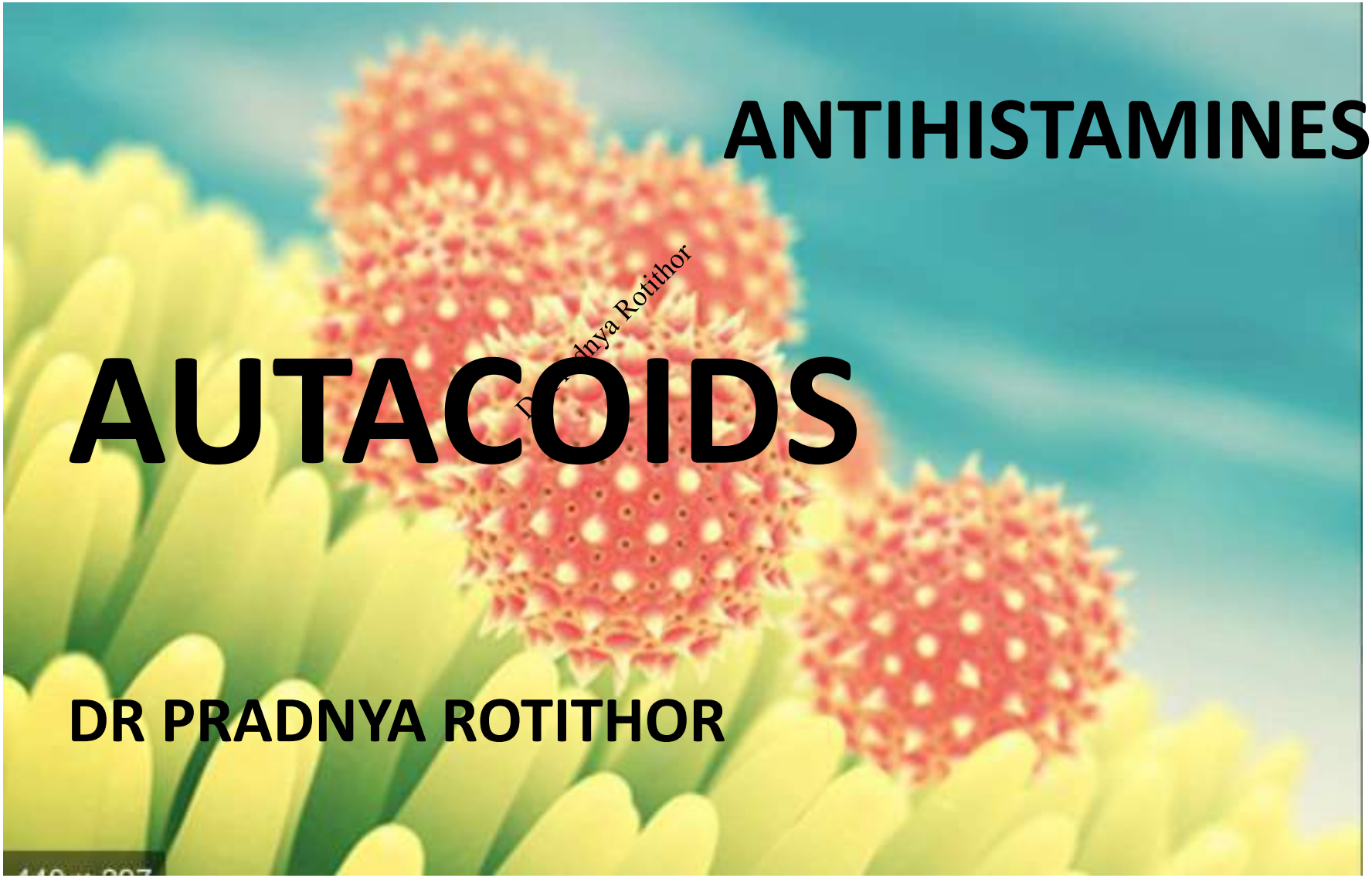


WIDELY USED OTC DRUGS

GENERAL INFORMATION

- **Autos = self Akos = healing substance**

- inflammatory and immunological reactions
- transmitters in nervous system.

Types-

- **Amines** –histamine, serotonin
- **Lipids** –PG ,LT, PAF
- **Peptides** –bradykinins, angiotensin
- **Others** –TNFα ,Gastrin,somatostatin ,intestinal peptide

HISTAMINE
TISSUE AMINE

- mast cells –storage

- Ex --Skin lungs liver gastric mucosa placenta
- **Nonmast cell –**
- 1) brain epidermis gastric mucosa and growing regions

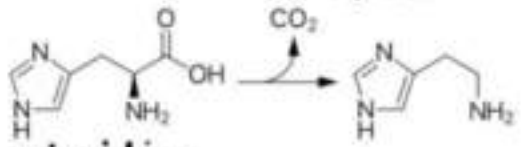
  2) blood ,most body secretions,venoms and pathological fluids .

- Synthesis – amino acid **histidine** locally

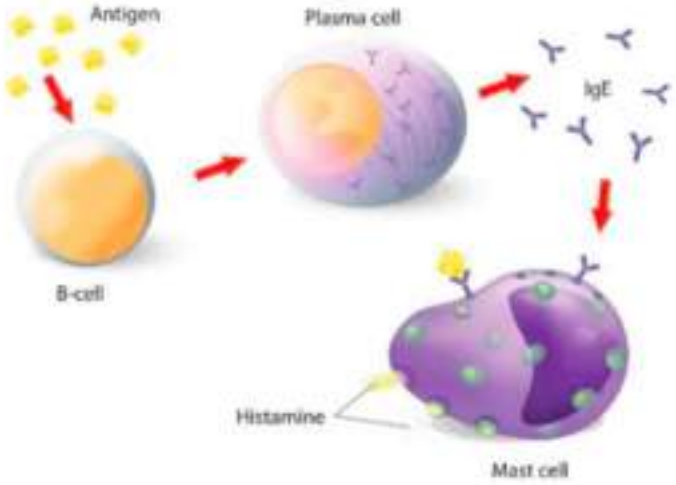
Histamine liberation

- **Venoms** (insect/reptile bites)
- Food products (crabs, lobsters, fish)
- **Trauma** due to cold, chemical, thermal, radiant energy
- **Antigen antibody reactions**
- Drugs: **d-tubocurarine**, morphine, pethidine, amphetamine

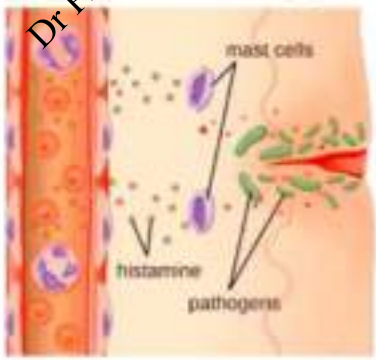
Histamine



Allergic reaction



Tissue injury



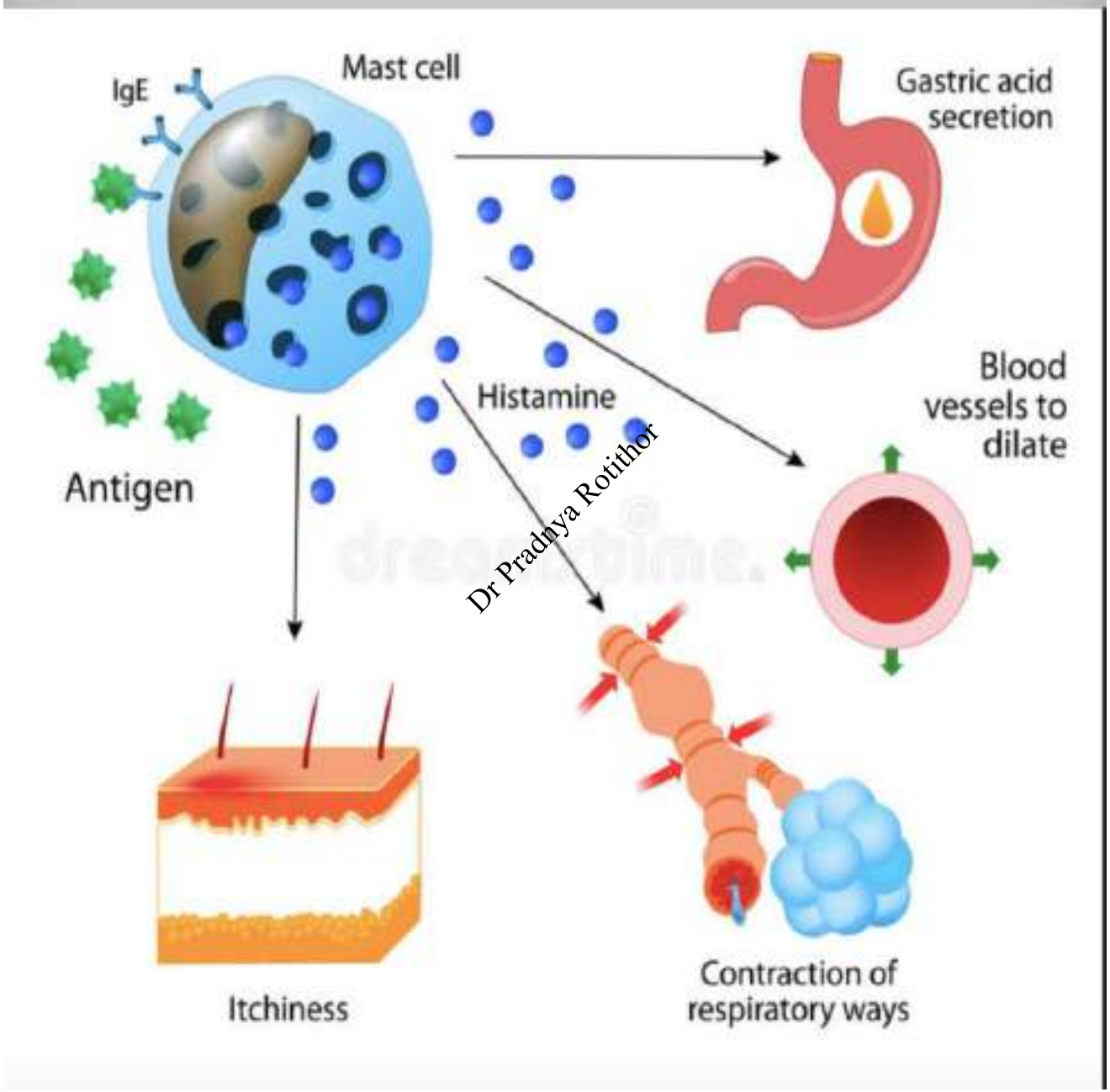
Drugs & Foreign chemicals

HISTAMINE RECEPTORS

G Protein coupled -- H1 , H2

- H3 - only in brain
- H4
-

- ***By convention antihistaminic drugs = H1 blockers ..***
- ***competitively block histamine receptors***


IgE
Mast cell
Gastric acid secretion
Histamine
Blood vessels to dilate
Antigen
Dr Pradnya Rotithor
Itchiness
Contraction of respiratory ways

BODY DISTRIBUTION OF H1 AND H2 AND ACTIONS MEDIATED

- **H1**
- 1**) Smooth muscles** of intestine airway,uterus,blood vessels =contraction ---bronchospasm
- Increased secretions –saliva and mucus
- 2) **blood vessels** –endothelium = release of EDRF,NO= vasodilatation ,hypotension,↑ capillary permeability ,oedema
- **Histamine dilates arterioles, capillaries and venules**
- **Triple response reaction—inj intradermally— wheal,flare, flush**
- 3) **afferent nerve endings** = stimulation------**itch and pain**
- 4) **brain** =transmitter ---**wakefulness** and some other functions

H2
NOT TO BE DISCUSSED TODAY

- 1) gastric glands =acid secretion
- 2)smooth muscles of blood vessels = dilatation
- 3) heart atria =+ve chronotrophy
- heart ventricles =+ve ionotrophy
- 4) uterus = relaxation
- 5) brain = transmitter

PATHOPHYSIOLOGICAL ROLE

- 1) Gastric secretion = H2

- 2**) allergy** =[H1] AG: AB reaction
- ↓Mast cell
- histamine
- ↓
- urticaria , angioedema, bronchoconstriction ,anaphylactic shock

- **Histamine is not involved in delayed /retarded type of allergy**

- 3)role as transmitter =
- a) at sensory nerve endings –itch and pain

- **b) In brain it is involved in maintaining wakefulness (H1) and some other functions**
-
- 4) inflammation = vasodilatation

H1 ANTIHISTAMINICS -MOA

competitive antagonism of H1 R

Effects seen--

Anti allergic

Anticholinergic

Anti inflammatory

CNS depression

Local anaesthetics

CLASSIFICATION –5star SAQ

1) Conventional/traditional/first generation antihistaminics

a) highly sedative --

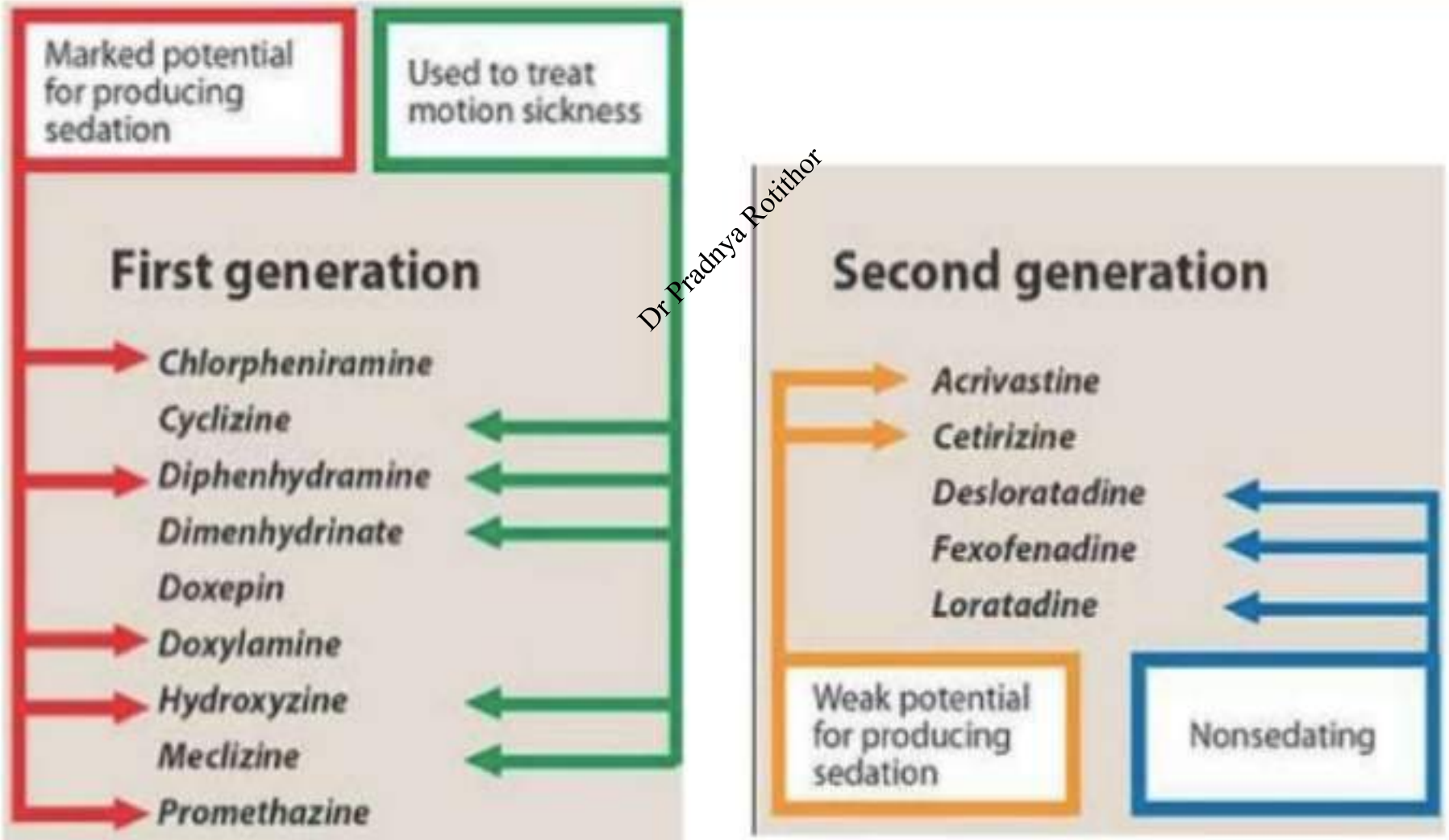
b) moderately sedative

c)mild sedative

<u>They have some action on cholinergic alpha adrenergic and serotonin R –base for some clinical uses</u>

