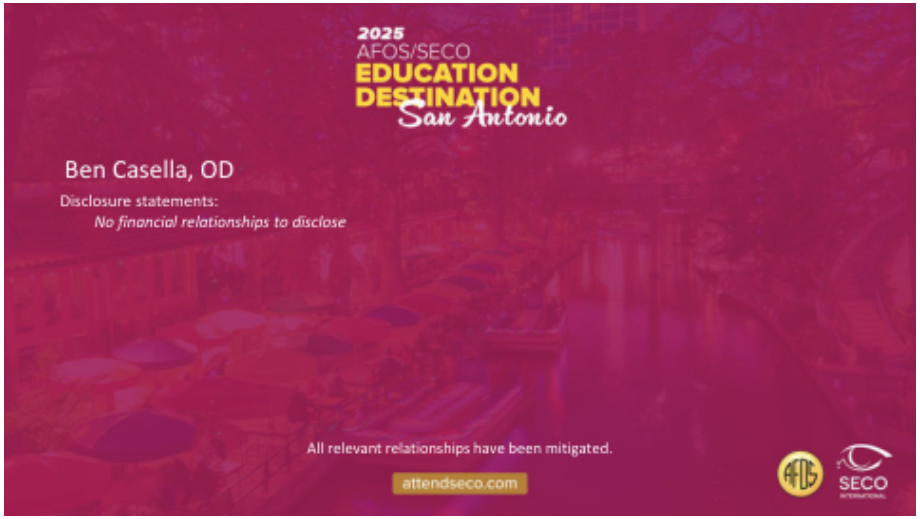
Slide 1

Slide 2



Slide 3

Slide 4

Slide 5

OBJECTIVES

- **BRIEFLY** go over pharmacology of commonly prescribed oral medications for the human eye and adnexa
- Indications / Contraindications
- Protocol for prescribing (dosages, etc.)

Slide 6

ANTIBIOTICS

Slide 7

ANTIBIOTICS

- Most prescribed empirically
  - Broad spectrum vs. tailored therapy
- Considerations
  - Safety (eg. drug-drug interactions)
  - Individual patient factors
  - Cost
  - Site of infection
  - Organism (or likely organism) causing infection

Slide 8

ANTIBIOTICS

- Begin with the correct diagnosis
- Treat with minimal adverse effects
- Take each case on a *per diem* basis
- Avoid tapering oral antibiotics
- Try to avoid using same oral agent twice in a short period
  - Not so much a concern with topicals

Slide 9

ANTIBIOTICS

- Prophylaxis
  - Topicals used prophylactically all the time
    - Eg. Corneal injuries
  - Only a few cases in which orals are prescribed prophylactically
    - Eg. True orbital blowout fracture

Slide 10

PENICILLINS

- Inhibit cell wall synthesis
- Most effective on actively replicating bacteria
- Bactericidal
- More G(-) and less G(+) in later generations
- Should be penicillinase resistant***
- Contraindications (penicillin allergy, cephalosporin crossover sensitivity)

Slide 11

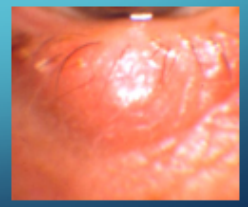
PENICILLINS

- Dicloxacillin
  - 250mg q.i.d. x 1 week
  - 500mg b.i.d.??? (short half-life)
  - Pregnancy category B
- Amoxicillin/clavulanate
  - Amoxicillin/clavulanate
  - 500/875/1000mg b.i.d. x 1 week
  - Pregnancy category B

Slide 12

57YOM

- Painful nodule LLL x 6 days
- MHx/OHx non-contributory
- 20/20 OD/OS
- PERRL(-)APD



Slide 13

CEPHALOSPORINS

- Very similar mechanism to penicillins (inhibition of cell wall synthesis)
- Crossover hypersensitivity with penicillins common
- More G(-) and less G(+) in later generations
- Bactericidal
- Like penicillins, may alter normal flora
- Contraindicated in hemophilia (can get vit. K deficiency)

Slide 14

CEPHALOSPORINS

- Cephalexin
  - 500mg b.i.d.
  - 1st generation (more G(+) coverage)
  - Pregnancy category B

Can get nephrotoxicity from concomitant use of cephalosporin and aminoglycoside (gentamicin, tobramycin, etc.)

