

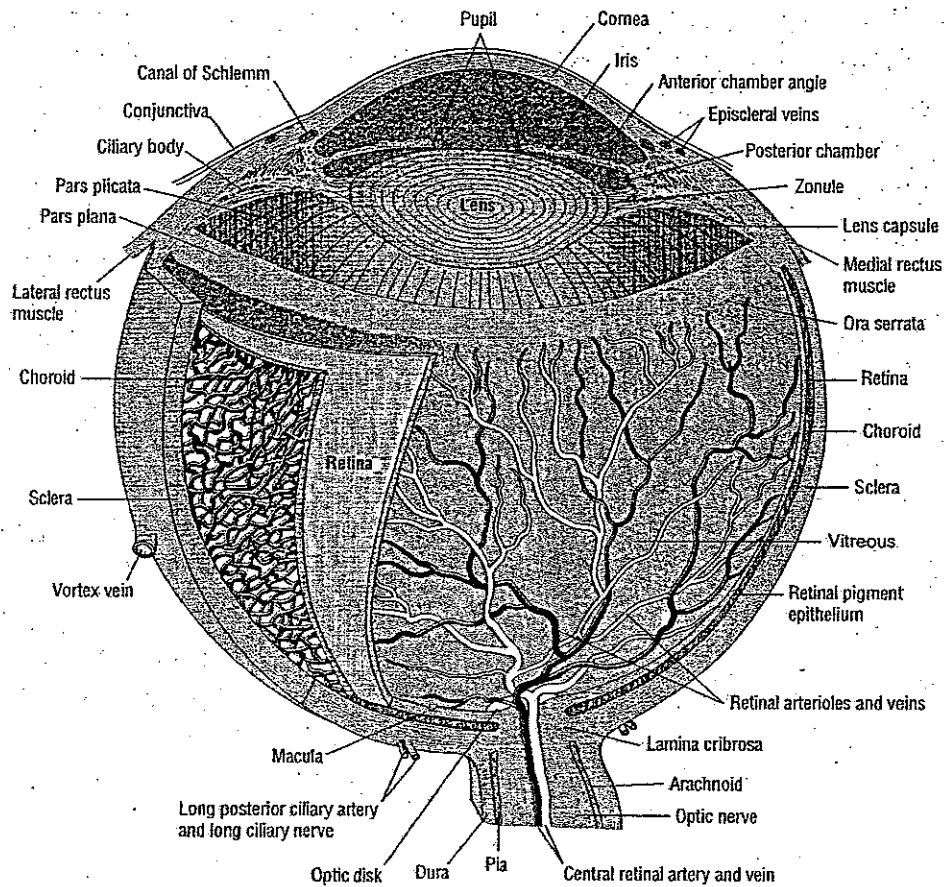


FIGURE 86-1. Anatomy of the eye. (Redrawn from an original by Paul Beck and reproduced with permission from *Anatomy of the Eye*. Courtesy of Lederle Laboratories. In Vaughn D, Asbury T, Riordan-Eva P. *General Ophthalmology*, 14th ed. Stamford, CT, Appleton & Lange, 1995, with permission.)

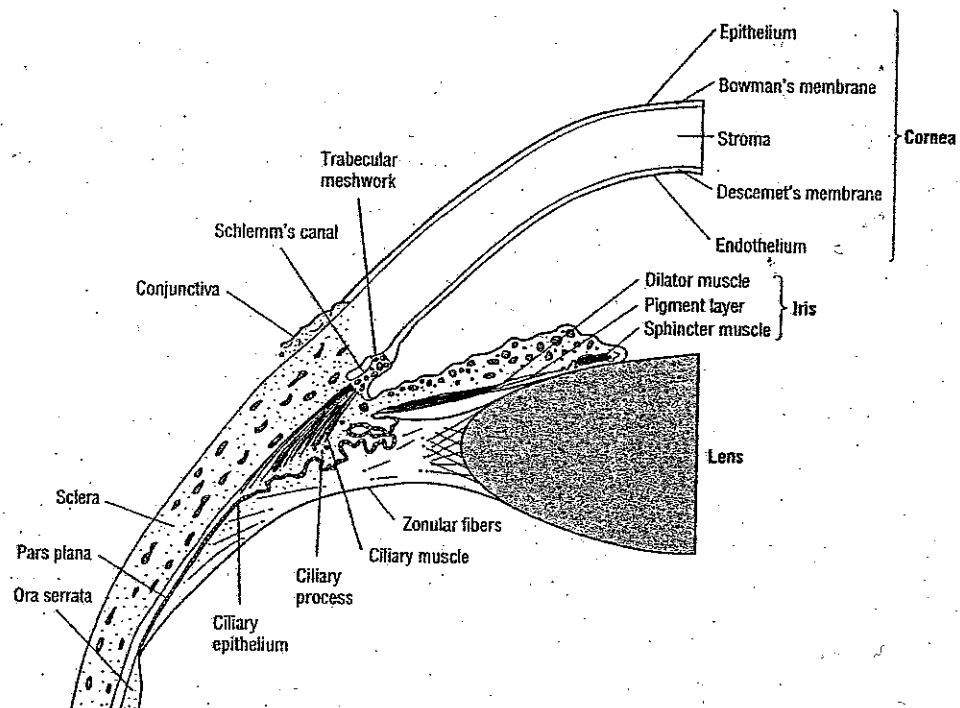


FIGURE 86-2. The anterior chamber of the eye. (From Vaughn D, Asbury T, Riordan-Eva P. *General Ophthalmology*, 14th ed. Stamford, CT, Appleton & Lange, 1995, with permission.)

