The eye is a good example of an organ with multiple ANS functions, controlled by several different autonomic receptors.” (Katzung)

Increased intraocular pressure: Untreated → blindness

Glaucoma:
- Open-angle (wide, chronic) – treated with beta-blockers and other agents
- Closed-angle (narrow-angle) – dilated iris can occlude outflow. Pilocarpine or surgical removal of part of iris (iridectomy)

Drugs used in glaucoma

Cholinomimetics
- Pilocarpine, physostigmine, echothiophate
  - Ciliary muscle contraction → opening of trabecular meshwork → Outflow
  - Topical

Alpha-Agonists: Unselective
- Epinephrine
  - ↑ Outflow
  - Topical

Alpha2-Selective Agonists
- Apraclonidine
  - ↓ Aqueous secretion from the ciliary epithelium
  - Topical

Beta-Blockers
- Timolol, betaxolol, carteolol
  - ↓ Aqueous secretion from the ciliary epithelium
  - Topical

Diuretics: Carbonic acid inhib.
- Acetazolamide, Methazolamide, Dorzolamide, Brinzolamide
  - ↓ Secretion due to lack of HCO3-
  - Oral/Topical

Prostaglandins
- Latanoprost
  - ↑ Outflow
  - Topical

Ach effects on smooth muscle in the eye

Contraction of sphincter muscle → miosis

Contraction of ciliary muscle for near vision
Innervation of the iris

Clinical Setting | Drug                  | Pupillary Response
---               |                       |                        
Normal           | Sympathomimetic (e.g., phenylephrine) | Dilation (mydriasis)    
Normal           | Parasympathomimetic (e.g., pilocarpine) | Constriction (miosis)   
Normal           | Parasympatholytic (e.g., atropine)     | Mydriasis, cyclopegia   
Homer's syndrome | Cocaine 4-10%          | No dilation             
Preganglionic Homer's | Hydroxyamphetamine | Dilation                  
Postganglionic Homer's | Hydroxyamphetamine | No dilation              
Adie's pupil     | Pilocarpine 0.05-0.1%  | Constriction            
Normal           | Dipivefrin (oral or intranasal)         | Pinpoint pupils

Effects of pharmacological agents on the pupil

Eye - Horner's Syndrome
- Destruction of Sympathetic innervation to the iris
  - Loss of preganglionic fibers
  - Loss of postganglionic fibers
  - Parasympathetic innervation left unopposed

Homer's Syndrome (note sagging left eyelid and miosis)

Adie's Pupil & Iritis
- Adie's Pupil
  - Poor light reflex
- Iritis
  - Muscarinic blocker to dilate pupil to prevent attachment to lens
  - Steroid to treat inflammation

Topical scopolamine drops on pupil diameter and accommodation in the normal human eye. One drop (0.5%) at zero time and 30 min.