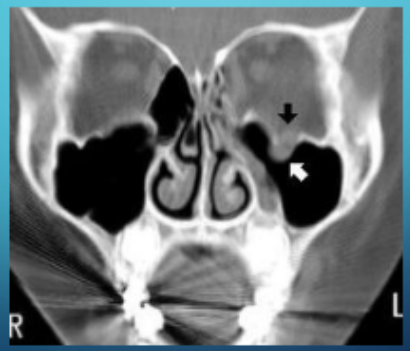
Slide 15

22YOM

- Hit in OS 4 days ago
- Pain, diplopia
- 20/30 OD 20/25 OS
- PERRL(-)APD
- Dilated retinal exam normal
- EOM's – vertical diplopia / OS constriction

Slide 16

22YOM



http://www.e-radiography.net/radpath/f/blowout_fracture/blowout_fracture.htm

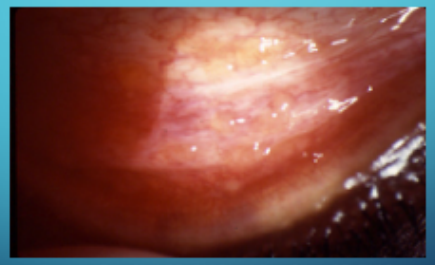
Slide 17

22YOM

- Cephalexin 500mg b.i.d.
- Orbital blowout fracture is one of the few instances when an ORAL antibiotic is prescribed prophylactically

Slide 18

(HINT: TOPICALS ARE NOT VERY USEFUL IN THIS CASE)



Courtesy: Brian Hall, OD, FAAO and Gary Oliver, OD, FAAO

Slide 19

MACROLIDES

- Inhibit protein synthesis in bacterial ribosomes
- Do not bind to mammalian ribosomes (generally safe)
- Contraindications
  - Hypersensitivity
  - Drug interactions (quite a few with Erythromycin)
  - Clarithromycin should be avoided in pregnancy

Slide 20

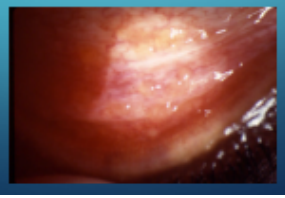
MACROLIDES

- Erythromycin
  - Usually in E.E.S. form
  - Typically 400mg q.i.d. x 1 week
  - Many drug interactions (check PDR, etc.)
  - Pregnancy category B
    - Probably the biggest reason macrolides have a place in eye care

Slide 21

MACROLIDES

- Azithromycin
  - "Dose packs" (500mg q.d. on day one, then 250mg q.d. on days 2-5)
  - 1g single dose*** for *Chlamydia trachomatis* (repeat regular dose if needed)



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FLUOROQUINOLONES

- Alter DNA gyrase (and, in some cases, topoisomerase)
- Broad spectrum (though resistance exists)
- Good for true penicillin allergies
- Not recommended for children / pregnant
  - bone issues***, risk of Achilles tendon rupture

Slide 23

FLUOROQUINOLONES

- Levofloxacin
  - Typically 500mg or 750mg q.d. x 1 week
  - By far most common oral
- Ciprofloxacin
  - Typically 250mg or 500mg b.i.d. x 1 week

Slide 24

A QUICK WORD ON DOXYCYCLINE

- Widely used for MGD
- Typically 50mg to 100mg q.d. for a few months and implement omega 3 FA supplementation concurrently
- 20mg available
- It is a tetracycline
  - Not for kids, pregnant, nursing

Slide 25

ANTIVIRALS

- Generally safe (renal considerations)
  - Select for virus, host cell largely unaffected
    - This need for selective toxicity is the reason antiviral development is often a slow process
  - Orals are pregnancy category B*** (in contrast to category C topical antivirals!)
- Inert until phosphorylated *in vivo*

Slide 26

48YOM

- Irritated OS x 5 days
- VA's 20/20 OD/OS cc
- PERRL(-)APD
- (-) Malaise
- H/O corneal issues OS

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HERPES SIMPLEX VIRUS (HSV)

- Most popular virus
  - Most humans infected by adolescence
  - Type 1 and 2
    - Based on where they generally go dormant

Slide 29

HSV

- Corneal infections can be treated orally, but the effective titer takes a few days due in part to the lack of vasculature of the cornea
  - Pregnancy considerations

Slide 30

HSV

- Acyclovir
  - 400mg p.o. 5x/day x 7-10 days
  - 400mg p.o. b.i.d. for maintanence
- Valacyclovir
  - 1000mg p.o. b.i.d. x 7-10 days
  - 500/1000mg p.o. q.d. for maintanence
- Famcyclovir
  - 250mg p.o. t.i.d. x 7-10 days
  - 250mg p.o. b.i.d. for maintanence