Table 5-1. RESPONSES OF EFFECTOR ORGANS TO AUTONOMIC NERVE IMPULSES

EFFECTOR ORGANS	Receptor Type ²	ADRENERGIC IMPULSES ¹	CHOLINERGIC IMPULSES ¹
		Responses ³	Responses ³
Eye Radial muscle, iris Sphincter muscle, iris Ciliary muscle	α_1 β_2	Contraction (<u>mydriasis</u>) ++ Relaxation for far vision +	Contraction (<u>miosis</u>) +++ Contraction for near vision +++

contraction = far vision

accommodation

contraction = near vision

10

Pharmacologie oculaire

(Acétylcholine)

Cornée
Anesthésiques locaux
Fluorescéine
Antibiotiques
Médicaments antiviraux
Médicaments anti-inflammatoires

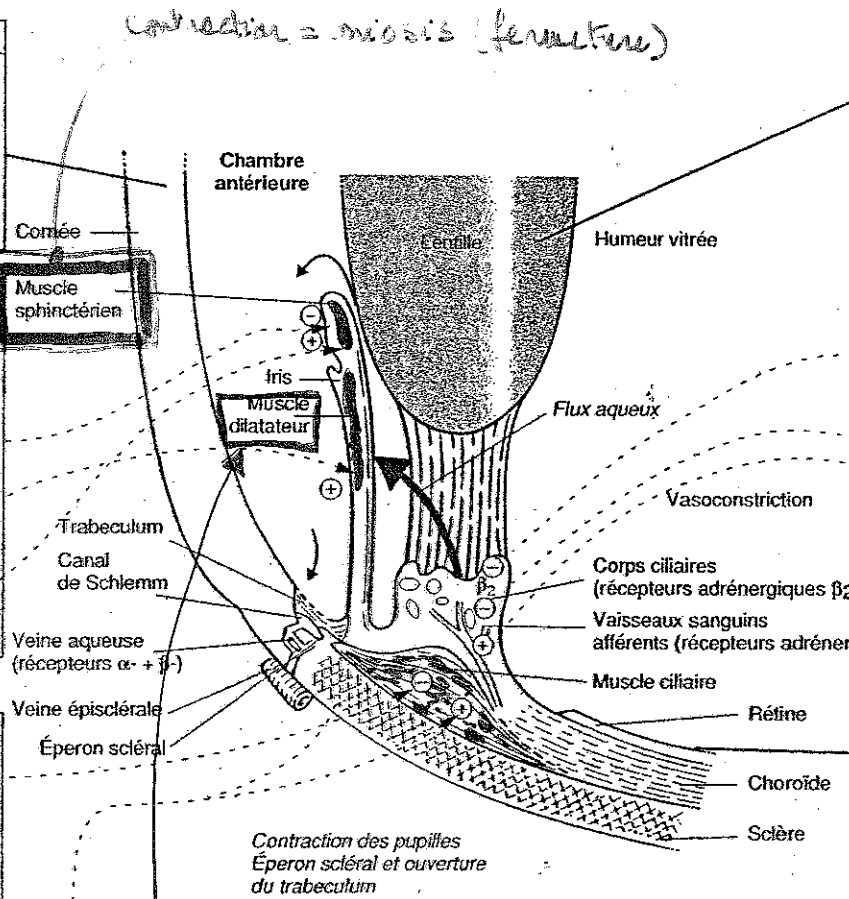
Iris
MYDRIATIQUES (dilatation des pupilles)
Médicaments analogues à l'atropine
Tropicamide
Cyclopentolate
α -stimulants
Phényléphrine
MIOTIQUES (contraction des pupilles)
Pilocarpine

Muscle cilié
Muscle cilié
CYCLOPLEGIQUES (paralysie du muscle)
Atropine
Tropicamide
Cyclopentolate
CONTRACTION (spasme)
Pilocarpine et autres agonistes muscariniques
Anticholinestérase
Physostigmine

Formation de cataracte
Corticoides
Anticholinestérase irréversibles
Diabète

Corps ciliés
β -bloquants
Timolol
Autres
Acétazolamide
Adrénaline

Rétinopathie
Chloroquine
Diabète
Hypertension
Taux d'oxygène élevé
Tension chez les bébés



contraction = miosis (fermeture)

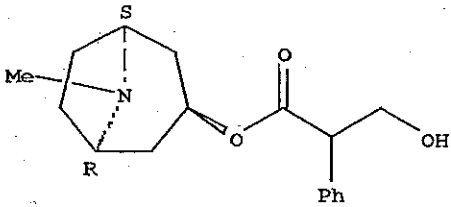
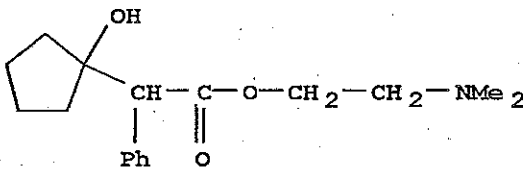
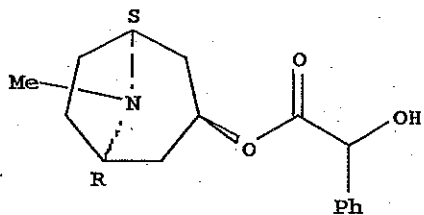
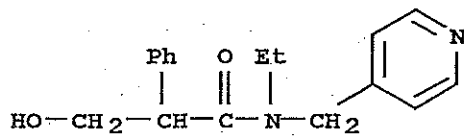
contraction = mydriase (ouverture)

noradrénaline
adrénaline

adrénaline / noradrénaline
= relaxation (vision de loin)

acétylcholine
= contraction (vision de près)

