ACTION OF AUTONOMIC DRUGS ON THE EYE

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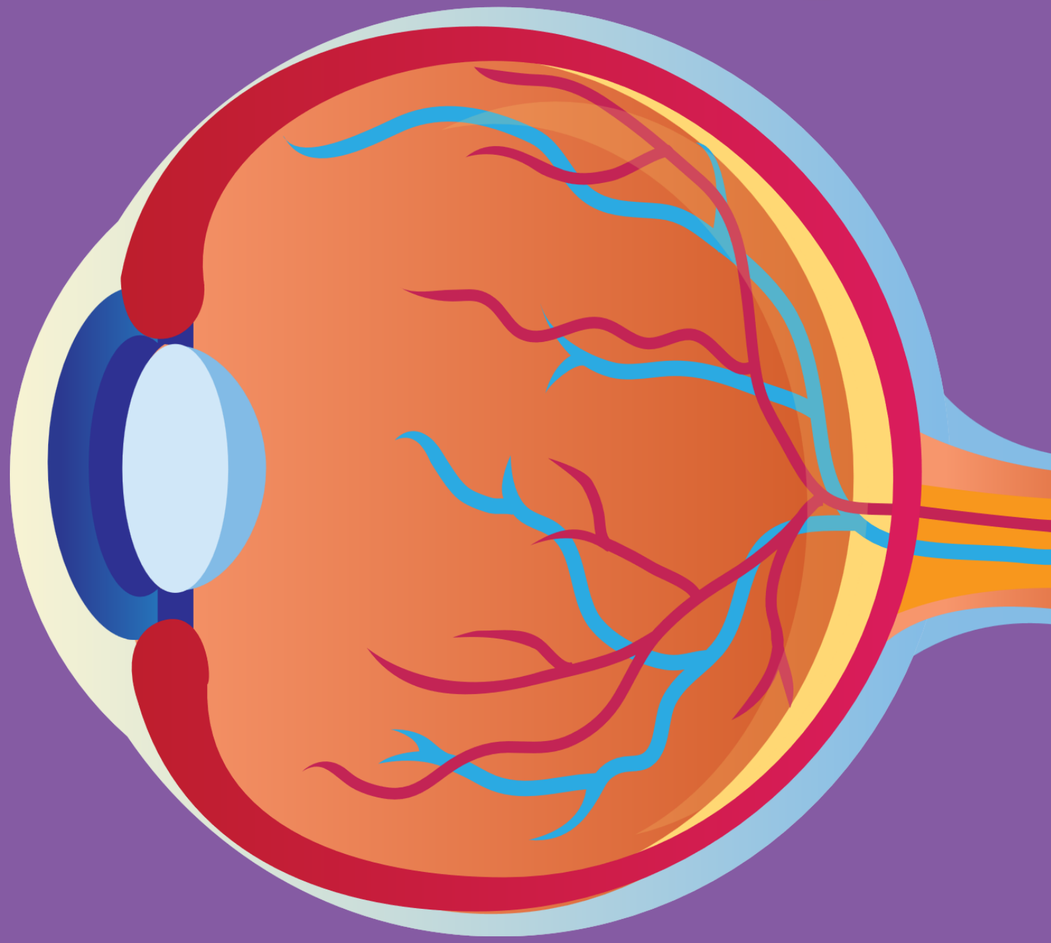
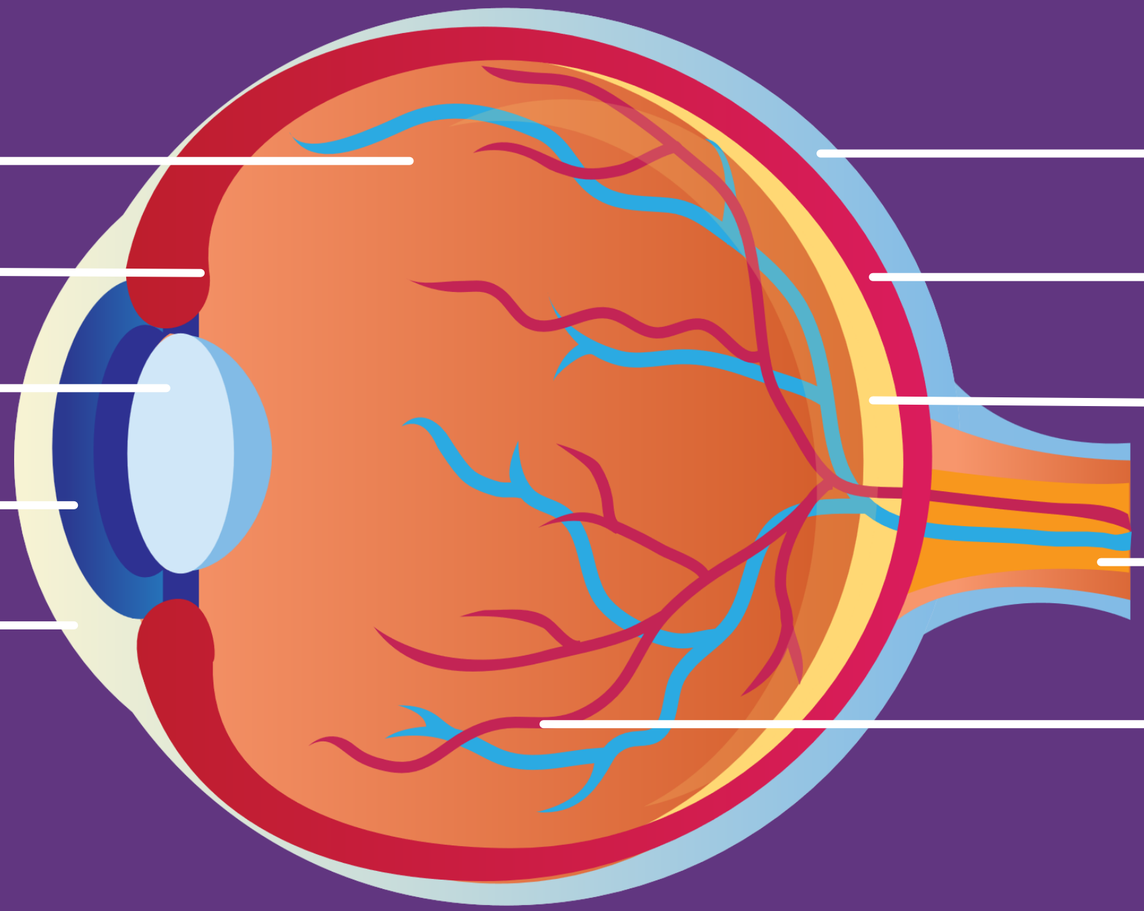