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ORAL ANTIVIRALS

- Pregnancy category B
- Adverse effects
  - Nausea
  - Rash
  - Diarrhea
  - Headache
- Contraindications
  - Hypersensitivity
  - Renal dysfunction (high doses)
  - Intolerance

Slide 32

HERPETIC INFECTIONS

Vesicles are a sign of herpetic infection

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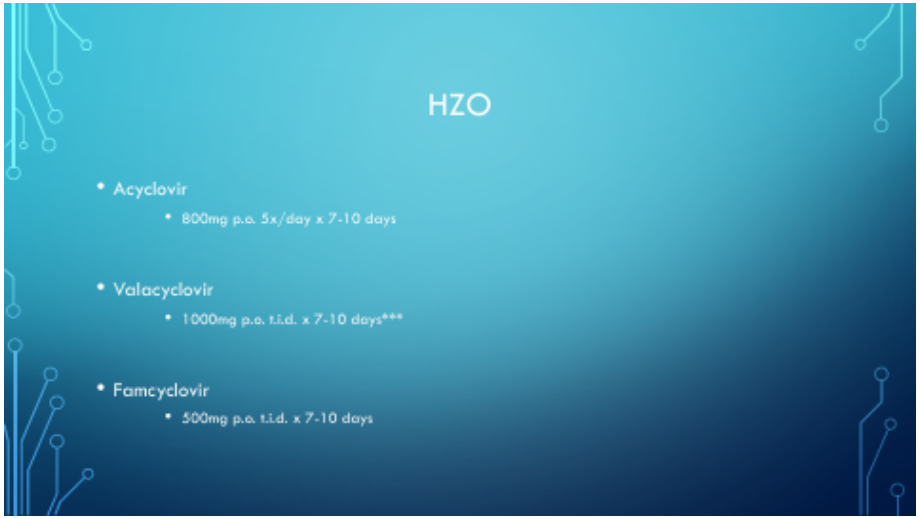
Slide 35



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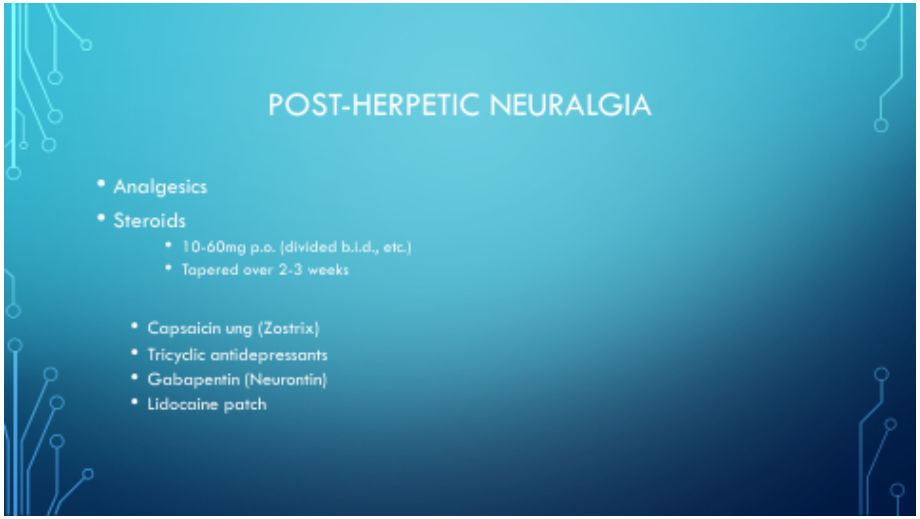

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STEROIDS

- Synthetic glucocorticoids
  - Mimic endogenous glucocorticoids produced in adrenal cortex
  - Inhibit arachadonic acid inflammatory cascade
  - Reduce capillary permeability
  - Protect against damage from inflammation (scarring, etc.)