Mydriatiques anticholinergiques

 atropine	 cyclopentolate
 homatropine	 tropicamide

Mydriatiques adrenergiques

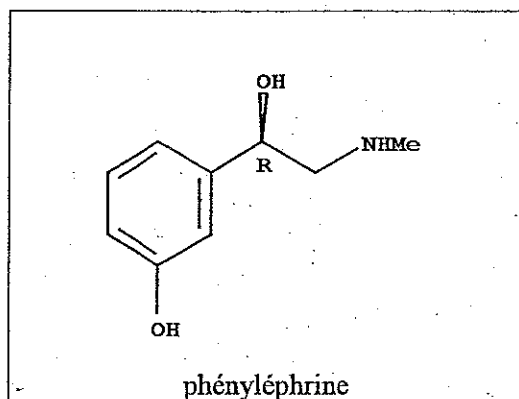
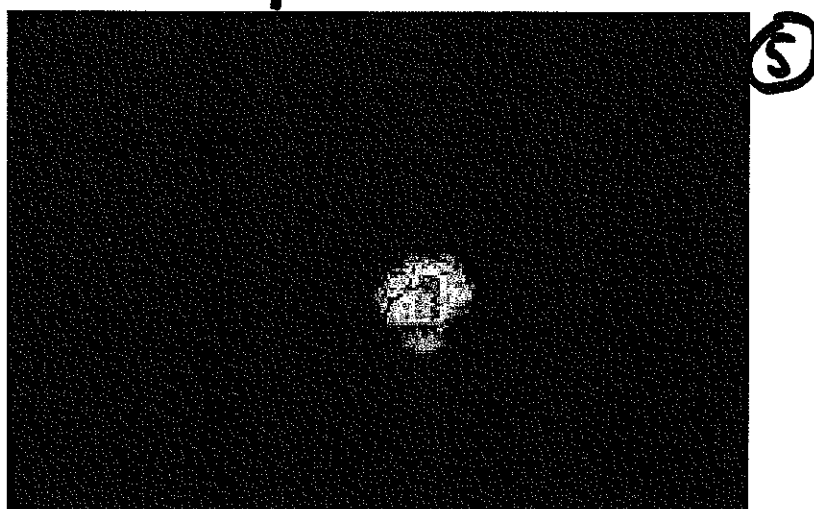
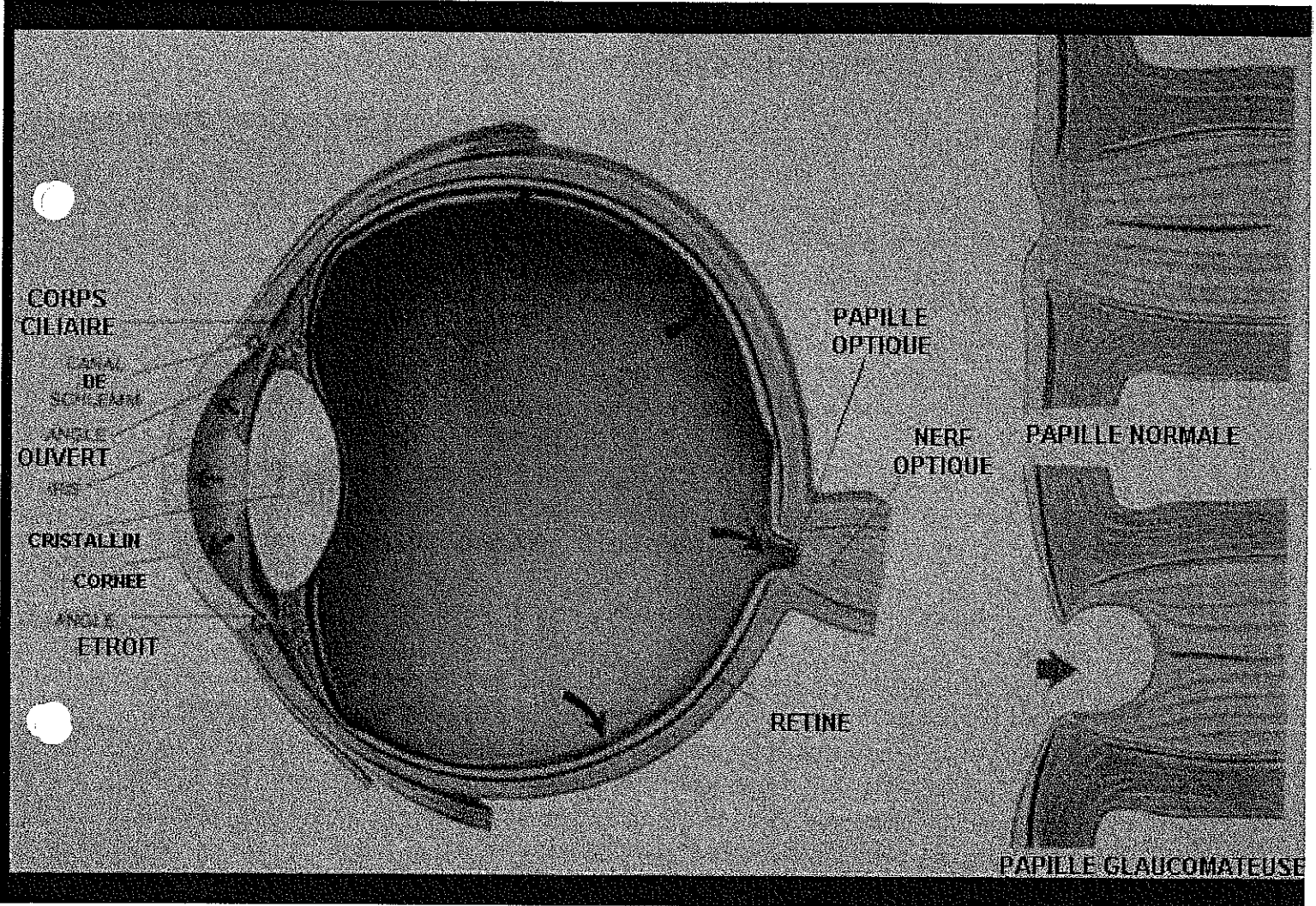


