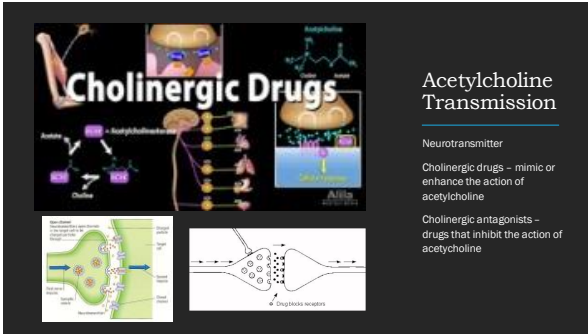
Sympathetic - epinephrine/norepinephrine
➢ Pupils dilate
➢ Secretions decrease
➢ Sympatholytic
➢ Sympathomimetic



Parasympathetic - acetylcholine
➢ Pupils constrict
➢ Secretions increase
➢ Parasympatholytic
➢ parasympathomimetic



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Cholinergic Drugs

Acetylcholine Transmission

Neurotransmitter

Cholinergic drugs - mimic or enhance the action of acetylcholine

Cholinergic antagonists - drugs that inhibit the action of acetylcholine

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Adrenergic Agonists



- Adrenergic agent is a drug which has effects similar to, or the same as epinephrine
- A kind of sympathomimetic agent
 - May refer to something which is susceptible to epinephrine or biological receptor (adrenergic receptors)
- Adrenergic drugs either stimulate a response (agonists) or inhibit (antagonists)
- 5 categories of receptors: α_1 , α_2 , β_1 , β_2 , and β_3
 - Agonists vary in specificity between receptors
 - Beta Blockers block action of epinephrine and norepinephrine

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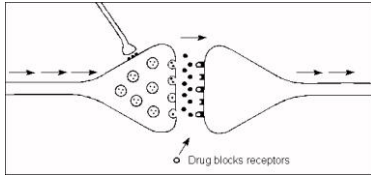


Adrenergic Antagonist

Adrenergic antagonist

- A pharmaceutical substance that acts to inhibit the action of the adrenergic receptors
- A type of sympatholytic drug

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Cholinergic Antagonists

Anticholinergics

- Drugs that bind to but do not activate cholinergic receptors
- Blocking the actions of acetylcholine or cholinergic antagonists

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Cholinergic - Acetylcholine

Related to the neurotransmitter acetylcholine

Cholinergic is used in the following contexts:

- A substance is cholinergic if it is capable of producing, altering, or releasing acetylcholine (indirect-acting)
- Or mimicking its behavior at one of more of the body's acetylcholine receptors (direct-acting)

A **receptor** is cholinergic if it uses acetylcholine as its neurotransmitter

A **synapse** is cholinergic if it uses acetylcholine as its neurotransmitter

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Nervous System

CNS
- Central Nervous System
- brain and spinal cord

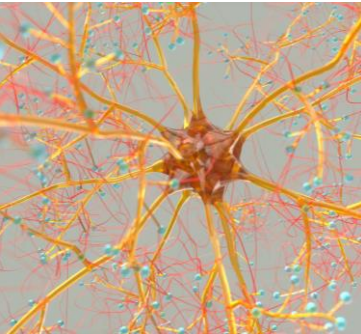
PNS
- Peripheral Nervous System
- all the nerves that project from brain and spinal cord

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Nervous System Cont.

Nerves can be:

- Motor** which sends signals away from the CNS
- Sensory** which sends signals toward the CNS
- Cranial** which stem from the brain
- Spinal** which stem from the spinal cord

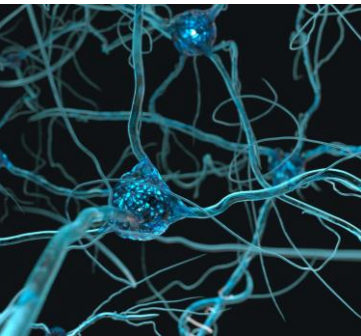


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Nervous System Cont.