2) second generation antihistaminics – highly selective for H1

Classification of H_1 Antagonists



FIRST GENERATION DRUGS

type	generic name	trade name
highly sedative	diphenhydramine	benadryl –cap/syr
25 to 50mg oral	promethazine	phenargan –tab/syr/inj
	hydroxyzine	atarax tab/syr/inj
moderately sedative	pheniramine	avil –tab/sry/inj
25 to 50 mg	cyproheptidine	ciplactin –tab/syr
	meclizine	diligan tab
	cinnarizine	vertigon tab
mild sedative	chlorpheniramine	cpm /piriton
	cyclizine	marezine tab

H1 blockers

- OLDER/CLASSICAL/TRADITIONAL/1st Gen

- **MOST SEDATIVE** and potent: 25-50 mg

  Diphenhydramine (Benadryl)

  Dimenhydrinate (Dramamine)

  Promethazine (Phenergan)

(phenothiazine structure-chlorpromazine)

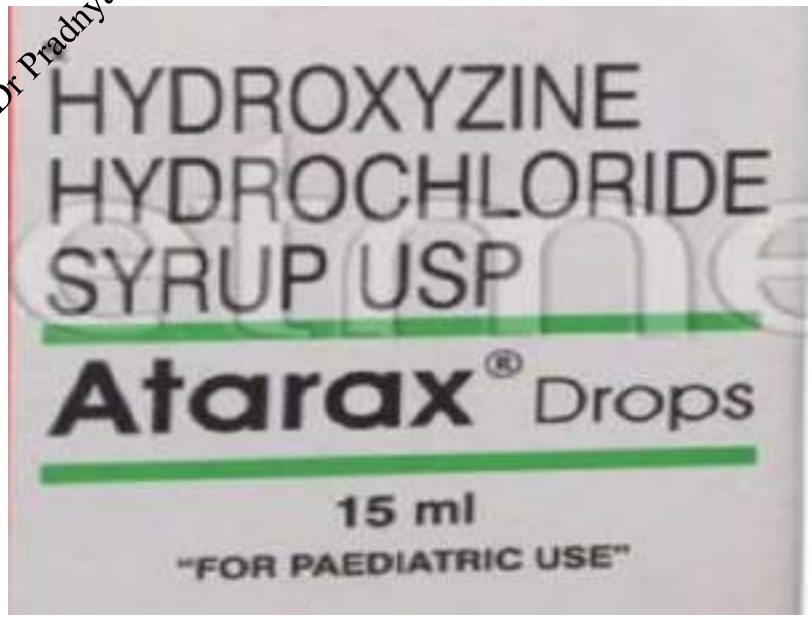
  Hydroxyzine Atarax

Moderate sedative, moderate potent

- **Pheniramine** **Avil 25-50 mg**
- **Antazoline** **Antistine 50-100 mg**
- **Cyproheptadine** **Ciplactin/periactin/peritol**
- **Meclizine** **Ancolan 25-50 mg**
- **Buclizine** **Longifene 25-50 mg**

Mild sedative, less potent

Chlorpheniramine	Zeet/Piriton	2-4 mg
Dimethindone	Foristal	1 mg
Mebhydroline	Incidal	100 mg
Clemastine	Tavist	1-2 mg



SECOND GENERATION ANTIHISTAMINICS

fexofenadine	120-180 mg oral	altiva/allegra
astemizole	10 mg oral	stemizole
loratadine	10 mg oral	loridine
desloratadine	5mg oral	deslor
cetrizine	10mg oral	cetzine
levocetrizine	5-10 mg oral	levosiz
Azelastine 4mg	Oral nasal spray	azep spray
ebastine	10 mg oral	ebast

2nd generation/newer

- **Mainly antiallergic/usual uses**

Terfenadine Terfed/Terin 30-60mg

- **Antivertigo, antimigraine** (Weak Ca blockers)

- **CINNARIZINE Stugeron 25-50mg**

- **FLUNNARIZINE Flunarine/Simentil/Sibelium 5-10mg**

SECOND GENERATION DRUGS

5star SAQ

Marketed after 1980

properties –

1) ***absence*** **of CNS depressant property /less sedating –**

Psychomotor performance is NoT affected

Less subjective effect on sleep

Don't potentiate alcohol or benzodiazepine drugs

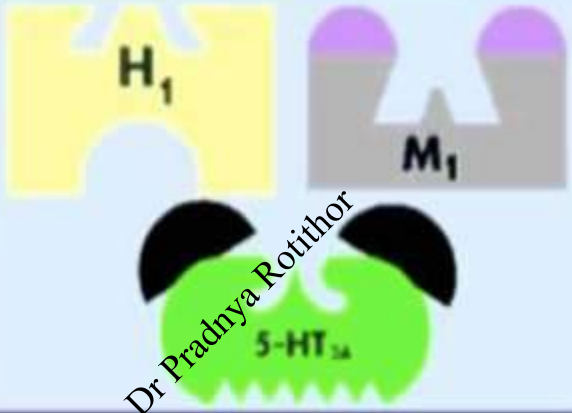
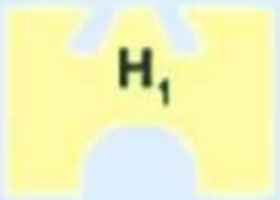
BBB XX

2) **higher H1 selectivity** -no anticholinergic side effects -dryness of mouth , blurring of vision

Flip side –narrow spectrum of therapeutic use

3) **additional anti allergic** mechanisms

- Mainly used in allergic conditions including food and drug allergy
- low antipruritic antiemetic and antitussive action

Generation	First	Second
Specificity		
Brain Concentration		
Sedation		

CLINICAL USES

--due to their

1) ability to block effects of endogenously released histamine

2) sedative property

3) anticholinergic property

Anti hitaminics are ineffective in bronchial asthma

- Because
- **Low concentration of antihistaminics in bronchi insufficient to block histamine released locally**
- **Leukotrienes and PAF are more important mediators than histamine**

USES

1. **Allergic disorders** –symptomatic relief in

   acute allergy such as itching skin rash urticaria seasonal hay fever allergic conjunctivitis angioedema of lips and eyelids.

   symptomatic relief in insect bite and ivy poisoning.

   Prophylactic value in infusion induced rigor

   Idiopathic pruritis : gen 1

2) **Common cold** : relief by anticholinergic and sedative action . Anticholinergic property reduces nasal secretion : Gen 2 less effective

USES ---

3.Motion Sickness : Promethazine etc. Should be taken 1 hr before for prophylaxis. Promethazine – morning sickness, drug induced vomiting, post operative vomiting

4.**Vertigo** : cinnarizine (vertigon). Cinnarizine has additional anticholinergic, anti 5HT, sedative, vasodilator properties. It inhibits vestibular sensory nuclei in inner ear

5. **Pre Anaesthetic medication** : Promethazine – anticholinergic, sedative property especially in children

6. Cough : gen 1 gr 1. anticholinergic, sedative property . **They have no selective cough suppressant action**

USES... contd..

- As sedative, hypnotic, anxiolytic
- **Pre-anesthetic medication**-promethazine- postop vomiting
- Drug-induced dystonia, PARKINSONISM –
- Promethazine orphenadrine

Most are atropine substitutes:Benzhexol, benztropine, cycrimine, procyclidine, biperiden, diphenhydramine

- **Vertigo-**migraine- CINNARIZINE, FLUNNARIZINE
- **Lytic cocktail** (To produce hypothermia during surgery) (promethazine, chlorpromazine, pethidine)

Uses – newer/2nd generation

- Anti-allergic – for allergic conditions like-
- Rhinitis conjunctivitis hay fever pollinosis
- Atopic eczema,urticaria –cetrizine drug of choice
- Drug allergy food allergy
- -fexofenadine–loratadine-desloratadine-levocetrizine

- Anti-vertigo, anti-migraine
- (also anti-5HT action)
- (weak ca channel blocking action) - flunarizine, cinnarizine
- Vertigo, Migraine, Ménière's disease

Adverse effects

- ONLY SEEN WITH OLDER /first gen– cross BBB
- **Sedation, decreased alertness and conc, motor incoordination, psychomotor performance impairment**
- ***Regular use of conventional group is NOT advisable in children as CNS depressant property may affect learning***
- **Skillful acts – drivers/machine operators**
- **Long term – increased appetite, weight gain (also 5HT blockade)**
- **SYNERGISM with CNS depressants (alcohol, sedative-hypnotics)—additive toxicity**
- **Hypotension-alpha blockade**
- These are MINIMAL WITH NEWER agents
- (X BBB)

Adverse effects

-Anti Cholinergic adverse effects- dryness, urinary hesitancy, retention, constipation, blurring vision

-Acute overdose leads to features like belladona poisoning– tremors, convulsions, fall in blood pressure,fever ,hallucinations

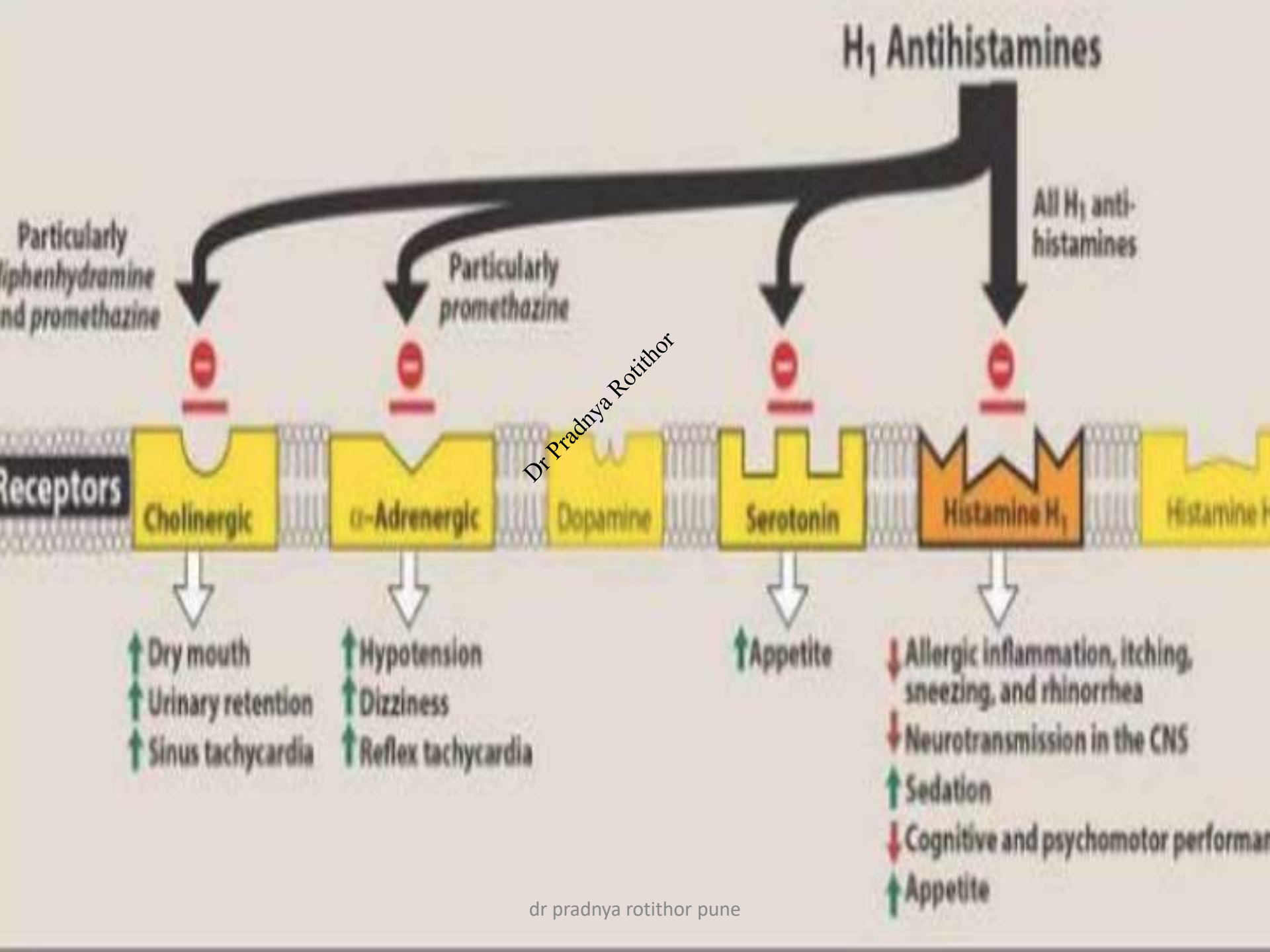
Management – PHYSOSTIGMINE –crosses blood brain barrier

Sodium bicarbonate – Intravenous

Additive effect of CNS depressants

Gen 2 :

- Cardiac Arrthymmias due to Drug interaction with Erythromycin, Ketoconazole (inhibitor of CYP3A4) by terfenadine, Astemizole was noted. But these drug interactions are not seen with other Gen 2 drugs


H1 Antihistamines
Particularly
liphenhydramine
nd promethazine
Particularly
promethazine
All H1 anti-
histamines
Dr Pradnya Rotithor
Receptors
Cholinergic
α-Adrenergic
Dopamine
Serotonin
Histamine H1
Histamine
Dry mouth
Urinary retention
Sinus tachycardia
Hypotension
Dizziness
Reflex tachycardia
Appetite
Allergic inflammation, itching,
sneezing, and rhinorrhea
Neurotransmission in the CNS
Sedation
Cognitive and psychomotor performan
Appetite

MUHS QUESTIONS

- **Distinguish between conventional and Sec Gen antihitaminics--HOMEWORK**
- Name newer antihistaminics , state their advantage over older/ conventional antihistaminics
- ADR of H1antihitamines
- Therapeutic uses of antihistaminics
- Various MCQs

Atropine

Dr Pradnya Rotithor


1mg
1ml
Atropine Sulfate Inj.
硫酸阿托品


1 mL
Code 1101
Atropine
Sulfate Injection USP
0.6 mg/mL

Cholinergic blockers

Dr Pradnya Rotithor

definition

Drugs which block the action of

Ach

Muscarinic R ---Atropine prototype drug

Nicotinic R

Acting on ganglion

Cholinergic blockers

Muscarinic blockers

-**ATROPINE** (Belladonna-beautiful lady)

-**Hyoscine (Scopolamine**) (More marked CNS effects)Motion sickness (vestibular apparatus)

-**ATROPINE SUBSTITUTES**

Nicotinic Blockers

-Competitive blockers (**skeletal muscle relaxants**) d-tubocurarine, and newer agents –(pancuronium, atracurium….)