TABLE 86-1. General Classification of Glaucoma

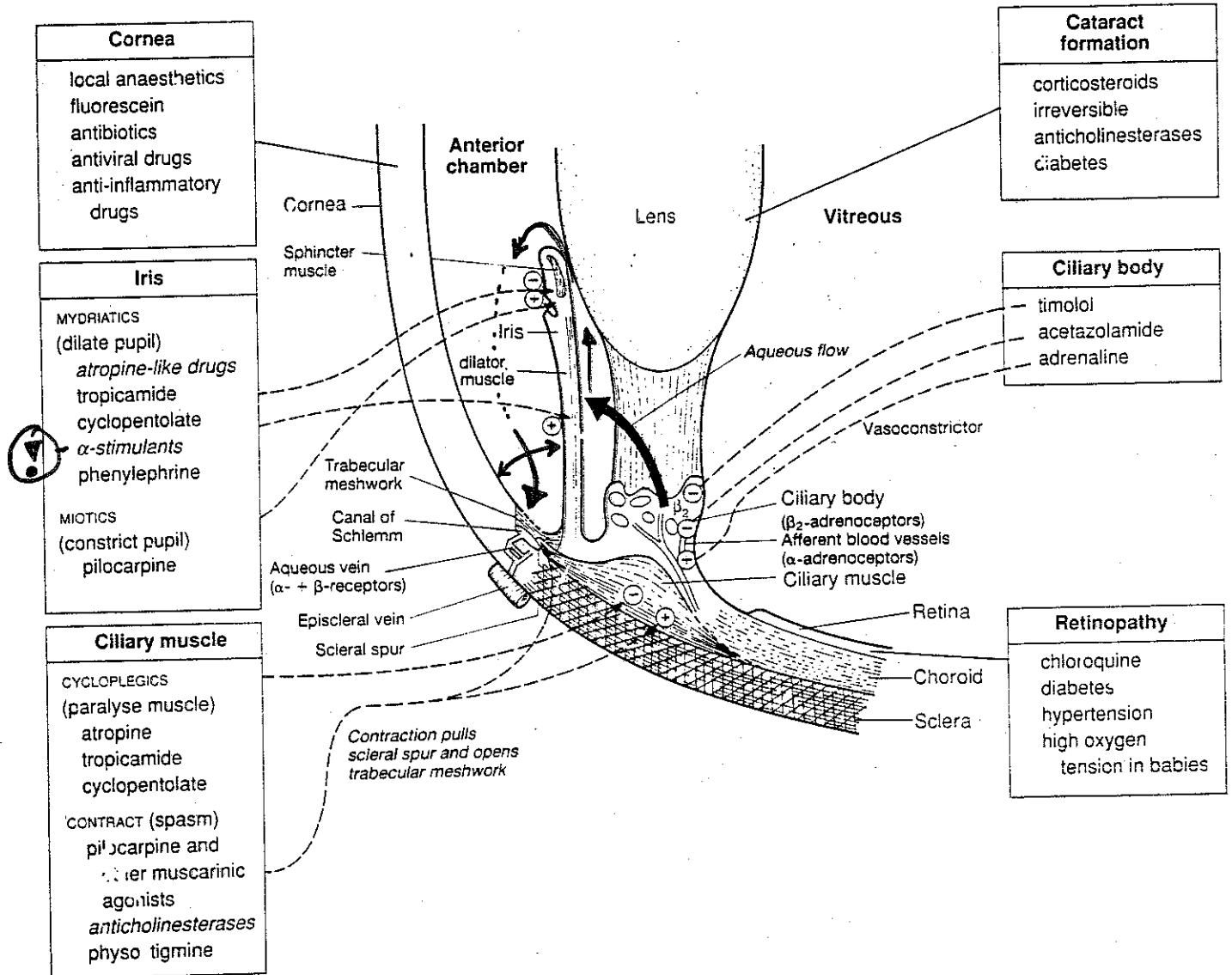
- I. Primary glaucoma
 - A. Open angle
 - B. Angle closure
 - 1. With pupillary block
 - 2. Without pupillary block
 - II. Secondary glaucoma
 - A. Open angle
 - 1. Pretrabecular
 - 2. Trabecular
 - 3. Posttrabecular
 - B. Angle closure
 - 1. With pupillary block
 - 2. Without pupillary block
 - III. Congenital glaucoma
-