PARTS OF THE EYE



Vitreous Humor

Ciliary Body

Lens

Iris

Cornea

Sclera

Choroid

Retina

Optic Nerve

Blood Vessels

INTRODUCTION

The autonomic nervous system (ANS) is crucial in regulating various eye functions, including pupil size, aqueous humor production, and intraocular pressure. Autonomic drugs, which act on the sympathetic and parasympathetic nervous systems, are widely used in ophthalmology for diagnostic, therapeutic, and surgical purposes.

AUTONOMIC CONTROL OF THE EYE

The eye is controlled by two main branches of the autonomic nervous system:

- **Sympathetic Nervous System (SNS):**
Mediates pupil dilation (mydriasis) and reduces aqueous humor outflow.
- **Parasympathetic Nervous System (PNS):**
Mediates pupil constriction (miosis), accommodation, and increases aqueous humor drainage.

EFFECTS OF AUTONOMIC DRUGS ON THE EYE

1. Sympathomimetic (Adrenergic Agonist) Drugs

These drugs stimulate the sympathetic nervous system, causing:

- Mydriasis (pupil dilation) by activating α1-receptors on the dilator pupillae muscle.
- Increased aqueous humor production, which can raise intraocular pressure (IOP).

Examples:

- **Phenylephrine (α1-agonist):**

Used for pupil dilation in eye exams.

- **Epinephrine (α & β-agonist):**

Reduces intraocular pressure in glaucoma by increasing outflow.

- **Brimonidine (α2-agonist):**

Lowers IOP by reducing aqueous humor production.

EFFECTS OF AUTONOMIC DRUGS ON THE EYE

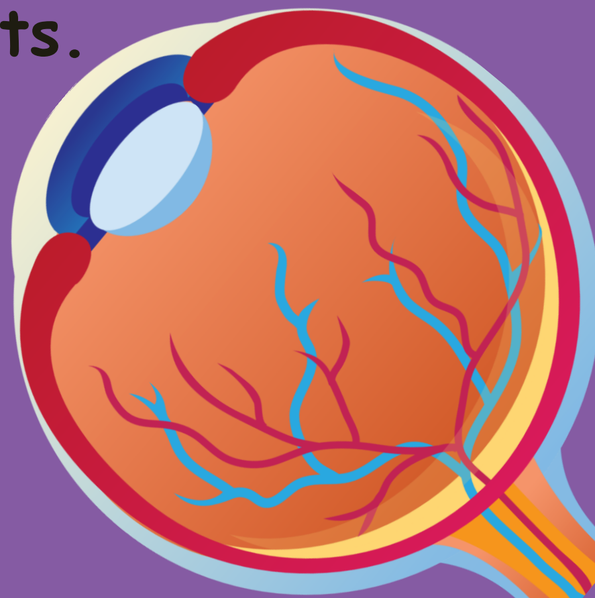
2. Sympatholytic (Adrenergic Antagonist) Drugs

These drugs block sympathetic activity, causing:

- Reduced aqueous humor production, lowering IOP.