Nerves can be:

- Sensory Fibers** - all over the body and send impulses to CNS via cranial and spinal nerves
- Motor Fibers** - connect to muscles and glands and send impulses to CNS via cranial spinal nerves

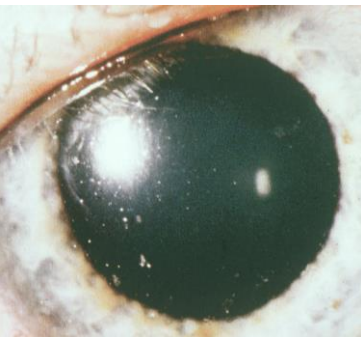


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Medications

Decreased Lacrimation

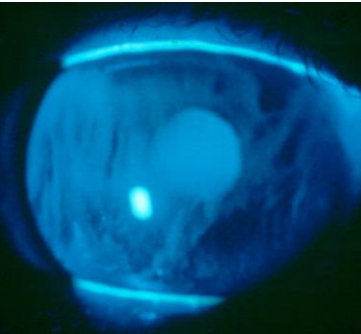
- >Anti-cholinergics
- >Antihistamines
- >Contraceptives
- >Tranquilizers
- >Analgesics
- >Diuretics
- >Beta-blockers



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Medications


- Decreased lacrimation
- Lipid secretion changes
 - Tetracycline
 - Accutane



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Medications

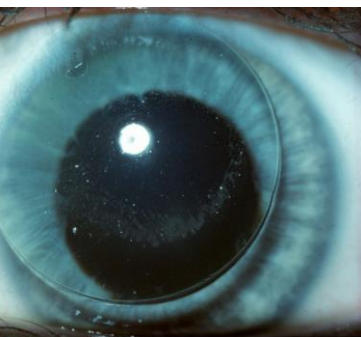
- Decreased lacrimation
- Lipid secretion changes
- Blink rate changes
 - Antihistamines
 - Muscle relaxants
 - Sleep enhancers
 - Anti-anxiety
 - Anti-depressants



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Medications


- Decreased lacrimation
- Lipid secretion changes
- Blink rate changes
- Mydriasis
 - CNS Stimulants
 - Amphetamines
 - Decongestants
 - CNS Depressants
 - Phenobarbital



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Medications

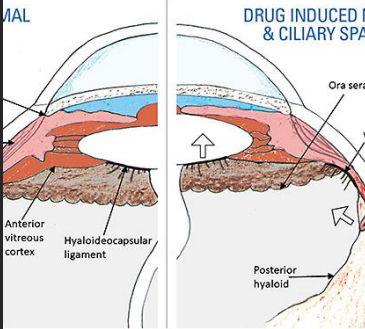
- Decreased lacrimation
- Lipid secretion changes
- Blink rate changes
- Mydriasis
- Soft lens discoloration
 - Tetracycline
 - Estax



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Medications

- Decreased lacrimation
- Lipid secretion changes
- Blink rate changes
- Mydriasis
- Soft lens discoloration
- Transient myopia
 - Sulfonamides
 - Diuretics
 - Carbon Anhydrase Inhibitors

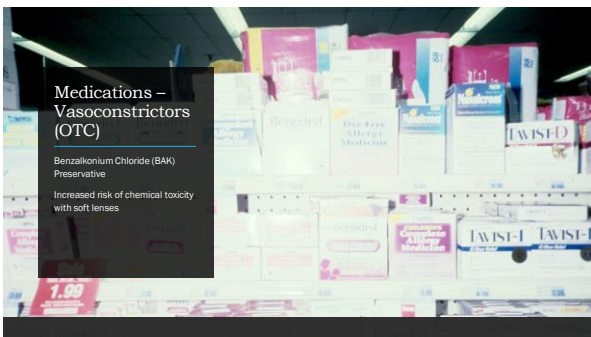


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Medications – Vasoconstrictors (OTC)

Benzalkonium Chloride (BAK)
Preservative


Increased risk of chemical toxicity with soft lenses



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Topical Eye Medications

- Preservatives
- Discoloration
- Increased lens deposits
- Follicles



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Thank You!

If you have any questions, please email me at alspauqh@durhamtech.edu

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