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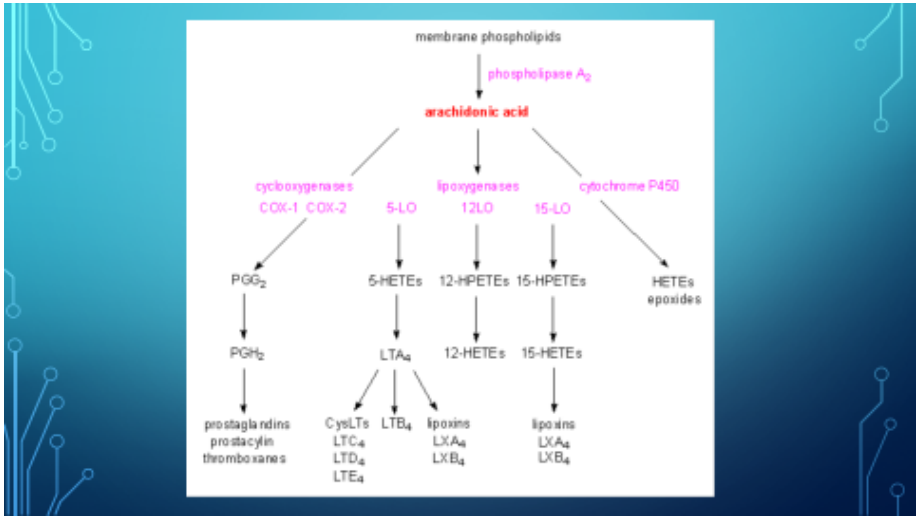

Slide 40

STEROIDS

- Indicated for conditions CAUSED BY INFLAMMATION
- If it's not inflammatory, a steroid is not going to help

Slide 41

STEROIDS

- Considerations
  - Pregnant (category C)
  - GI issues (ulcers)
  - Diabetic
  - Certain infectious disease (TB, syphilis, herpes, fungal, etc.)***

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STEROIDS

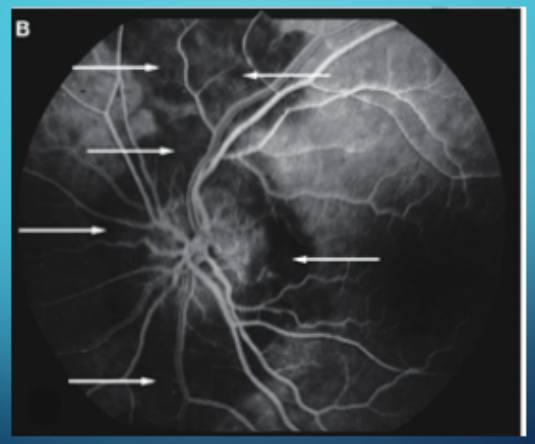
- Adverse effects
  - Headache
  - Insomnia
  - Mood changes
  - Dizziness
  - Fever / malaise (infection)
  - Sweating
  - Changes in fat distribution
  - Fatigue
  - Cataract
  - IOP increase
  - GI upset (take with food)

Slide 43

STEROIDS

- Corticosteroids
  - Prednisone
    - Generic
    - 5/10mg tablets
    - Typically start at 40-60mg/day (can divide)
    - Tapering made easy
  - Methylprednisolone "Dosepaks" exist, also

Slide 44



Medscape.com

Slide 45

STEROIDS

- 56yoF presents with tender right upper temporal lid x 1 week
- 20/20 OD/OS
- Pupils/EOM's/Confrontations normal OU
- IOP 17mmHg OU
- (-)PA Node

Slide 46

ANALGESICS

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NON-NARCOTIC ANALGESICS

- Act on CNS to elevate pain threshold
  - Acetaminophen
    - 325-500mg q4-6h
  - Tramadol
    - 50-100mg q4-6h

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ACETAMINOPHEN

- Exact mechanism unknown
- Usually safe in pediatric patients
- No cross-over sensitivity with aspirin/NSAIDS
- Antipyretic
- Little to no GI issues
- No effect on platelets
- Seems to be safe short-term in pregnant/nursing patients

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ACETAMINOPHEN

- Does have a ceiling effect
- Caution with hepatic disease
- May lead to liver toxicity
- Commonly Rx'd in combination with narcotic***

Slide 50

NSAIDS

- Nonsteroidal anti-inflammatory drugs
- Mimic endogenous glucocorticoids to produce anti-inflammatory effect
- Block cyclo-oxygenase

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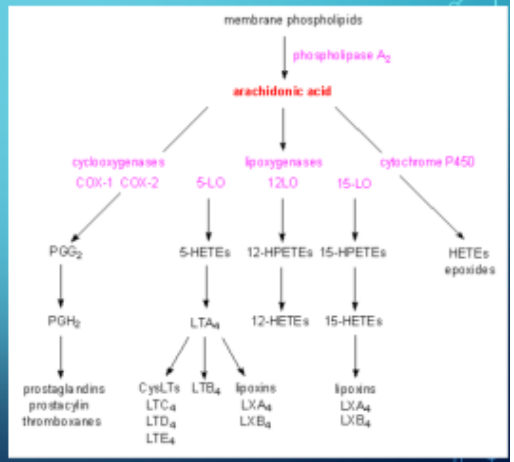