- **Ganglionic blocking agents**

Atropine – Hyoscine - Plants

- *Atropa belladonna (* deadly nightshade)
- *Datura stramonium (*jimsonweed or Jamestown weed), sacred Datura, or thorn apple

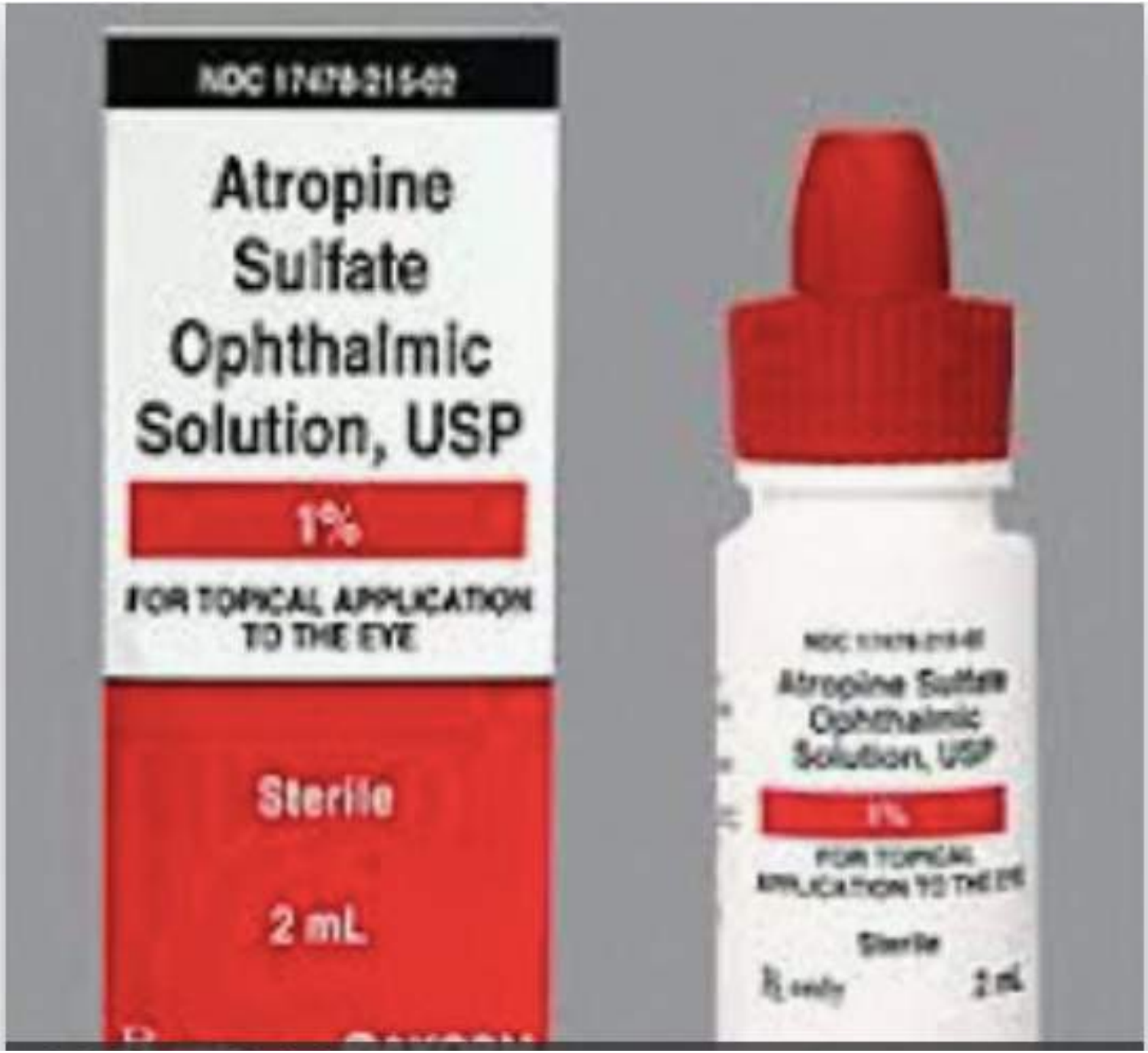
- Scopolamine (hyoscine) occurs in *Hyoscyamus niger*, or henbane

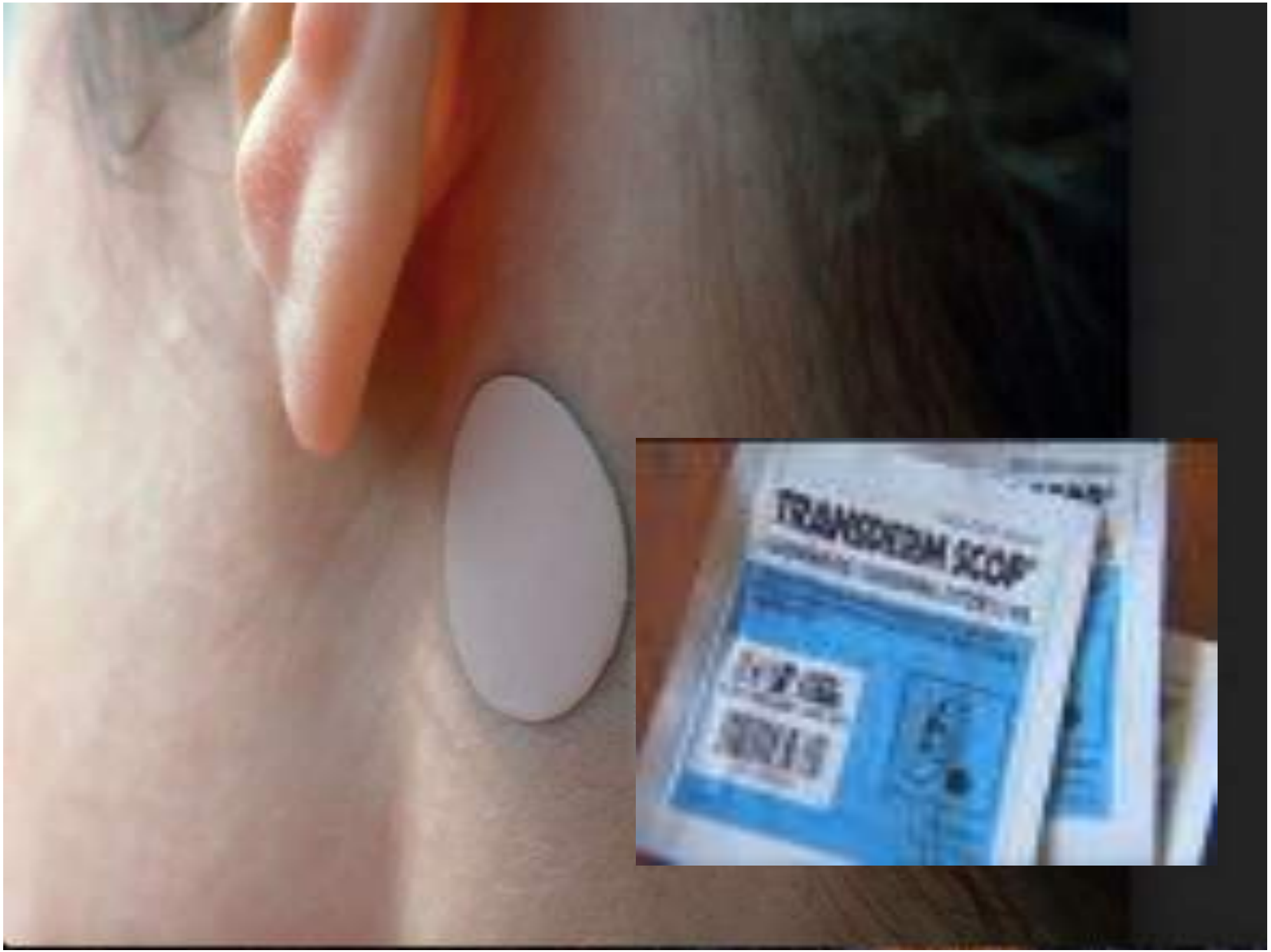
Natural alkaloids

- **Atropine** --atropa belladona
- **Scopolamine or Hyoscine**

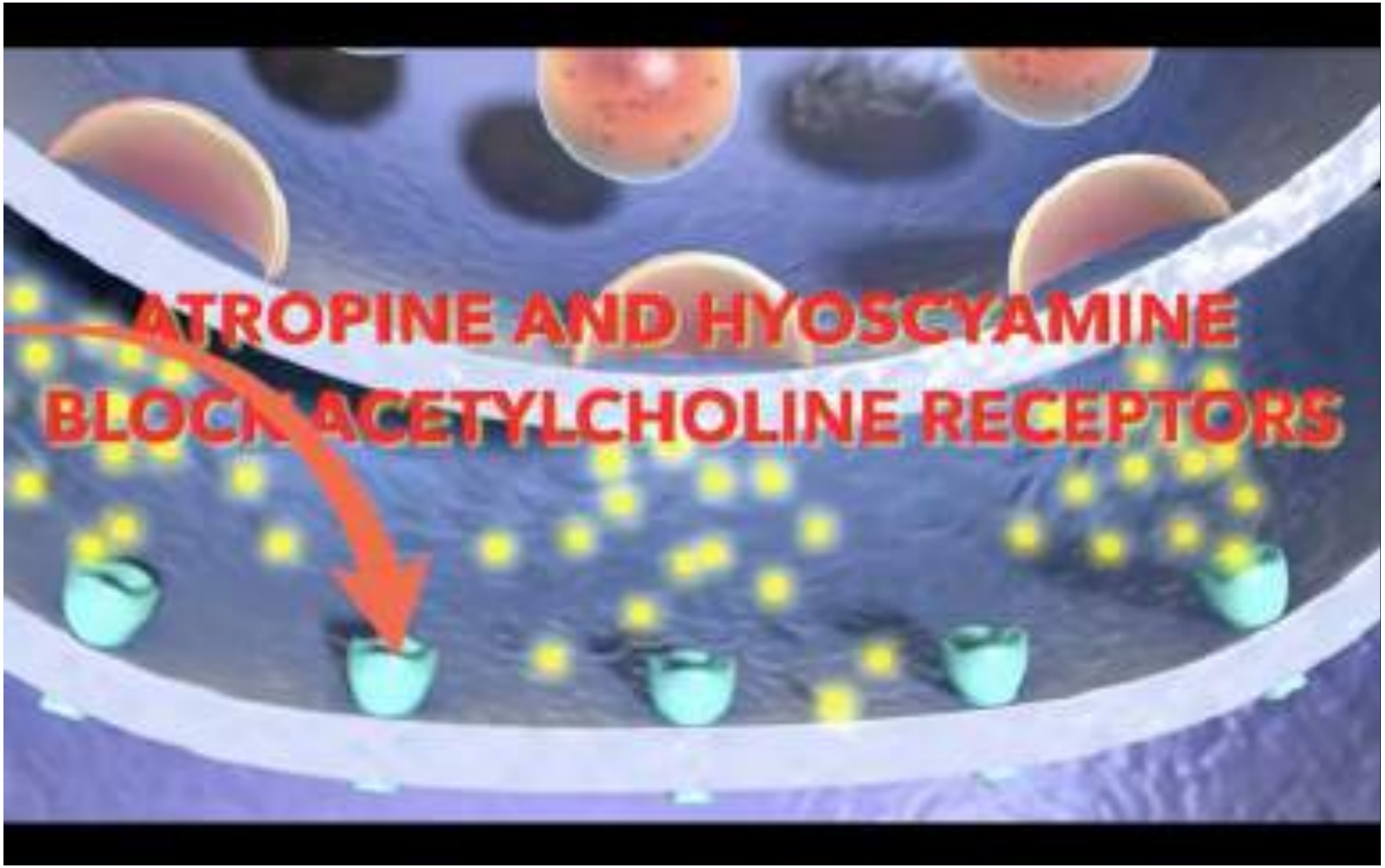

Scopolamine
Devil's Breath
Devil's Plant
& Calvinism

Inj Atropine


Atropine
Sulfate
Ophthalmic
Solution, USP
1%
FOR TOPICAL APPLICATION
TO THE EYE
Sterile
2 mL
Atropine Sulfate
Ophthalmic
Solution, USP
1%
Sterile
2 mL


TRANSDERM SCOP

Atropine	Scopolamine	SAQ
Atropa belladona	hyoscyamys niger	
Datura stramonium		
BBB++	BBB++++	
CNS excitatory	depressant	
	excitation at v high dose	
Long acting	short acting	
Anti Motion sickness+	+++	
Im /eye ointment	oral /im /transdermal	