Examples:

- **Timolol (β-blocker):** Used in glaucoma treatment to decrease aqueous humor secretion.
- **Betaxolol (β1-blocker):** Selectively lowers IOP with fewer systemic effects.



EFFECTS OF AUTONOMIC DRUGS ON THE EYE

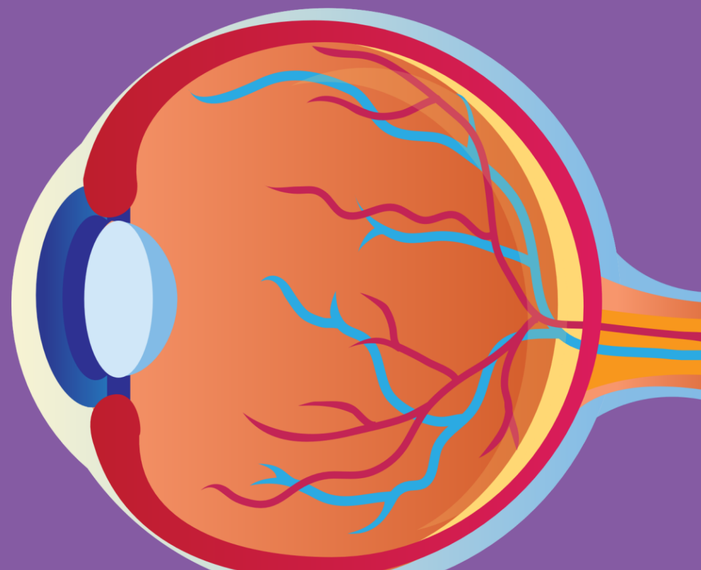
3. Parasympathomimetic (Cholinergic Agonist) Drugs

These drugs stimulate the parasympathetic nervous system, causing:

- Miosis (pupil constriction) by activating M3 receptors on the sphincter pupillae muscle.
- Increased aqueous humor outflow, reducing IOP.

Examples:

- **Pilocarpine:** Used in glaucoma to enhance trabecular outflow.
- **Carbachol:** Induces miosis during eye surgery.



EFFECTS OF AUTONOMIC DRUGS ON THE EYE

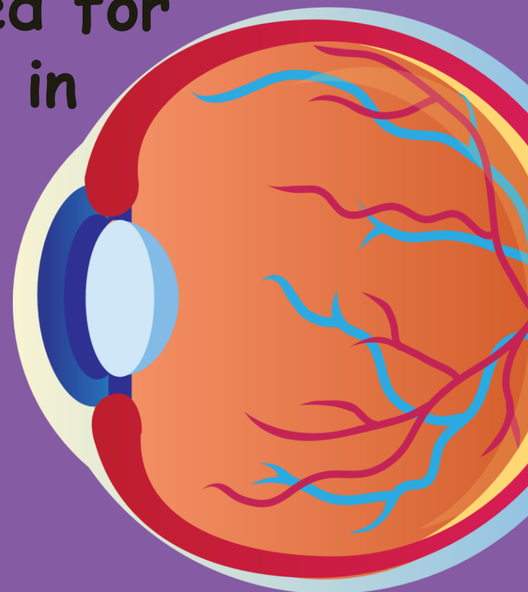
4. Parasympatholytic (Cholinergic Antagonist) Drugs

These drugs block parasympathetic activity, leading to:

- Mydriasis (pupil dilation).
- Cycloplegia (paralysis of accommodation), impairing near vision.

Examples:

- **Atropine:** Long-acting mydriatic, used in uveitis and refraction tests.
- **Tropicamide:** Short-acting mydriatic for eye exams.
- **Cyclopentolate:** Used for cycloplegic refraction in children.



CLINICAL APPLICATIONS OF AUTONOMIC DRUGS IN OPHTHALMOLOGY

- **Mydriatics (Pupil Dilators):** Phenylephrine, Tropicamide, Atropine.
- **Miotics (Pupil Constrictors):** Pilocarpine, Carbachol.
- **Glaucoma Treatment:** Timolol, Brimonidine, Pilocarpine.
- **Cycloplegic Refraction:** Atropine, Cyclopentolate.

"In Every Day, There Are 1,440 Minutes.
That Means We Have 1,440 Daily
Opportunities To Make A Positive Impact."

-Les Brown