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NSAIDS

- DO have effect on platelet coagulation
- DO have ceiling effect
- Analgesic, anti-inflammatory, antipyretic, anticoagulant
- May increase risk of stroke, heart attack

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NSAIDS

- Contraindications
  - Pregnancy
  - Bleeding disorders
  - Chronic renal / hepatic Dz
  - CHF
  - Bronchial asthma
  - Upper GI Dz
  - Hypersensitivity

Slide 54

NSAIDS

- Ibuprofen Most common
  - 200mg capsules / tablets available OTC
  - Typically 400mg p.o. q4-6h
  - 1600mg approaches effect of schedule III narcotic

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NSAIDS

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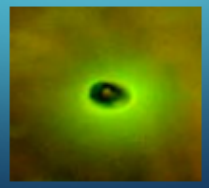
NSAIDS

- What would you do for the lesion?
- What would you do for the pain?



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NSAIDS

- Adverse effects include…
  - Blurred vision
  - Optic disc pallor
  - Renal dysfunction
  - Headache
  - Dizziness
  - Diplopia
  - Short-term memory loss

Slide 58

NARCOTICS

- Mechanism
  - Bind directly to opioid receptors mimicking morphine (take with food!)
- CNS effects (don't mix with alcohol)***
- 5 schedules (Schedule II, III most common)
- There is risk of dependence even with short term use***

Slide 59

SCHEDULE III NARCOTICS

- Combinations
  - 30mg codeine / 300mg acetaminophen
  - q4-6h
  - Codeine frequently causes more nausea than other narcotics
  - Use seems to be decreasing

Slide 60

SCHEDULE II NARCOTICS

- Hydrocodone with acetaminophen
  - 5/500mg, 7.5/750mg (ES), 10/650mg (HP)
  - q4-6h
- Hydrocodone with acetaminophen
  - 2.5/500mg, 5/500mg, 7.5/500mg, 10/500mg
  - q4-6h

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NARCOTICS

- Have CNS effects
- Have respiratory effects***
- Peak around 2 hours after initial dose
- For severe acute pain
- DO NOT have ceiling effect

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NARCOTICS

- Make Rx "tamper-proof"
- Write out "ten", etc.
- Adverse effects include
  - Nausea / vomiting
  - Breathing difficulties
  - Euphoria
  - Constipation
  - Pruritis

Slide 63

NARCOTICS

- Contraindications
  - Hypersensitivity
  - Pregnant (nursing?)
  - COPD
  - Bronchial asthma
  - Caution with renal/hepatic dysfunction
  - Alcoholism
  - Use of other CNS agents

Slide 64

ORAL GLAUCOMA AGENTS

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CARBONIC ANHYDRASE INHIBITORS

- CAI's
  - Acetazolamide
    - 250mg p.o. q.i.d. or 500mg sequels
  - Methazolamide
    - 25-50mg p.o. q.i.d.
    - Tends to be safer
  - Both have good bioavailability in their generic forms

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CAI'S

- Acute narrow angle glaucoma with IOP>45mmHg
- May be used as additive therapy
- Reduce aqueous formation
  - May not be effective for closed angle neovascular glaucoma or other secondary glaucomas
- Vasodilate, as well

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CAI'S

- Contraindications
  - Pregnancy
  - Advanced renal / hepatic Dz
  - Kidney stones
  - Hypersensitivity
  - Caution in DM
  - Caution in gout
  - Caution with sulfonamide allergy

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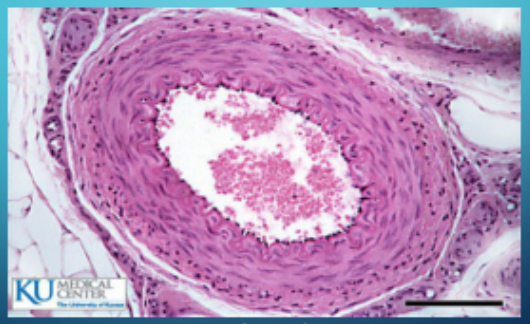
CALCIUM CHANNEL BLOCKERS