ATROPINE AND HYOSCYAMINE
BLOCK ACETYLCHOLINE RECEPTORS

Scopolamine –motion sickness

Whenever body is rotated or equilibrium is disturbed

Vestibular apparatus sends nauseating signals to emetic centre

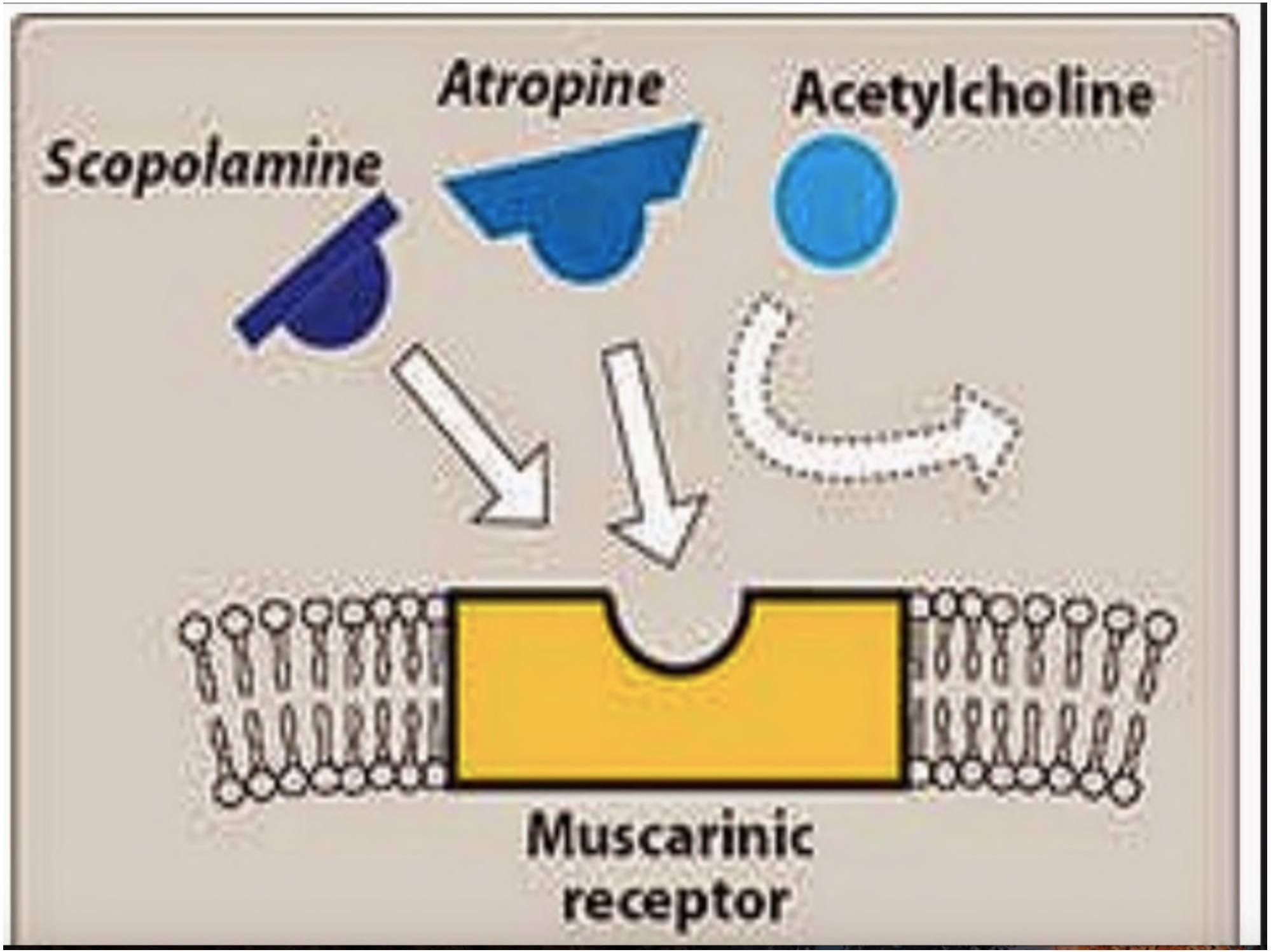
Ach --neuro transmitter –

Scopolamine blocks Ach and additional action of CNS depression

Atropine – anti muscarinic

- **Mechanism of action:**
- **Competitive** (surmountable) **Blocker - muscarinic receptor sites**, but is **nonselective** within these sites (M1,M2,M3).

- **Actions:**
- **CVS: Mild Tachycardia, and small increase in blood pressure, ↑ AV cond^{n,}**
- **Smooth muscles (↓) –**relaxation- **antispasmodic action**
- **Exocrine glands (↓)- secretions**


Atropine
Acetylcholine
Scopolamine
Muscarinic
receptor

Atropine –actions …continued

Eye- paralyzes sphincter pupillae- dilator pupillae overactivity- **(passive mydriasis)**

Paralyzes ciliary muscle of lens (**cycloplegia)** (Inability to accommodate for near vision)

Crowding of lens and iris in ant. chamber – (↑ **IOT)**

CNS - ↓ tremors, rigidity(useful in Parkinson)

Disorientation, confusion, hyperpyrexia

Variable Intensity of action

Exocrine glands > >heart and eyes> > bladder and GIT > >gastric glands

Atropine – adverse effects

Dryness of mouth –difficulty in talking and swallowing

Tachycardia

Blurring of vision, photophobia

↑ IOT

Urinary retention, urgency

Dry secretions (Eye) (Resp Tract)

(XXX COPD)

Constipation

Atropine - Overdose

↓ thermoregulatory sweating, **Hyperpyrexia, flushing**

Palpitation/blurred vision

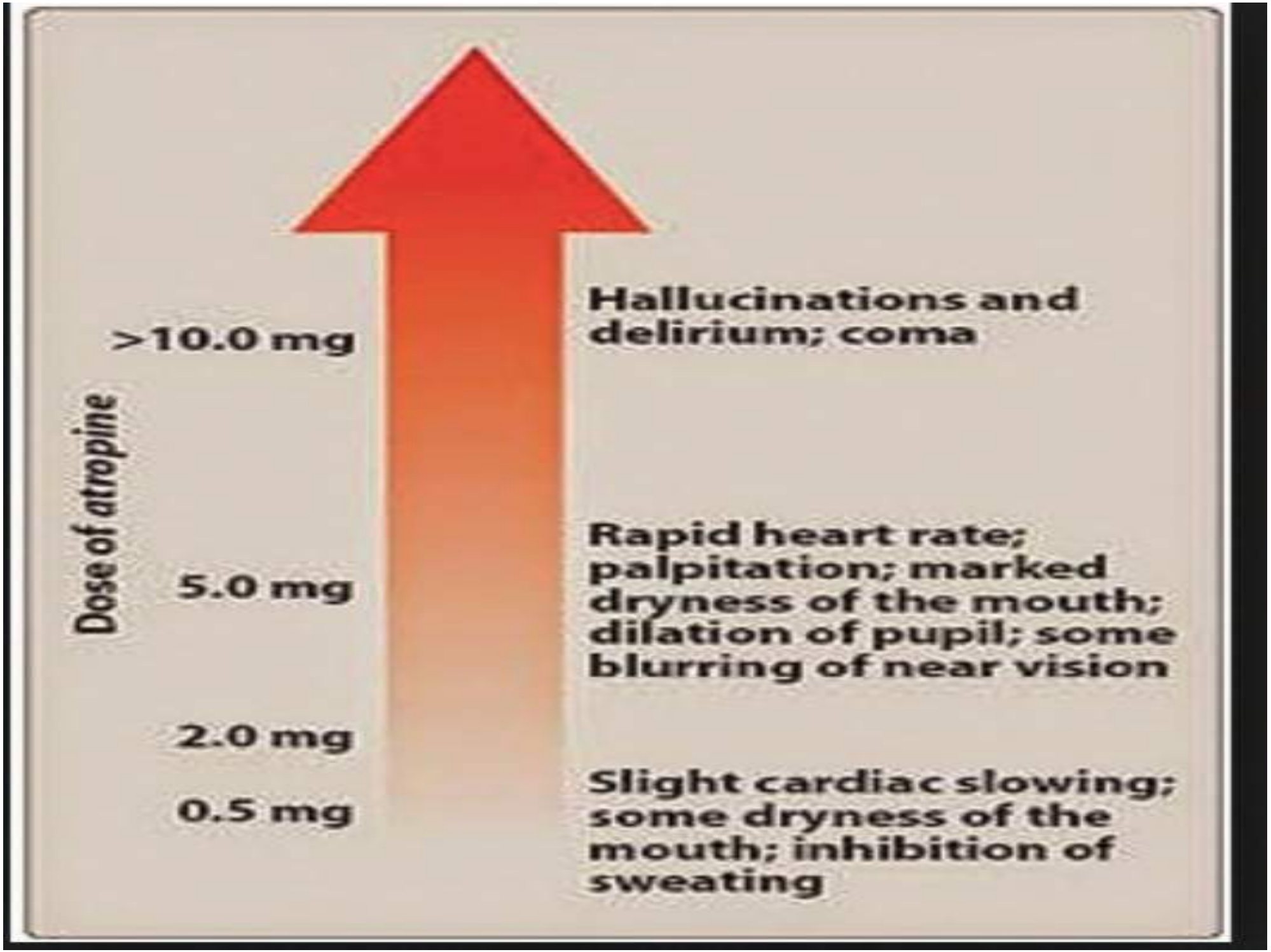
Confusion, excitement, agitation, delirium, disorientation, and coma

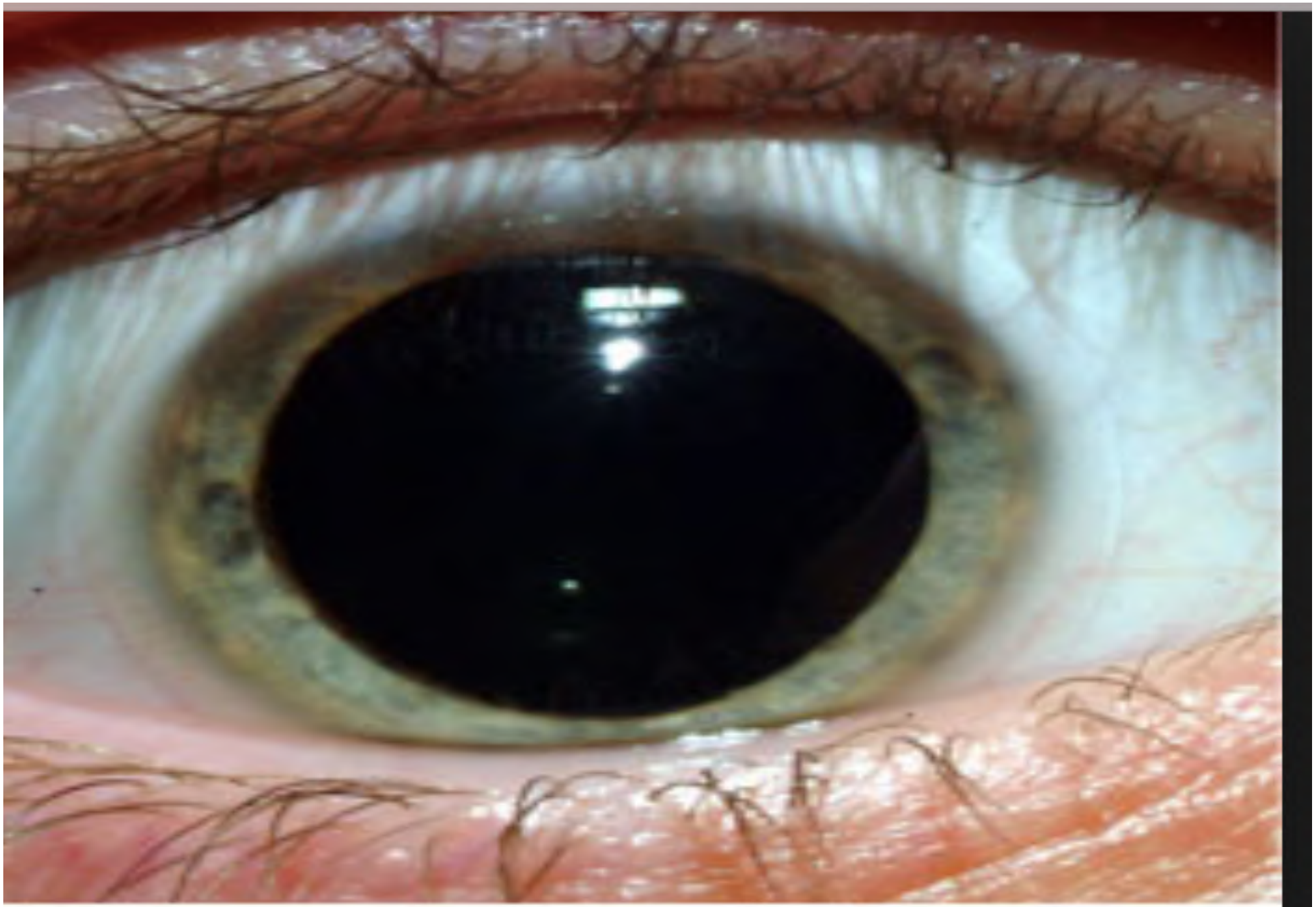
"Dry as a bone" "Red as meat"

"Hot as iron" "Blind as a bat"

"Mad as a hatter"

Treat with Physostigmine (crosses BBB)


Dose of atropine
>10.0 mg
Hallucinations and delirium; coma
5.0 mg
Rapid heart rate; palpitation; marked dryness of the mouth; dilation of pupil; some blurring of near vision
2.0 mg
0.5 mg
Slight cardiac slowing; some dryness of the mouth; inhibition of sweating



. 2 Pharmacologically dilated pupil.

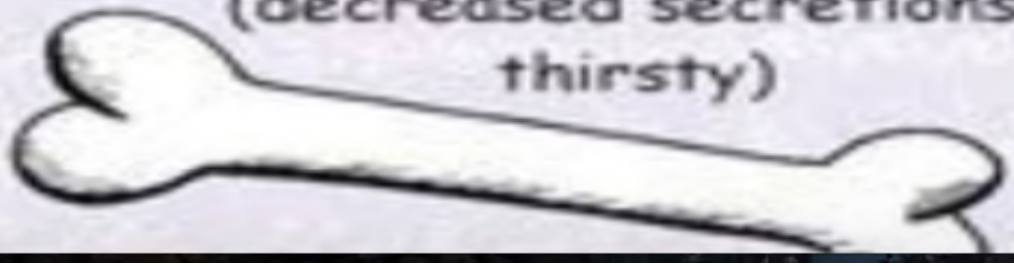
ATROPINE OVERDOSE

Hot as a Hare
(↑ temperature)

Mad as a Hatter
(confusion, delirium)

Red as a Beet
(flushed face)

Dry as a Bone
(decreased secretions, thirsty)



Atropine - contraindications

- Acute congestive glaucoma
- Retention of urine
- Benign prostatic hyperplasia
- COPD/ASTHMA
- Extremes of age