Mouvement de l'humour aqueux

10 Ocular pharmacology



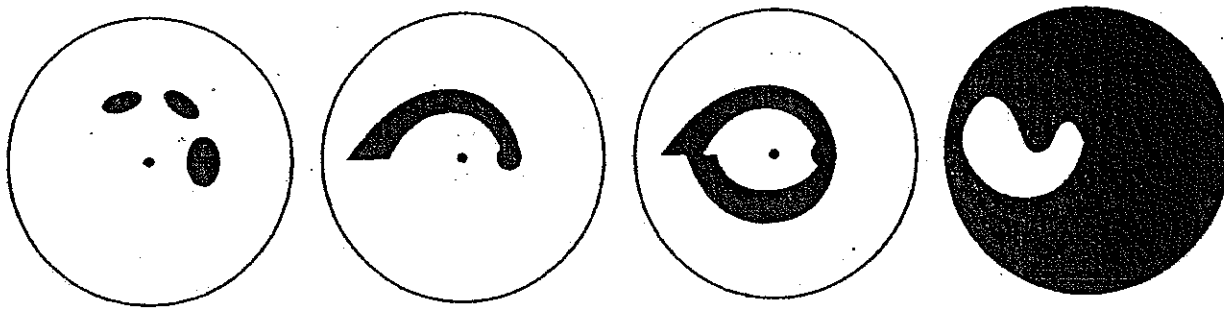


FIGURE 86-4. Schematic representation of the progression of visual field loss.

► PRINCIPLES OF PHARMACOTHERAPY

- The objective of treating primary open-angle glaucoma is to reduce intraocular pressure.
- Effective glaucoma therapy stops progression of visual field loss.
- Each patient needs an effective, well-tolerated, and convenient drug regimen for treating glaucoma.
- Topical glaucoma medications have the potential to produce systemic adverse effects.
- Patient and family education is necessary to assure compliance and successful outcomes for treating glaucoma.

TABLE 88.4. TOPICAL AGENTS USED IN THE TREATMENT OF GLAUCOMA

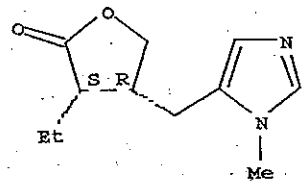
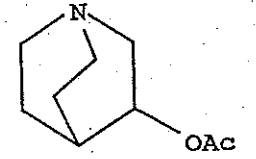
	Drug	Form	Strength% ^a	Brand Name	Dose Frequency ^a	Mechanism of IOP Reduction
①	β-Adrenergic Blockers					Decreased aqueous humor production
	Betaxolol	Solution	0.5	Betoptic	q 12 h	
		Suspension	0.25	Betoptic S	q 12 h	
	Carteolol	Solution	1	Ocupress	q 12 h	
	Levobunolol	Solution	0.25, 0.5	Betagan	q 12–24 h	
	Metipranolol	Solution	0.3	OptiPranolol	q 12 h	
②	Adrenergic Agents					Increased aqueous humor production
	α/β agonist					
	Epinephrine HCl	Solution	0.25, 0.5, 1, 2	Epifrin, Glaucon	q 12 h	
	Epinephrine bitartrate	Solution	2		q 12 h	
	Epinephrine borate	Solution	0.5, 1, 2	Epinal	q 12 h	
	Dipivefrin	Solution	0.1	Propine	q 12 h	
③	α₁ agonist					Increased aqueous humor production
	Apraclonidine	Solution	1	lopidine	pre- and post-op	
		Solution	0.5	lopidine	q 8–12 h	
	Parasympathomimetics					
	Direct acting					
	Pilocarpine	Solution	0.25–10	Numerous	q 4–12 h	
④	Pilocarpine	Gel	4	Pilopine HS	q 24 h	Increased aqueous outflow
	Carbachol	Solution	0.75, 1.5, 2.25	IsoptoCarbachol	q 8–12 h	
	Cholinesterase inhibitors					
	Physostigmine	Solution	0.25, 0.5	Isopto Eserine	q 8–12 h	
	Demecarium	Solution	0.125	Humorsol	q 8–12 h	
	Echothiophate	Solution	0.03–0.25	Phospholine iodide	q 12–24 h	
⑤	Isoflurophate	Ointment	0.25	Floropryl	q 8–12 h	Increased uveoscleral outflow
	Carbonic Anhydrase Inhibitors					
	Dorzolamide	Solution	2	Trusopt	q 8–12 h	
	Prostaglandin Analogues					
	Latanoprost	Solution	0.005	Xalatan	q 24 h	

^aUse of nasolacrimal occlusion (NLO) may allow use of lower concentrations at longer intervals.