www.kumc.edu

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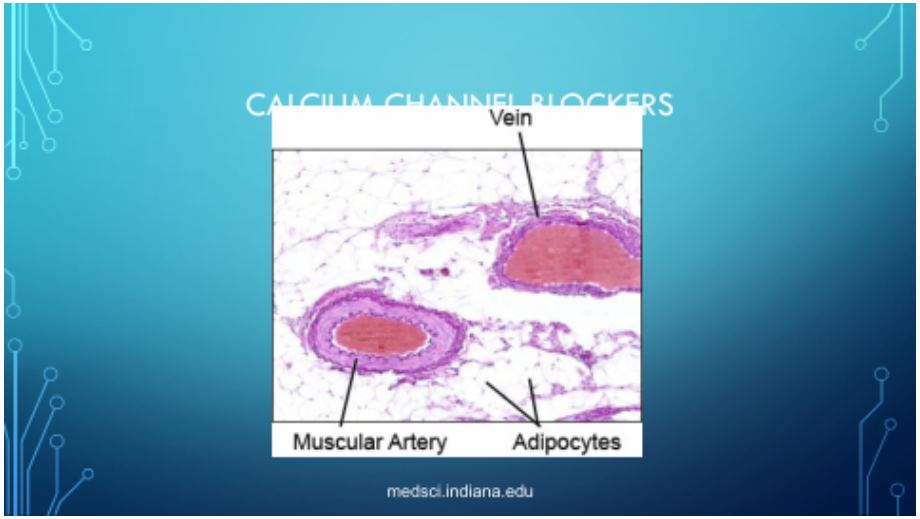

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CALCIUM CHANNEL BLOCKERS

- Ca++ excitotoxicity linked to several neurological diseases
  - Parkinson
  - Huntington
- Optic nerve is CNS
- May improve bloodflow (vasodilation***) / relieve oxidative stress

Slide 71

HYPEROSMOTICS

- Glycerin
  - Make sure patient doesn't have DM
- Isosorbide
  - Safer – not metabolized
- Both 1.5mg/kg
- Acute narrow angle glaucoma attack with IOP >/=50mmHg

Slide 72

MIRTOGENOL

- Oral supplement
  - 80mg bilberry extract
  - 40mg French maritime pine bark extract
- Shown in one study to have additive effect with latanoprost and also to have a positive effect on diastolic blood velocity
  - Mal Vis. 2008 Jul 10;14:1288-92.
  - Clin Ophthalmol. 2010 May 14;4:471-6.

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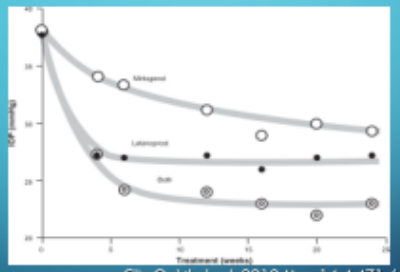
MIRTOGENOL



Clin Ophthalmol. 2010 May 14;4:471-6.

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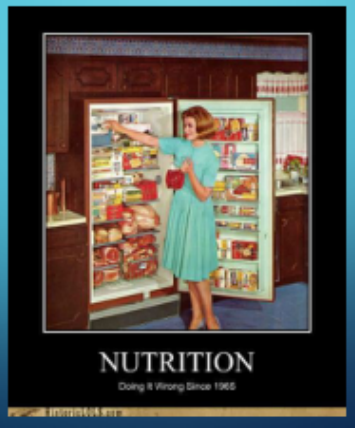
NUTRACEUTICALS



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NUTRACEUTICALS

- CAM
  - Complementary and Alternative Medicine
  - HAS a place in evidence-based medicine
  - IS a BIG business
  - DOES affect patients of all walks of life

Slide 76

AMD

- The leading cause of legal blindness for those 65 and older in US, Canada, Western Europe, Australia, and Japan

Surv Ophth, June 2003

Adamis et al

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AMD

- Two flavors
  - "Dry" and "Wet" (Nonexudative and Exudative)
- All "Wet" was once "Dry"
- Remember that as the population ages…..

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AMD

- AREDS
  - Antioxidants and Zinc
  - Vit. C/E, beta-carotine, zinc
  - Copper
  - Shown beneficial for patients with *intermediate* AMD or *unilateral advanced* AMD
    - Intermediate = extensive intermediate drusen OR at least one large druse OR non-central geographic atrophy

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AREDS

- 500mg Vitamin C
- 400mg Vitamin E
- 15mg Beta-carotine (25,000 IU)
- 80mg Zinc
- 2mg Copper

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RETINITIS PIGMENTOSA

- Vitamin A 15,000 IU beneficial
  - Liver considerations???
- Vitamin E detrimental
- Lutein beneficial

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THANK YOU!

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