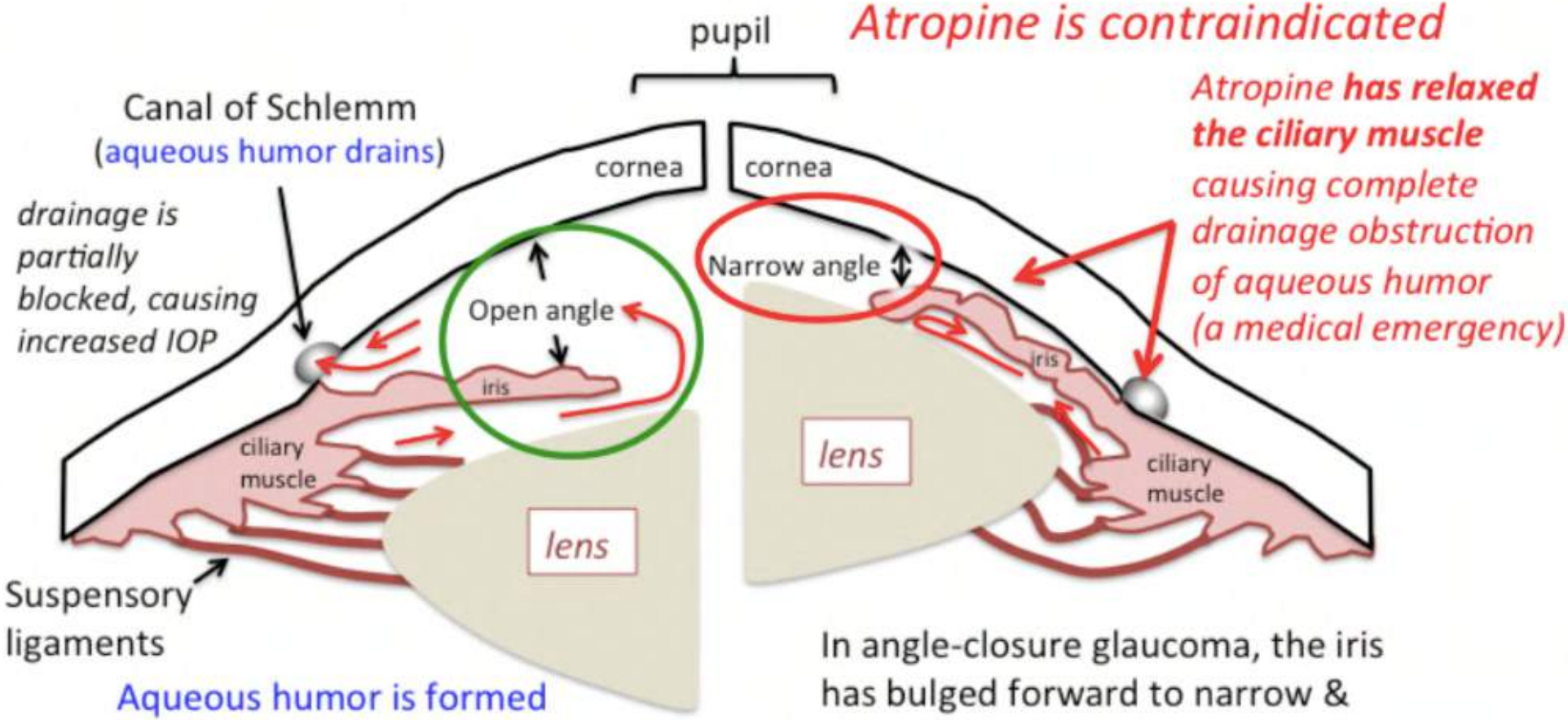
Glaucoma

Atropine-induced relaxation of ciliary muscle can obstruct flow in patients with angle-closure glaucoma *(can cause a sudden increase of IOP)*

Open Angle
(~90% of cases of glaucoma)

Angle-Closure
(Narrow Angle) Glaucoma

Atropine is contraindicated



LAQ Atropine – Uses-1

-- **Preanesthetic medication**: (0.6 mg IM IV)

SAQ

-Prevents vagal bradycardia and cardiac arrest

-Decreases secretions, relaxes smooth muscles

-Prevents cough, vomiting, laryngospasm

Organophosphorous Poisoning – 2-3 mg

Early mushroom poisoning

Anti ChE overdose – (physostigmine) (Crosses BBB)

Atropine – Uses-2

AV block, digitalis-induced bradycardia

With Pyridostigmine/Neostigmine in Myasthenia

Antispasmodic – abdominal, intestinal, biliary, renal, urinary colicky pain, peptic ulcer (+decreases HCl)

To produce mydriasis, cycloplegia

Parkinsonism – To block A.ch excess

Indications

1.Bradycardia

2.Asystole

3.AV block

4.Pulseless electrical activity

5.OP poisoning

Why atropine is used as preanaesthetic medication SAQ

GA drugs like ether induce lots of **secretions** which may lead to laryngospasm–

atropine **reduces salivary and respiratory secretio**ns .

Atropine **reduces gastric secretions-prevents vomiting**

Prevents aspiration pneumonia

Newer GA agents are less irritant

Prevents vagal bradycardia and sudden cardiac arrest

Relaxes smooth muscles

Prevents cough –bronchodilator

Prior atropinization counters bronchospasm during reversal

ATROPINE SUBSTITUTES

DR PRADNYA ROTITHOR

PUNE

Why do you need to find substitutes for atropine ?

Because

Atropine has many – adverse effects and is nonselective within Muscarinic receptors

Atropine ADR

Dryness of mouth

Blurring of vision, photophobia

↑ IOT

Urinary retention, urgency

Dry secretions (Eye) (Resp Tract)

(XXX COPD)

Constipation

Tachycardia

NONSELECTIVITY

No selectivity within (M1,M2,M3) muscarinic sites

Hence unwanted A/E

Long duration of action (Eye) Mydriasis, cycloplegia may take 5-7 days to subside

To overcome these drawbacks ----

ATROPINE SUBSTITUTES

Atropine substitutes

Atropine Substitutes - advantages

Selectivity within (**M1,M2,M3**) muscarinic sites

MINIMAL adverse effects **on other sites**

Short duration of action in the **eye**

Mydriasis, cycloplegia lasts for shorter time

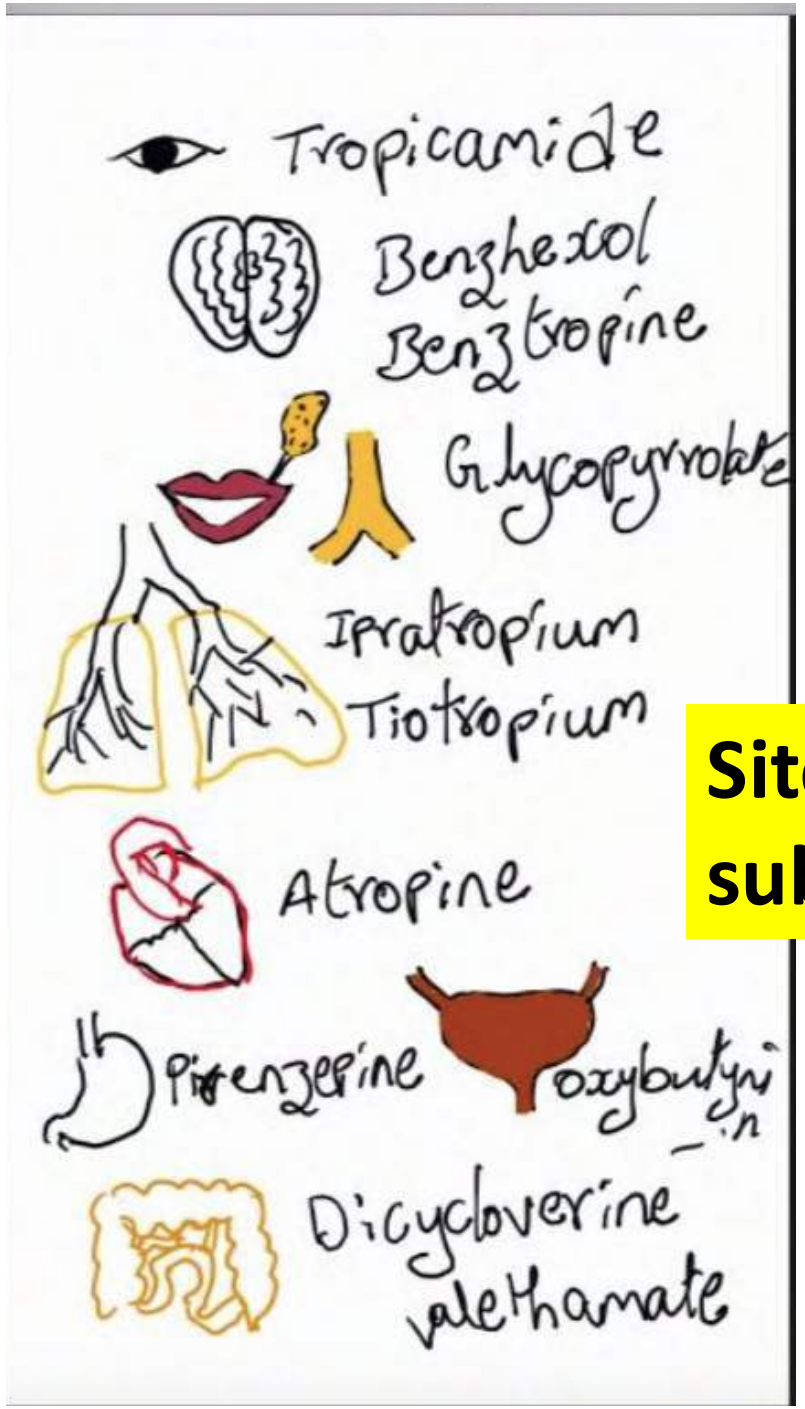
Sites of action of atropine substitutes

GIT lungs bladder

Eye

Pre anaesthetic medication

other uses



Sites of action of atropine substitutes

Atropine Substitutes

Antispasmodics	Dicyclomine, propanthelin Buscopan (hyosine butyl bromide)
Urinary Incontinence	Flavoxate, Oxybutinin
Mydriatics	Cyclopentolate Homatropine Tropicamide
Bronchodilators	Ipratropium Tiotropium
Preanaesthetic medication	Glycopyrrolate
Antiparkinson	Benzhexol(trihexyphenidyl)
Acting on Uterus	Drotaverine,Valethamate

Antispasmodics —

Peptic ulcer pain, colicky pain in abdomen

Pirenzepine (Selective M1 blocker) (peptic ulcer)—now replaced by H2blockers and PPIs

Propantheline, Methantheline

Oxyphenonium bromide

Dicyclomine (CYCLOPAM)

Hyoscine butyl bromide(BUSCOPAN)

Urinary incontinence

Urinary urgency

Oxybutynin (M1/M3)

Tolterodine (M3)

Propiverine, **Flavoxate**

Darifenacin, Solifenacin

℞

25 x 10 Tablets

FLAVOXATE TABLETS B.P.

URISPAS®

युरीस्पास

WALTER BUSHNELL

Under Licence from:
RECORDATI
INDUSTRIA CHIMICA e FARMACEUTICA S.p.A.

Uterus

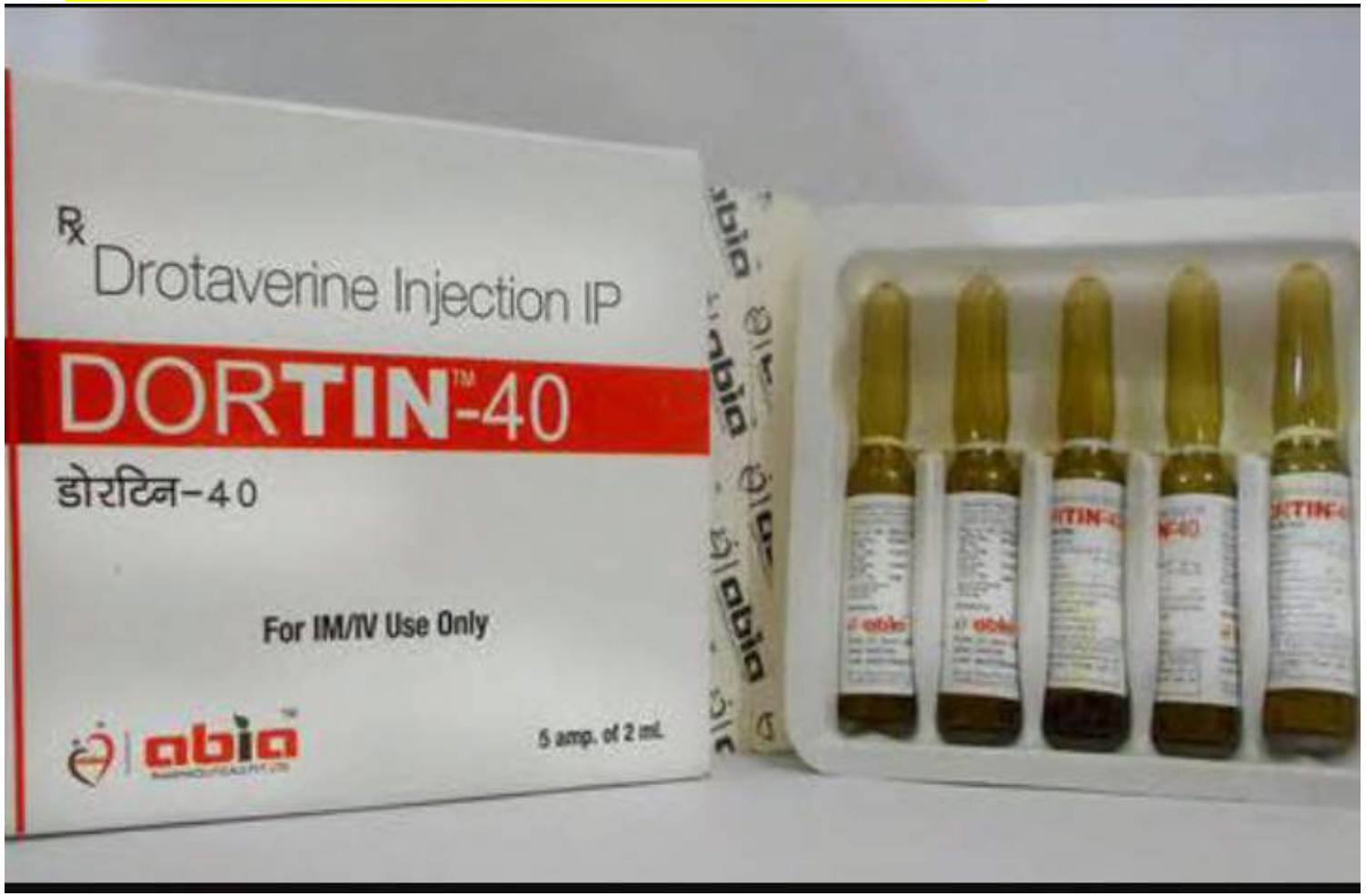
- **Drotaverine** --(DROTIN)
  IM/ORAL

  uterine spasm

Valethamate –(EPIDOSIN) IM

Cervical dilatation during labour

Acts on uterus -antispasmodic



Used for dilatation of cervix during vaginal delivery

Mydriatics – short duration

Atropine actions last long

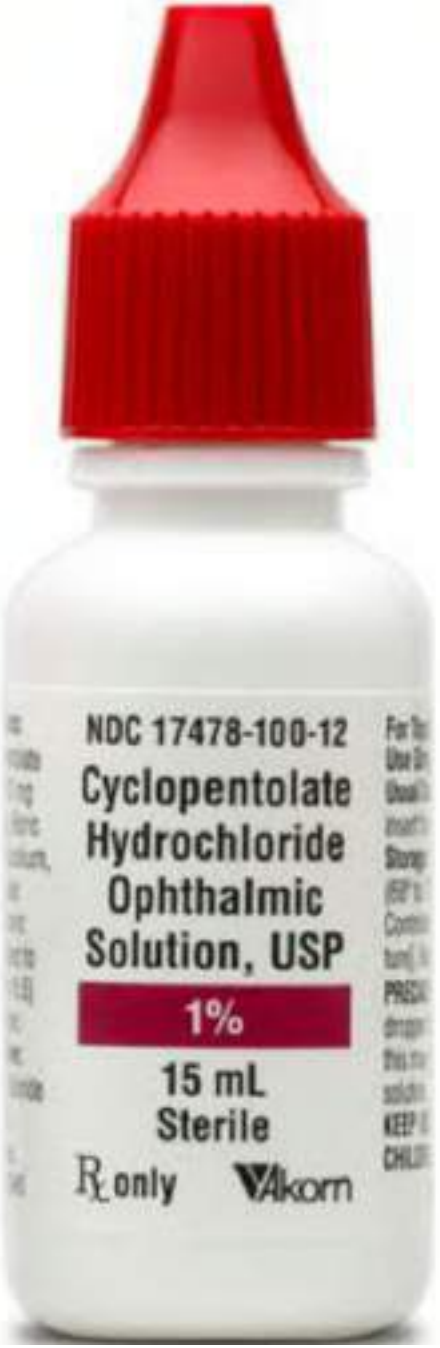
Tropicamide 0.5%,1% (6 Hrs)