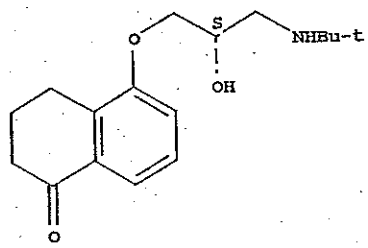
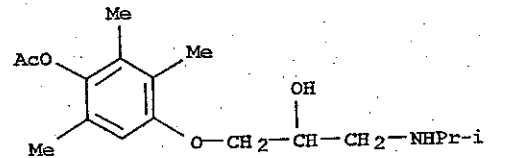
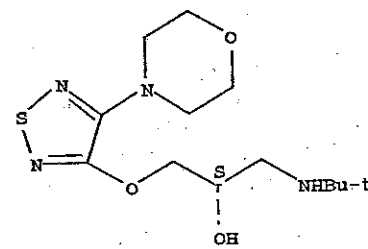
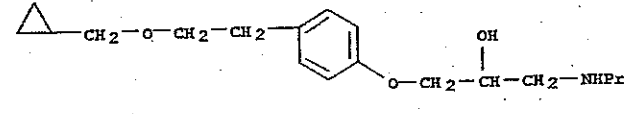
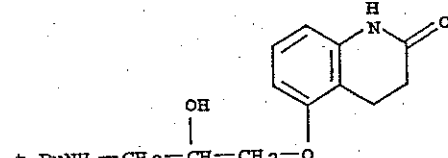
- ① ↓ la production d'humour aqueuse (β₂) au niv. des cap. ciliaires
- ② ↑ le flux de l'humour aqueuse (α) au niv. des cap. ciliaires
- ③ ↑ le flux de l'humour aqueuse par ↑ écoulement vers la chambre antérieure
- ④ ↓ la production d'humour aqueuse
- ⑤ ↑ de l'écoulement uveoscléaire (relaxe les trabécules)

Molécules utilisées dans le traitement du glaucome

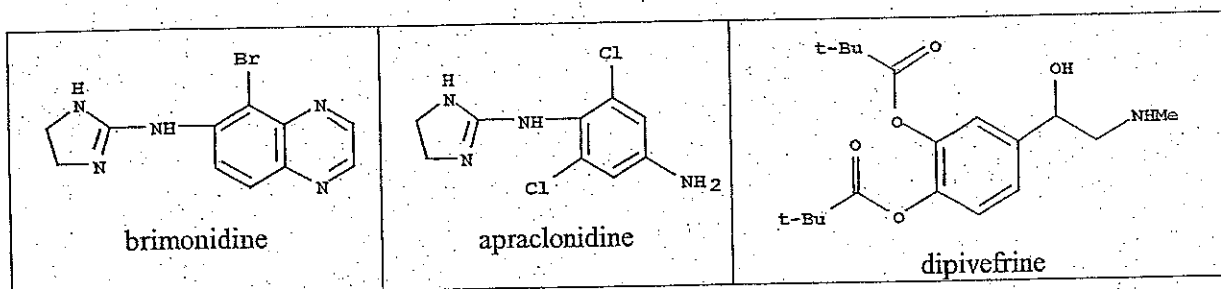
Cholinomimétiques

 pilocarpine	$\text{H}_2\text{N}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_2-\text{CH}_2-\text{N}^+\text{Me}_3$ · Cl⁻ carbachol	 aceclidine
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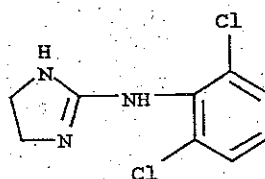
Beta-bloquants

 levobunolol	 metipranolol
 timolol	 betaxolol  carteolol

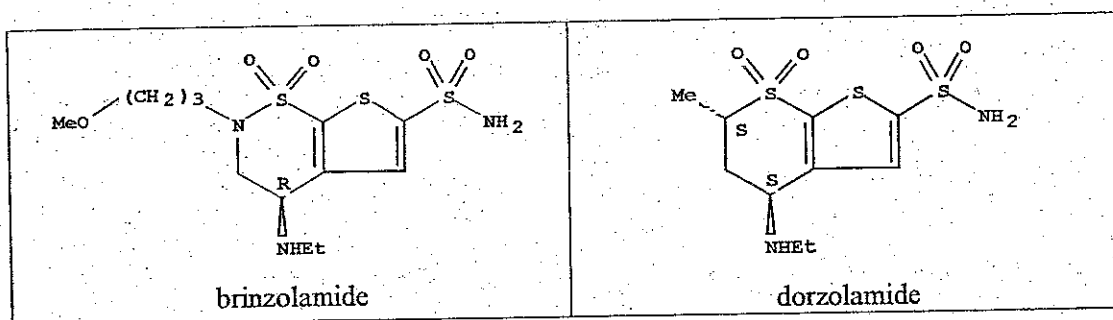
alpha-sympathicomimétiques



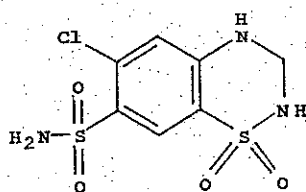
pour mémoire: clonidine =



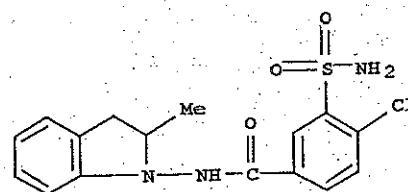
inhibiteurs de l'anhydrase carbonique



pour mémoire, voici deux diurétiques thiazidiques ...