Cyclopentolate 0.5%,1% (24 Hrs),
Preferred – quick, short acting

Homatropine 1%,2% (1-3 days)
Eucatropine (no cycloplegia)


NDC 17478-102-12
Tropicamide
Ophthalmic
Solution, USP
1%
Sterile
15 mL
℞ only
AKORN
FOR TOPICAL OPHTHALMIC USE ONLY


Homatropine
Eye Drops IP
Mydryn



cyclopentolate

Rapid and Short acting
Hence preferred

Bronchial Asthma /COPD

Bronchodilatation

Ipratropium bromide 4-6 hrs

Action on R in large airways

More effective in COPD ,chronic smokers ,***acute*** bronchial asthma (with beta 2 agonist)

Tiotropium bromide –*long acting* 24hrs

Not useful in acute attack of asthma

Inhalational drugs ,not much absorbed from GIT


Tiotropium Bromide
Inhaler 9 mcg
Tiova
Inhaler
120
Cipla
Tiova

Parkinson's disorder

Benztropine

Benzhexol (trihexyphenidyl)-mcq

Orphenadrine, Cycrimine

Procyclidine, Biperiden

useful as ---

adjuncts +

in drug-induced parkinsonism

Anticholinergics and antihistaminics are the only drugs effective in drug induced Parkinsonism

PREANAESTHETIC MEDICATION

Atropine **0.6mg im/iv**

Glycopyrrolate **0.2mg/kg im/iv** **BBB X**

LESS TACHYCARDIA

<u>Advantages –</u>

↓ salivation ↓ respiratory secretions

ether anaesthesia → copious secretions –

Now ether is rarely used

currently used drugs are less irritant

Thereby ↓ need of atropine

Now mainly used to ↓ vagal bradicardia and hypotension

And prophylaxis of laryngospasm due to resp secretions –

Preanaesthetic medication

NDC 0517-4620-25

GLYCOPYRROLATE

INJECTION, USP

4 mg/20 mL

(0.2 mg/mL)

20 mL

MULTIPLE DOSE VIAL

FOR IM OR IV USE

Rx Only

AMERICAN REGENT, INC.

SHIRLEY, NY 11967

Each mL contains:
Glycopyrrolate
0.2 mg, Benzyl Alcohol
0.9%, Water for Injection
q.s. pH adjusted with
Sodium Hydroxide
and/or Hydrochloric Acid.
Store at 20° to 25°C
(68° to 77°F) [See USP
Controlled Room
Temperature].
Directions for Use: See
Package Insert.
Rev. 8/09

Pre-anaesthetic medication

glycopyrrolate vs atropine

Antisecretory	**+++**	**++**
Tachycardia	**++**	**+++**
CNS effect	**--**	**+**
Bronchodilatation	**++**	**++**

Now these drugs are used iv intraop as and when required

Motion sickness

Scopolamine (hyoscine) patch

1.6 mg - behind pinna

long duration 3 days

Hyoscine butyl bromide (N-butylhyoscine bromide) (Buscopan)

Smooth muscle relaxant – abd colic, and radiologic procedures of GIT, to relax sm m of stomach, colon

MUHS--SAQ

- ★ ★ ★ ★

write a note on Atropine substitutes

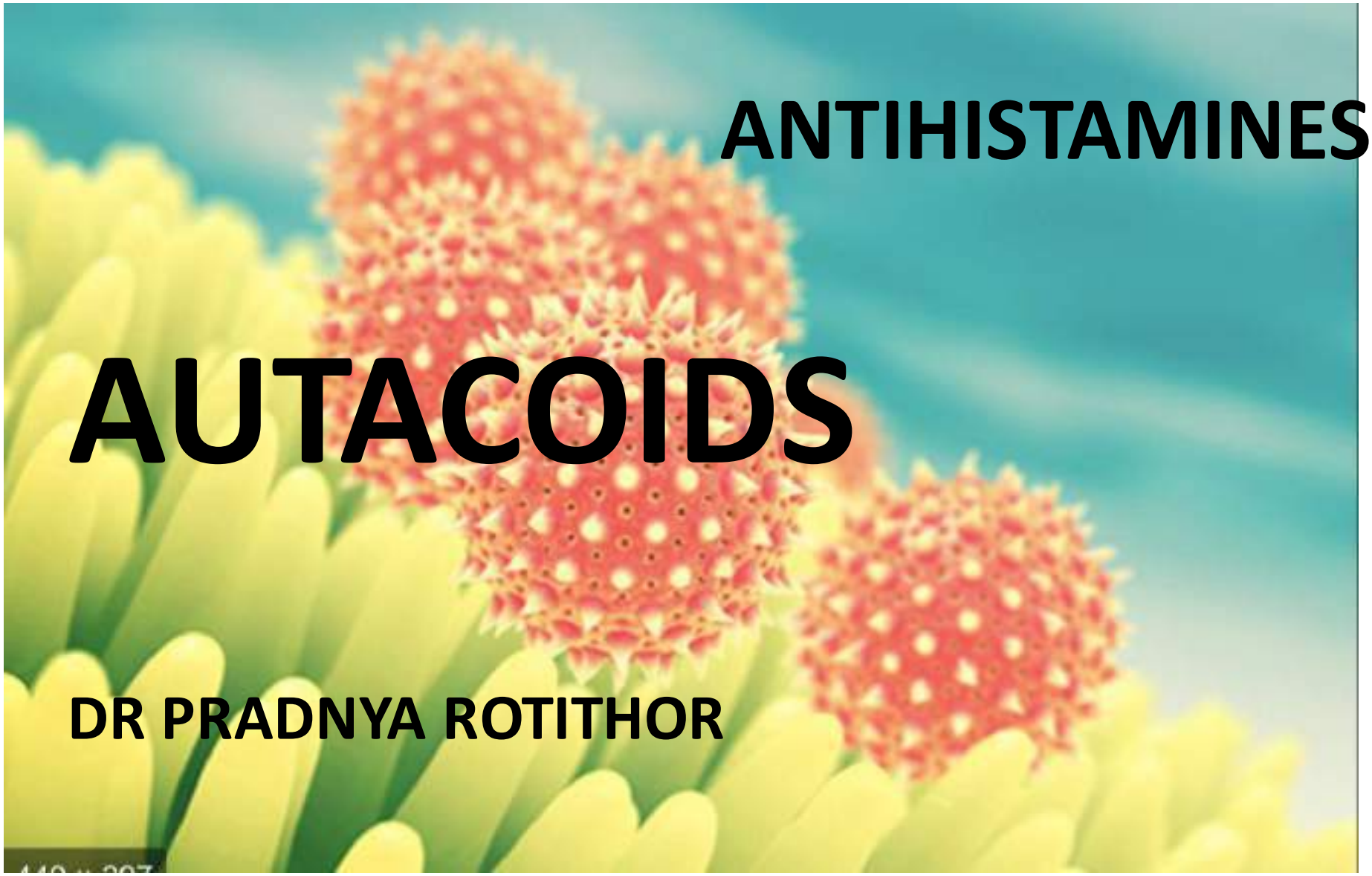
MUHS EXAM

AND

LOTS OF

MCQs

THANK YOU


ANTIHISTAMINES
AUTACOIDS
DR PRADNYA ROTITHOR

WIDELY USED OTC DRUGS

dr pradnya rotithor pune

GENERAL INFORMATION

- **Autos = self Akos = healing substance**

- inflammatory and immunological reactions
- transmitters in nervous system.

Types-

- **Amines** –histamine, serotonin
- **Lipids** –PG ,LT, PAF
- **Peptides** –bradykinins, angiotensin
- **Others** –TNFα ,Gastrin,somatostatin ,intestinal peptide

HISTAMINE
TISSUE AMINE

- mast cells –storage
- Ex --Skin lungs liver gastric mucosa placenta
- **Nonmast cell –**
- 1) brain epidermis gastric mucosa and growing regions

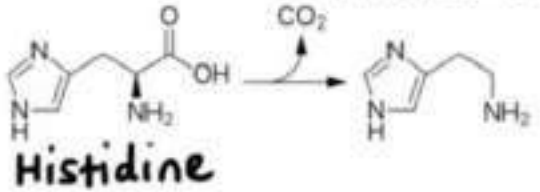
  2) blood ,most body secretions,venoms and pathological fluids .

- Synthesis – amino acid **histidine** locally

Histamine liberation

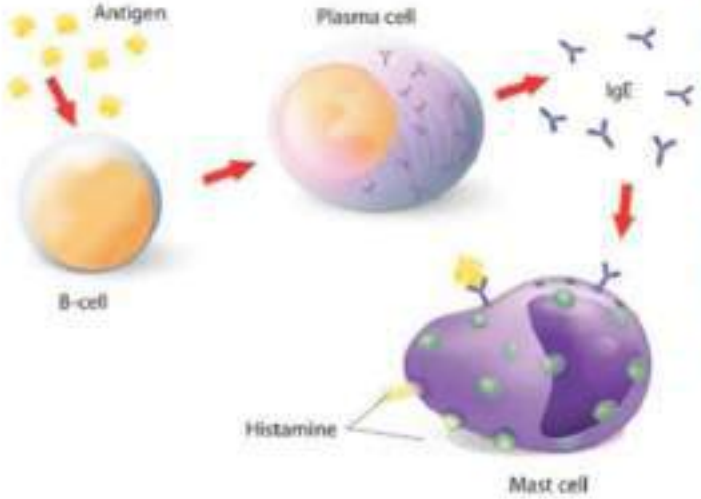
- **Venoms** (insect/reptile bites)
- Food products (crabs, lobsters, fish)
- **Trauma** due to cold, chemical, thermal, radiant energy
- **Antigen antibody reactions**
- Drugs: **d-tubocurarine**, morphine, pethidine, amphetamine

Histamine

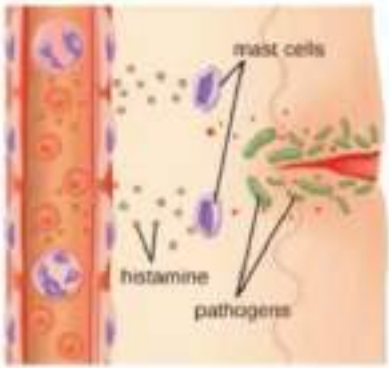


Histidine

Allergic reaction



Tissue injury



Drugs & Foreign chemicals

HISTAMINE RECEPTORS

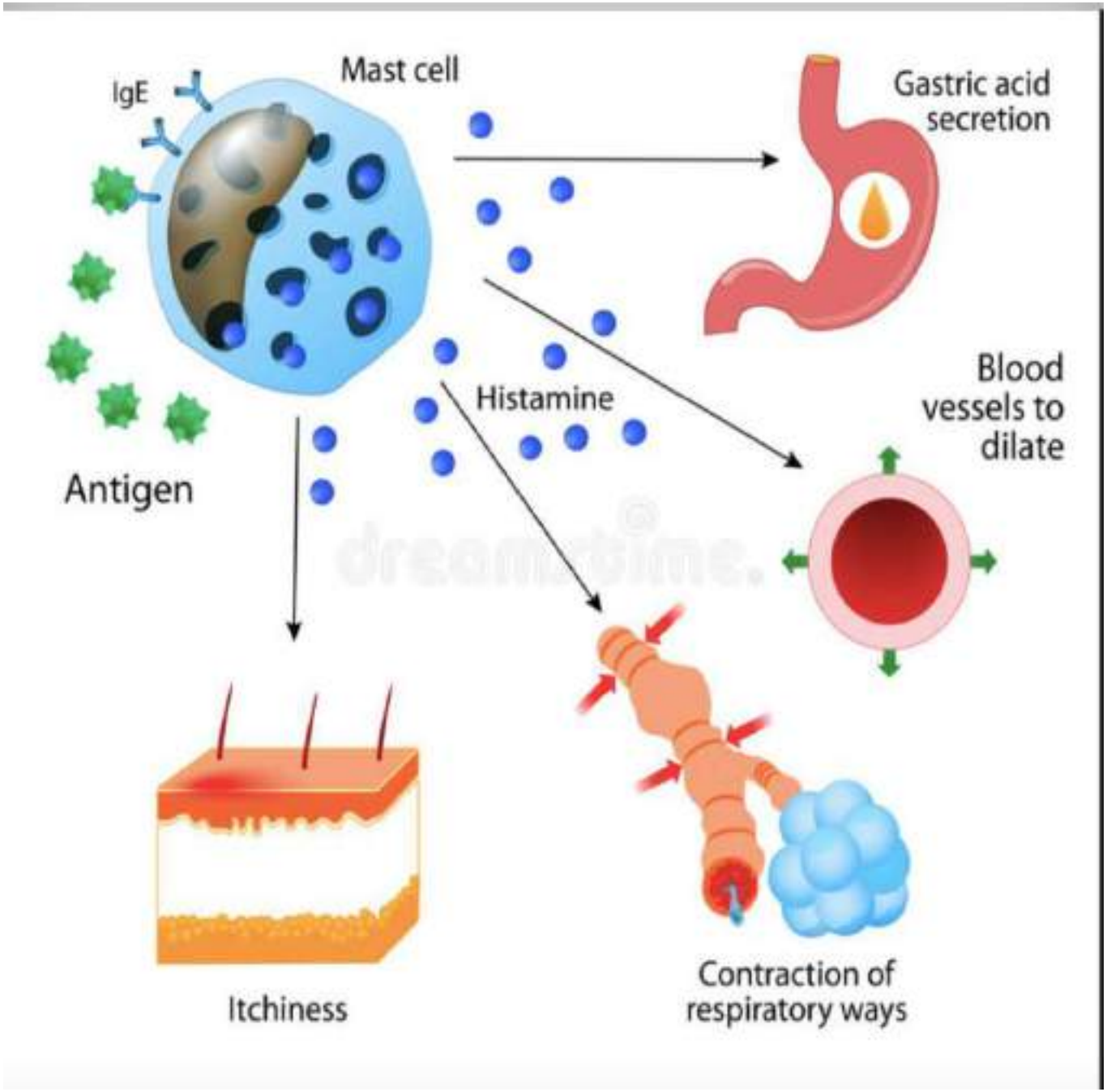
G Protein coupled -- H1 , H2

- H3 - only in brain
- H4
-

- ***By convention antihistaminic drugs = H1 blockers ..***
- ***competitively block histamine receptors***

The Histamine Receptors Subtypes, Their Location and Effects

Receptor	Location	Effects
H_1	Throughout the body, especially in smooth muscles on vascular endothelial cells, in the heart and Central Nervous System	Increases vascular permeability at site of inflammation, bronchoconstriction, increase gut motility, triple response and oedema formation, stimulation of sensory nerve ending.
H_2	Gastric parietal cells, vascular smooth muscles, CNS, heart and Uterus	Increase gastric acid secretion and vasodilation
H_3	Found mostly in CNS with high level in thalamus and cortex, Also in small extent to intestine, testis and prostate	Inhibition of synthesis and release of Histamine acting on presynaptic sites in the CNS, Modulating release of 5-HT, dopamine, NAD, Ach and GABA in the CNS acting as heteroreceptors.
H_4	Expressed in various cells of immune system and mast cells and mediate chemotaxis of eosinophil and mast cells.	Immunomodulation


IgE
Mast cell
Gastric acid secretion
Histamine
Blood vessels to dilate
Antigen
Itchiness
Contraction of respiratory ways

BODY DISTRIBUTION OF H1 AND H2 AND ACTIONS MEDIATED

- **H1**
- 1**) Smooth muscles** of intestine airway,uterus,blood vessels =contraction ---bronchospasm
- Increased secretions –saliva and mucus
- 2) **blood vessels** –endothelium = release of EDRF,NO= vasodilatation ,hypotension,↑ capillary permeability ,oedema
- **Histamine dilates arterioles, capillaries and venules**
- **Triple response reaction—inj intradermally— wheal,flare, flush**
- 3) **afferent nerve endings** = stimulation------**itch and pain**
- 4) **brain** =transmitter ---**wakefulness** and some other functions

H2
NOT TO BE DISCUSSED TODAY

- 1) gastric glands =acid secretion
- 2)smooth muscles of blood vessels = dilatation
- 3) heart atria =+ve chronotrophy
- heart ventricles =+ve ionotrophy
- 4) uterus = relaxation
- 5) brain = transmitter

PATHOPHYSIOLOGICAL ROLE

- 1) Gastric secretion = H2

- 2**) allergy** =[H1] AG: AB reaction
- ↓Mast cell
- histamine
- ↓
- urticaria , angioedema, bronchoconstriction ,anaphylactic shock

- **Histamine is not involved in delayed /retarded type of allergy**

- 3)role as transmitter =
- a) at sensory nerve endings –itch and pain

- **b) In brain it is involved in maintaining wakefulness (H1) and some other functions**
-

- 4) inflammation = vasodilatation

H1 ANTIHISTAMINICS -MOA

competitive antagonism of H1 R

Effects seen--

Anti allergic

Anticholinergic

Anti inflammatory

CNS depression

Local anaesthetics

CLASSIFICATION –5star SAQ

1) Conventional/traditional/first generation antihistaminics

a) highly sedative --

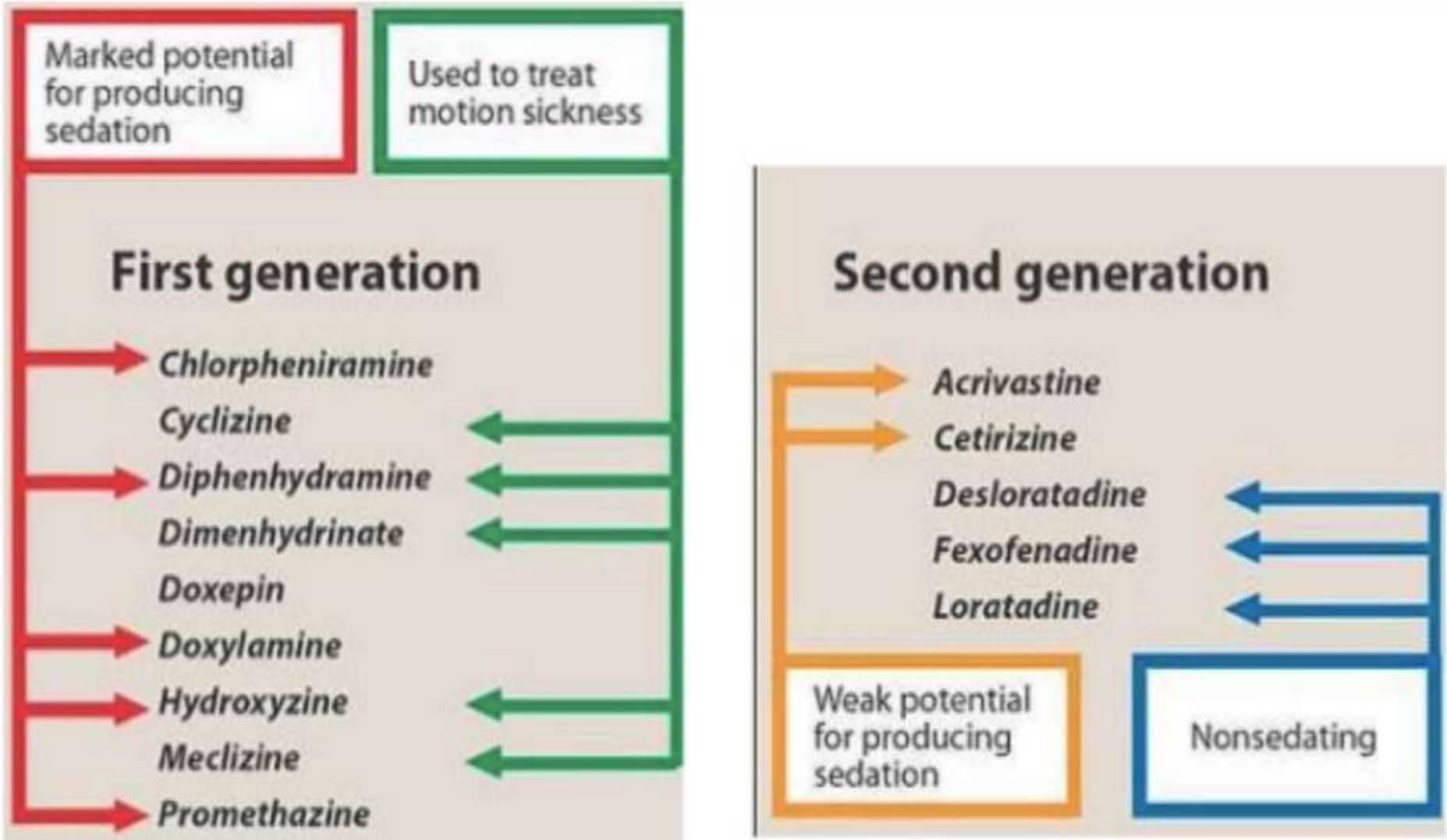
b) moderately sedative

c)mild sedative

They have some action on cholinergic alpha adrenergic and serotonin R –base for some clinical uses

2) second generation antihistaminics – highly selective for H1

Classification of H_1 Antagonists



FIRST GENERATION DRUGS

type	generic name	trade name
highly sedative	diphenhydramine	benadryl –cap/syr
25 to 50mg oral	promethazine	phenargan –tab/syr/inj
	hydroxyzine	atarax tab/syr/inj
moderately sedative	pheniramine	avil –tab/sry/inj
25 to 50 mg	cyproheptidine	ciplactin –tab/syr
	meclizine	diligan tab
	cinnarizine	vertigon tab
mild sedative	chlorpheniramine	cpm /piriton
	cyclizine	marezine tab

H1 blockers

- OLDER/CLASSICAL/TRADITIONAL/1st Gen

- **MOST SEDATIVE** and potent: 25-50 mg

  Diphenhydramine (Benadryl)

  Dimenhydrinate (Dramamine)

  Promethazine (Phenergan)

(phenothiazine structure-chlorpromazine)

  Hydroxyzine Atarax

Moderate sedative, moderate potent

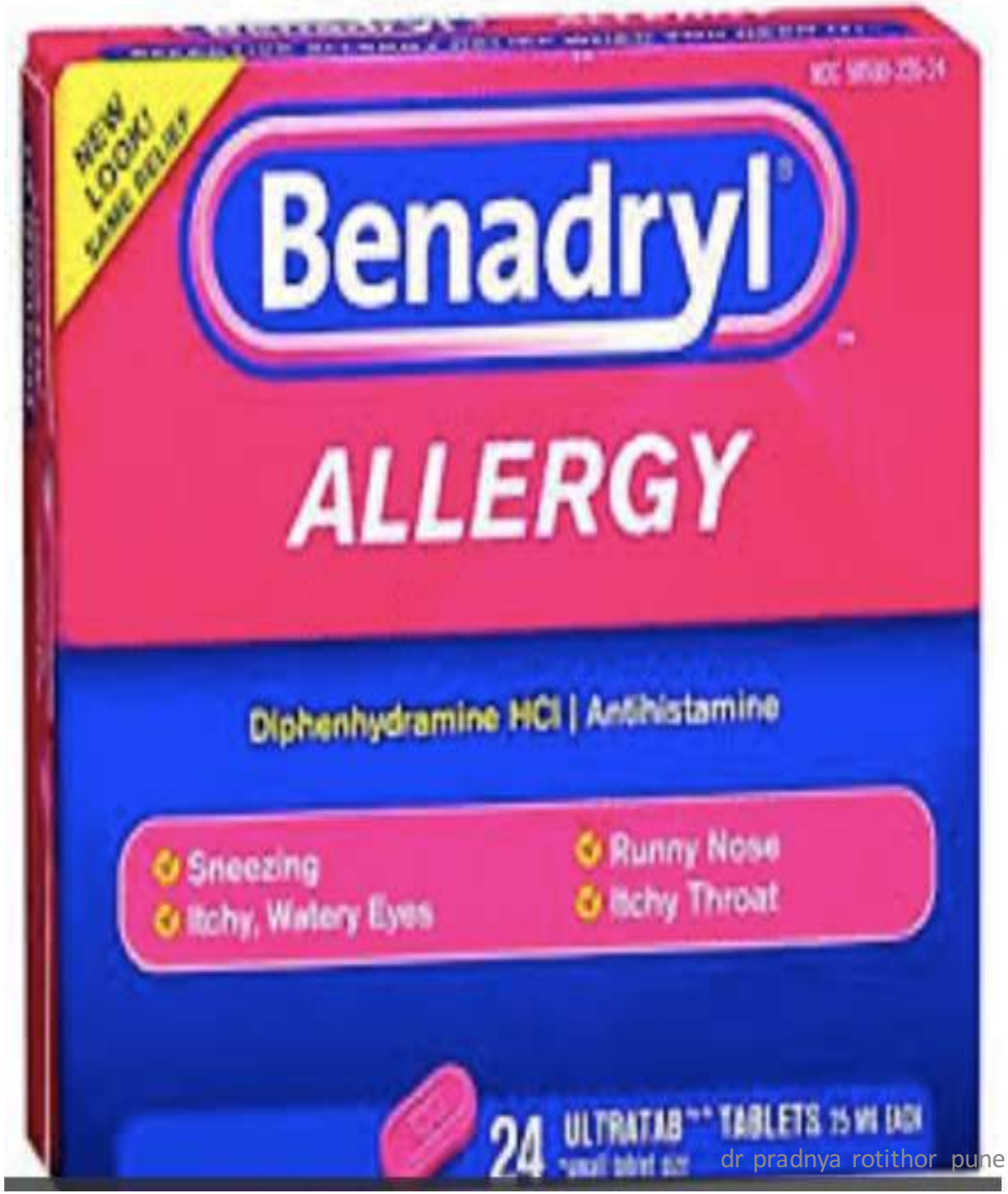
- **Pheniramine** **Avil 25-50 mg**
- **Antazoline** **Antistine 50-100 mg**
- **Cyproheptadine** **Ciplactin/periactin/peritol**
- **Meclizine** **Ancolan 25-50 mg**
- **Buclizine** **Longifene 25-50 mg**

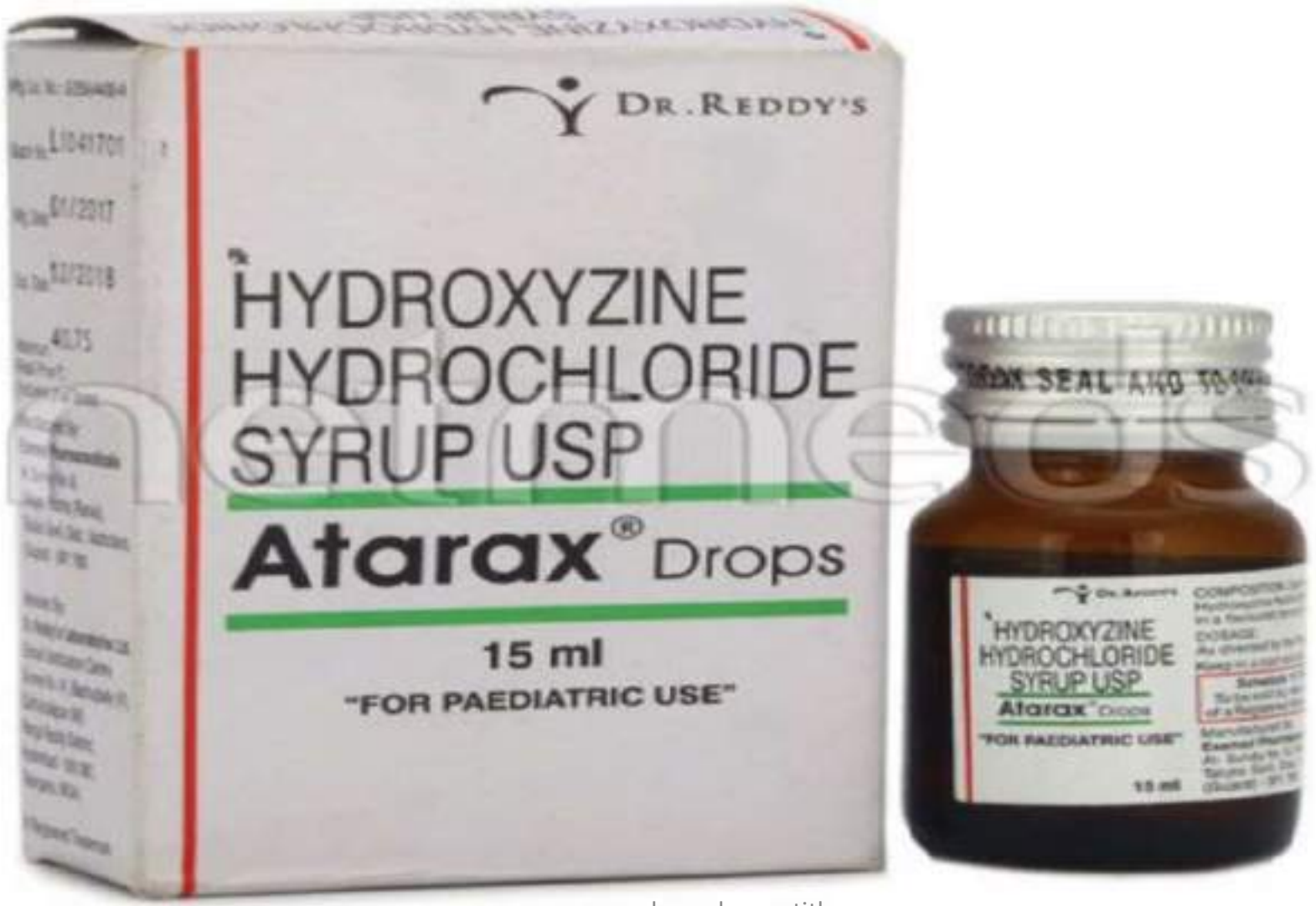
Mild sedative, less potent

● Chlorpheniramine	Zeet/Piriton	2-4 mg
● Dimethindone	Foristal	1 mg
● Mebhydroline	Incidal	100 mg
● Clemastine	Tavist	1-2 mg