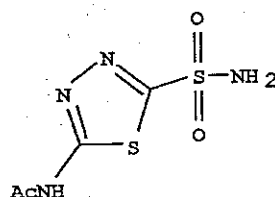


hydrochlorothiazide (historique)

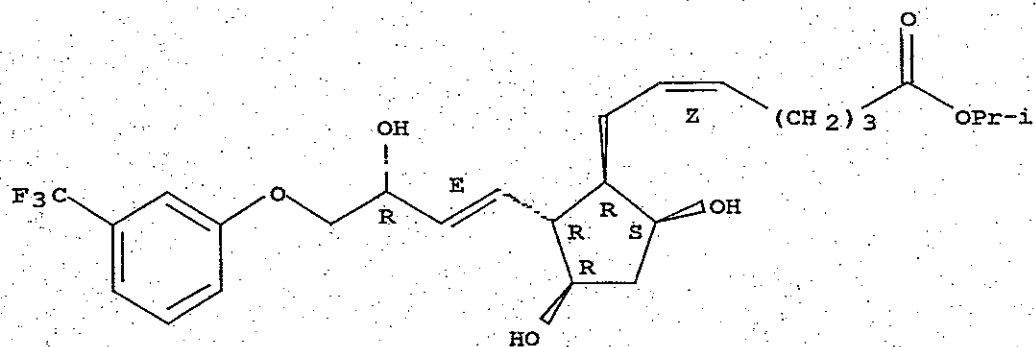


indapamide (actuel)

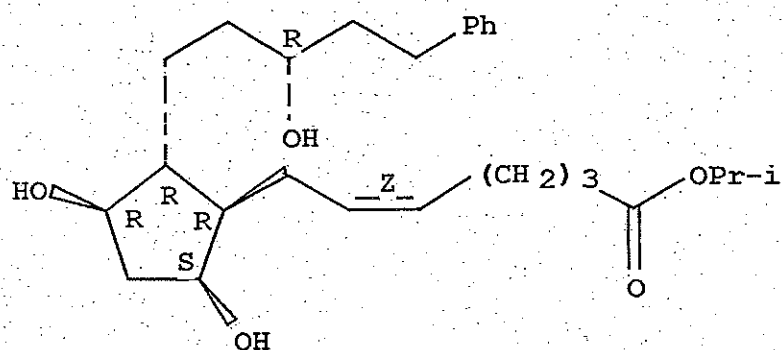
et l'acétazolamide (inhibiteur "historique" de l'anhydrase carbonique... et diurétique faible)



Analogues des prostaglandines



travoprost



latanoprost

■ PATIENT EDUCATION

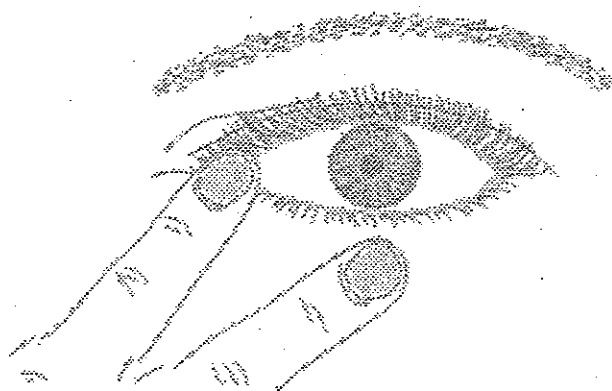
An important consideration in patients failing to respond to drug therapy is compliance. Poor compliance or noncompliance occurs in 25% to 60% of glaucoma patients. A large percentage of patients also fail to use topical ophthalmic drugs correctly. The patient should be taught the following procedure:

- Wash and dry the hands; shake bottle if it contains a suspension.
- With a forefinger, pull down the outer portion of the lower eyelid to form a "pocket" to receive the drop.
- Grasp the dropper bottle between the thumb and fingers with the hand braced against the cheek or nose with the head upward.
- Place the dropper over the eye while looking at the tip of the bottle; then, look up and place a single drop in the eye.
- The lids should be closed (but not squeezed or rubbed) for 1 to 3 minutes after instillation. This increases the ocular availability of the drug.
- Recap bottle and store as instructed.
- Note that many patients are physically unable to administer their own eyedrops without assistance.

Les collyres ?

Il existe de nombreuses classes thérapeutiques qui permettent d'abaisser la pression intra-oculaire, ce sont : Les bêta-bloquants, les myotiques (comme la pilocarpine), les inhibiteurs de l'anhydrase carbonique, les prostaglandines, et les dérivés de l'adrénaline. Votre ophtalmologiste vous prescrira le traitement le mieux à même de contrôler votre glaucome. Le but est d'utiliser le moins de médicaments possible afin d'éviter leurs effets indésirables. Suivez donc strictement les instructions de votre ophtalmologiste. Il faut également signaler à votre médecin généraliste les collyres que vous instillez dans votre œil car ceux-ci peuvent avoir des effets secondaires sur le plan de l'état général.

• Comment les instiller ?



Après avoir déposé une goutte dans votre œil, appuyez délicatement un doigt sur l'angle des paupières proches du nez pendant une minute. Cette pression délicate permet de bloquer le canal lacrymal, et votre collyre aura moins de chances de passer dans le nez puis dans le courant sanguin.

• Est-il important de respecter les horaires ?

Il est important de respecter les horaires. Lorsqu'on instille un collyre dans l'œil, celui-ci n'agit que pendant un certain nombre d'heures. Certains collyres ont une durée d'action de 8h et seront instillés 3 fois par jour toutes les 8 heures, d'autres ont une durée d'action de 12h et seront instillés 2 fois par jour, ou enfin une durée d'action plus longue de 24h nécessitant une seule instillation par jour.

• Devez-vous instiller les gouttes avant de venir en consultation ?

Sauf instructions contraires de votre ophtalmologiste, il faut instiller les gouttes avant de venir en consultation afin de pouvoir contrôler l'efficacité du traitement.

• Quelques règles fondamentales à suivre

Prenez vos médicaments régulièrement. Essayez de programmer la prise du traitement en fonction de vos activités journalières (réveil, heures des repas, coucher). Si vous devez instiller 2 collyres, attendez environ 5mn avant d'instiller le second dans votre œil.

Signalez à votre ophtalmologiste les autres médicaments que vous prenez, même ceux qui sont en vente libre (comme par exemple l'aspirine). Assurez-vous que les autres médecins qui vous suivent sont au courant de votre traitement anti-glaucomeux.

TABLE 86-7. Drugs That May Induce or Potentiate Glaucoma

Open-angle Glaucoma

Ophthalmic corticosteroids (high risk)
Systemic corticosteroids
Nasal/inhaled corticosteroids
Fenoldapam
Ophthalmic anticholinergics
Vasodilators (low risk)
Cimetidine (low risk)

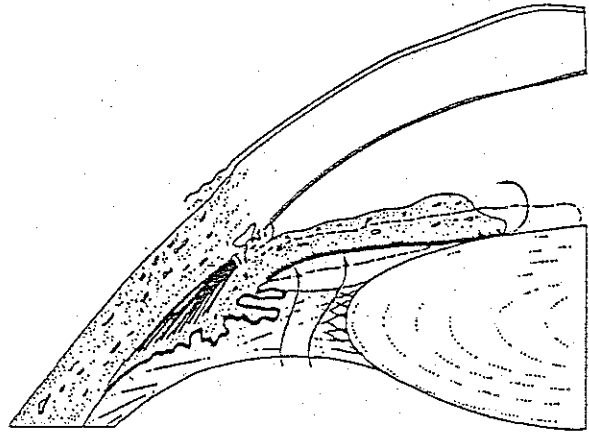
Angle-closure Glaucoma

Topical anticholinergics (high risk)
Topical sympathomimetics (high risk)
Antihistamines
Systemic anticholinergics
Heterocyclic antidepressants
Phenothiazines
Ipratropium
Benzodiazepines
Theophylline (low risk)
Vasodilators (low risk)
Systemic sympathomimetics (low risk)
CNS stimulants (low risk)
Tetracyclines (low risk)
Carbonic anhydrase inhibitors (low risk)
Monoamine oxidase inhibitors (low risk)
Topical cholinergics (low risk)

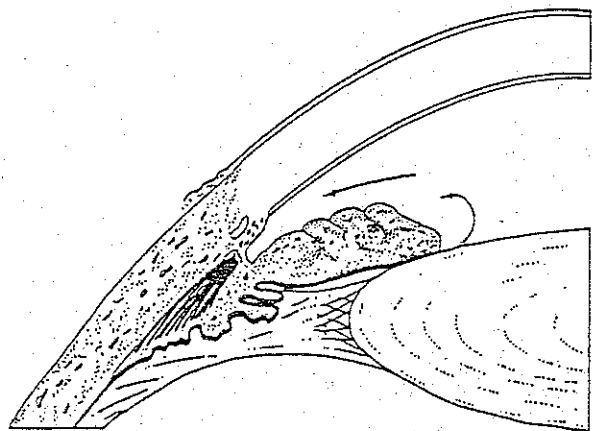
Le plus
fréquent

plus rare
mais
dangereux !

GLAUCOME AIGU!



glaucoma à angle fermé (chronique)



?

Figure 88.7. In the narrow-angle eye, the lens is displaced anteriorly in relation to the ciliary body and the iris root. When the eye is miotic (dotted line), the iris lies firmly against the lens, producing pupillary block, but the iris root is pulled away from the trabecular meshwork. In mid-dilation, pupillary block is present but the lax iris bows forward to block the meshwork. With further dilation, pupillary block is broken and the iris does not bow forward, allowing aqueous to flow to the meshwork. (From Kolker A, Hetherington S. *Becker-Shaffer's Diagnosis and Therapy of the Glaucomas*, 5th ed. St Louis, MO, CV Mosby, 1983, with permission.)

glaucoma sur iris annexé

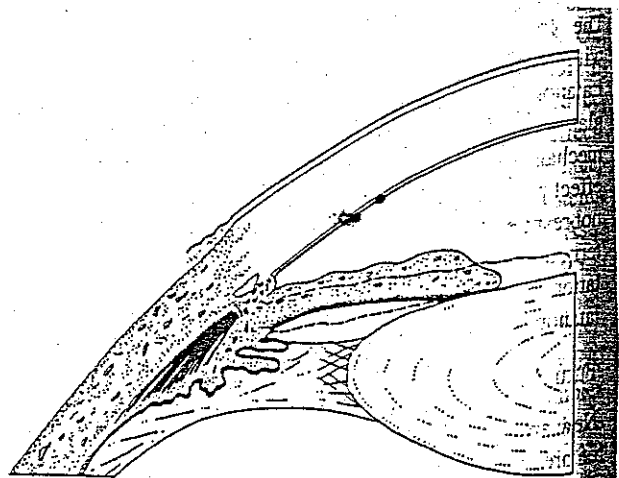


Figure 88.8. In an eye with plateau iris, the iris is attached anteriorly to the ciliary body. In miosis (dotted line), the root of the iris is pulled away from the meshwork and pupillary block is minimal. In mydriasis, the root of the iris bunches up, blocking the meshwork and producing angle closure. (From Kolker A, Hetherington S. *Becker-Shaffer's Diagnosis and Therapy of the Glaucomas*, 5th ed. St Louis, MO, CV Mosby, 1983, with permission.)

Traitement urgent!!