Promethazine
Syrup I.P.
Phenergan


Phenergan
25mg
PHARMACIST ONLY MEDICINE
Phenergan® 25mg
Antihistamine
50 Tablets
Sanofi aventis





dr pradnya rotithor pune

SECOND GENERATION ANTIHISTAMINICS

fexofenadine	120-180 mg oral	altiva/allegra
astemizole	10 mg oral	stemizole
loratadine	10 mg oral	loridine
desloratadine	5mg oral	deslor
cetrizine	10mg oral	cetzine
levocetrizine	5-10 mg oral	levosiz
Azelastine 4mg	Oral nasal spray	azep spray
ebastine	10 mg oral	ebast

2nd generation/newer

- **Mainly antiallergic/usual uses**

Terfenadine Terfed/Terin 30-60mg

- **Antivertigo, antimigraine** (Weak Ca blockers)

- **CINNARIZINE Stugeron 25-50mg**

- **FLUNNARIZINE Flunarine/Simentil/Sibelium 5-10mg**

SECOND GENERATION DRUGS

5star SAQ

Marketed after 1980

properties –

1) ***absence*** **of CNS depressant property /less sedating –**

Psychomotor performance is NoT affected

Less subjective effect on sleep

Don't potentiate alcohol or benzodiazepine drugs

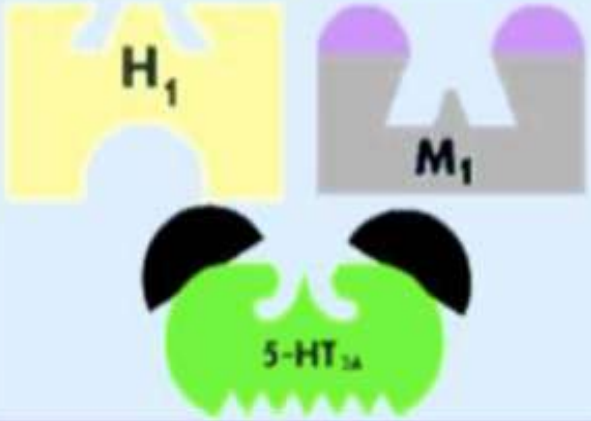
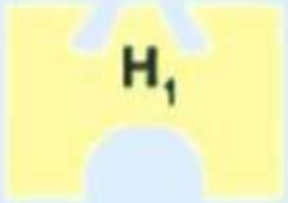
BBB XX

2) **higher H1 selectivity** -no anticholinergic side effects -dryness of mouth , blurring of vision

Flip side –narrow spectrum of therapeutic use

3) **additional anti allergic** mechanisms

- Mainly used in allergic conditions including food and drug allergy
- low antipruritic antiemetic and antitussive action

Generation	First	Second
Specificity		
Brain Concentration		
Sedation		

CLINICAL USES

--due to their

1) ability to block effects of endogenously released histamine

2) sedative property

3) anticholinergic property


RITE AID
PHARMACY
ORIGINAL PRESCRIPTION STRENGTH
allergy relief
loratadine tablets USP, 10 mg
antihistamine
INDOOR & OUTDOOR ALLERGIES
NON-DROWSY†
24 hour relief of:
sneezing
runny nose
itchy, watery eyes
itchy throat or nose
ACTUAL SIZE
10 TABLETS
10 mg EACH


Original prescription strength
loratadine
tablets 10 mg | antihistamine
Compare to Claritin Tablets active ingredient
loratadine
loratadine


Cetirizine
Allergy Relief
TWIN PACK
cetirizine
ZYRTEC
CETIRIZINE
cetirizine
children's allergy relief
CETRINE
ALLERGY
meijer
24 Hour Allergy
CETIRIZINE
ALLERGY
cetirizine
360 × 360 - samsclub.com

cetrizine

Anti hitaminics are ineffective in bronchial asthma

- Because
- **Low concentration of antihistaminics in bronchi insufficient to block histamine released locally**
- **Leukotrienes and PAF are more important mediators than histamine**

USES

1. **Allergic disorders** –symptomatic relief in

   acute allergy such as itching skin rash urticaria seasonal hay fever allergic conjunctivitis angioedema of lips and eyelids.

   symptomatic relief in insect bite and ivy poisoning.

   Prophylactic value in infusion induced rigor

   Idiopathic pruritis : gen 1

2) **Common cold** : relief by anticholinergic and sedative action . Anticholinergic property reduces nasal secretion : Gen 2 less effective


antihistamine drugs
NUMARK
Allergy Relief
Antihistamine Tablets
Maleate BP 4mg
For relief
• hayfever • insect bites • skin allergies
NUMARK
Allergy Relief Antihistamine Tablets
Chlorphenamine Maleate
For relief from • hayfever • insect bites • skin allergies


Benadryl
ALLERGY
First generation
Diphenhydramine HCl 25mg | Antihistamine
Sneezing
Runny Nose
Itchy, Watery Eyes
Itchy Throat
48 TABLETS
498 × 493
Second generation
Allegra
ALLERGY
fexofenadine HCl tablet
180 mg/antihistamine
24 HR
INDOOR / OUTDOOR ALLERGY RELIEF
Sneezing
Runny Nose
Itchy, Watery Eyes
Itchy Nose or Throat
45 TABLET


antihistamine drugs
NEW!
Non-Drowsy*
Claritin®
Loratadine 10 mg/Antihistamine
24 hour
Allergy
Relief of:
Sneezing; Runny Nose
Itchy, Watery Eyes
Itchy Throat or Nose


antihistamine drugs
MediCol
10
TABLETS
RAPID ACTING
24
HOUR
RELIEF
HAYFEVER ALLERGY
RELIEF CETIRIZINE
EFFECTIVE 24 HOUR RELIEF FROM
SNEEZING
RUNNY NOSE
WATERY ITCHY EYES
Each tablet contains CETIRIZINE HYDROCHLORIDE 10mg
AUST R XXXXX
HAYFEVER ALLERGY
RELIEF CETIRIZINE

USES ---

3. **Motion Sickness** : Promethazine etc. Should be taken 1 hr before for prophylaxis. Promethazine – morning sickness, drug induced vomiting, post operative vomiting
4. **Vertigo** : cinnarizine (vertigon). Cinnarizine has additional anticholinergic, anti 5HT, sedative, vasodilator properties. It inhibits vestibular sensory nuclei in inner ear
5. **Pre Anaesthetic medication** : Promethazine – anticholinergic, sedative property especially in children
6. Cough : gen 1 gr 1. anticholinergic, sedative property . **They have no selective cough suppressant action**

USES… contd..

- As sedative, hypnotic, anxiolytic
- **Pre-anesthetic medication**-promethazine- postop vomiting
- Drug-induced dystonia, PARKINSONISM –
- Promethazine orphenadrine

Most are atropine substitutes:Benzhexol, benztropine, cycrimine, procyclidine, biperiden, diphenhydramine

- **Vertigo-**migraine- CINNARIZINE, FLUNNARIZINE
- **Lytic cocktail** (To produce hypothermia during surgery) (promethazine, chlorpromazine, pethidine)

Uses – newer/2nd generation

- Anti-allergic – for allergic conditions like-
- Rhinitis conjunctivitis hay fever pollinosis
- Atopic eczema,urticaria –cetrizine drug of choice
- Drug allergy food allergy
- -fexofenadine–loratadine-desloratadine-levocetrizine

- Anti-vertigo, anti-migraine
- (also anti-5HT action)
- (weak ca channel blocking action) - flunarizine, cinnarizine
- Vertigo, Migraine, Ménière's disease

Adverse effects

- ONLY SEEN WITH OLDER /first gen– cross BBB
- **Sedation, decreased alertness and conc, motor incoordination, psychomotor performance impairment**
- ***Regular use of conventional group is NOT advisable in children as CNS depressant property may affect learning***
- **Skillful acts – drivers/machine operators**
- **Long term – increased appetite, weight gain (also 5HT blockade)**
- **SYNERGISM with CNS depressants (alcohol, sedative-hypnotics)—additive toxicity**
- **Hypotension-alpha blockade**
- These are MINIMAL WITH NEWER agents
- (X BBB)

Adverse effects

-Anti Cholinergic adverse effects- dryness, urinary hesitancy, retention, constipation, blurring vision

-Acute overdose leads to features like belladona poisoning– tremors, convulsions, fall in blood pressure,fever ,hallucinations

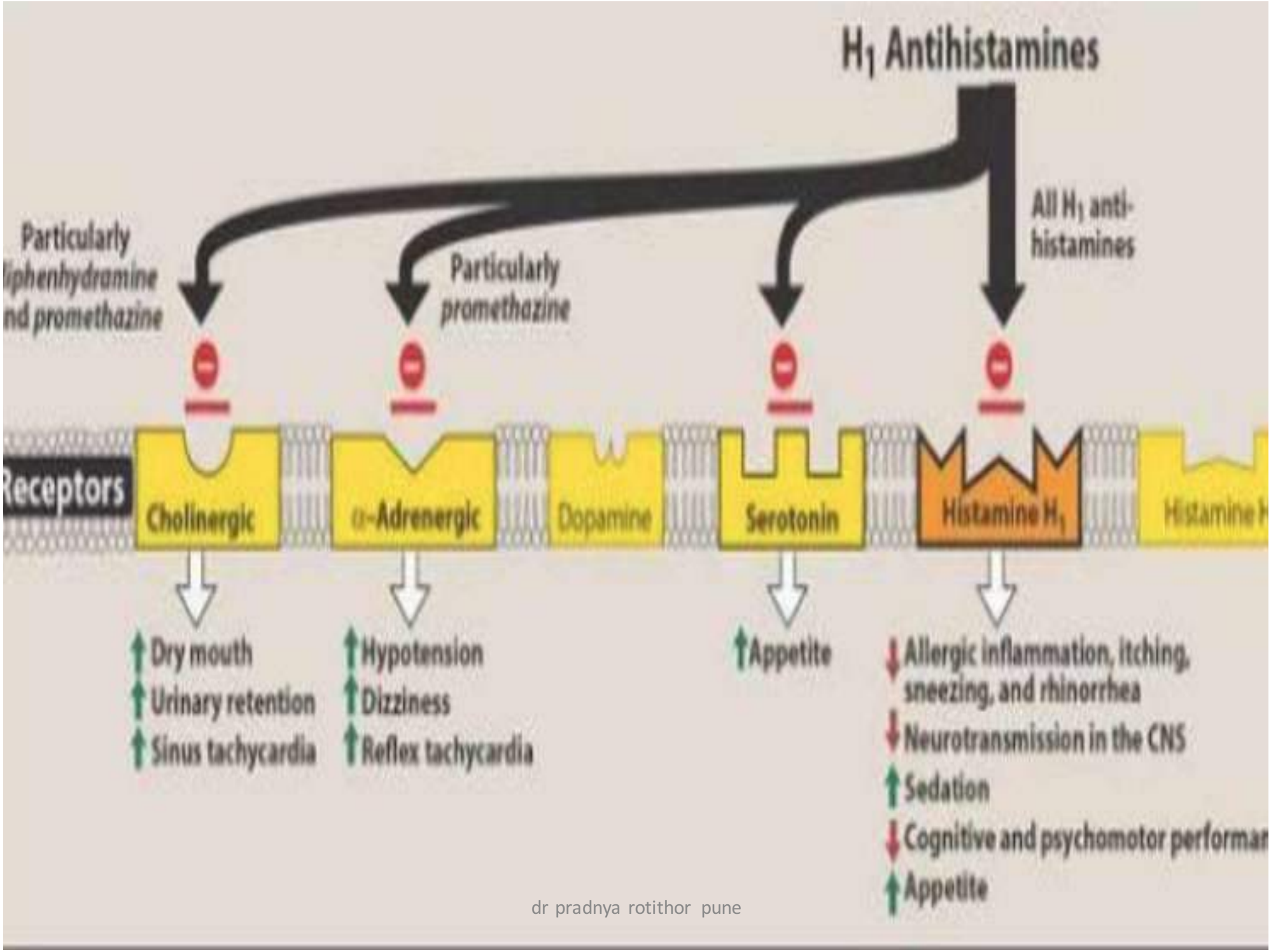
Management – PHYSOSTIGMINE –crosses blood brain barrier

Sodium bicarbonate – Intravenous


Additive effect of CNS depressant
Claritine
10 mg, tableta
dr pradnya rotithor pune

Gen 2 :

- Cardiac Arrthymmias due to Drug interaction with Erythromycin, Ketoconazole (inhibitor of CYP3A4) by terfenadine, Astemizole was noted. But these drug interactions are not seen with other Gen 2 drugs


H1 Antihistamines
Particularly
Diphenhydramine
and promethazine
Particularly
promethazine
All H1 anti-
histamines
Receptors
Cholinergic
α-Adrenergic
Dopamine
Serotonin
Histamine H1
Histamine H
Dry mouth
Urinary retention
Sinus tachycardia
Hypotension
Dizziness
Reflex tachycardia
Appetite
Allergic inflammation, itching,
sneezing, and rhinorrhea
Neurotransmission in the CNS
Sedation
Cognitive and psychomotor performan
Appetite

MUHS QUESTIONS

- **Distinguish between conventional and Sec Gen antihitaminics--HOMEWORK**
- Name newer antihistaminics , state their advantage over older/ conventional antihistaminics
- ADR of H1antihitamines
- Various MCQs

Skeletal muscle relaxants

DR PRADNYA ROTITHOR

Definition

Drugs that ↓ **muscle tone**

and/or

Cause paralysis

Without loss of consciousness

Site of action----

1)**peripheral** -- **NM junction** or **muscle fibre**

2) **central- brain and spinal cord**

Therapeutic uses

Peripherally acting ---with G A drugs

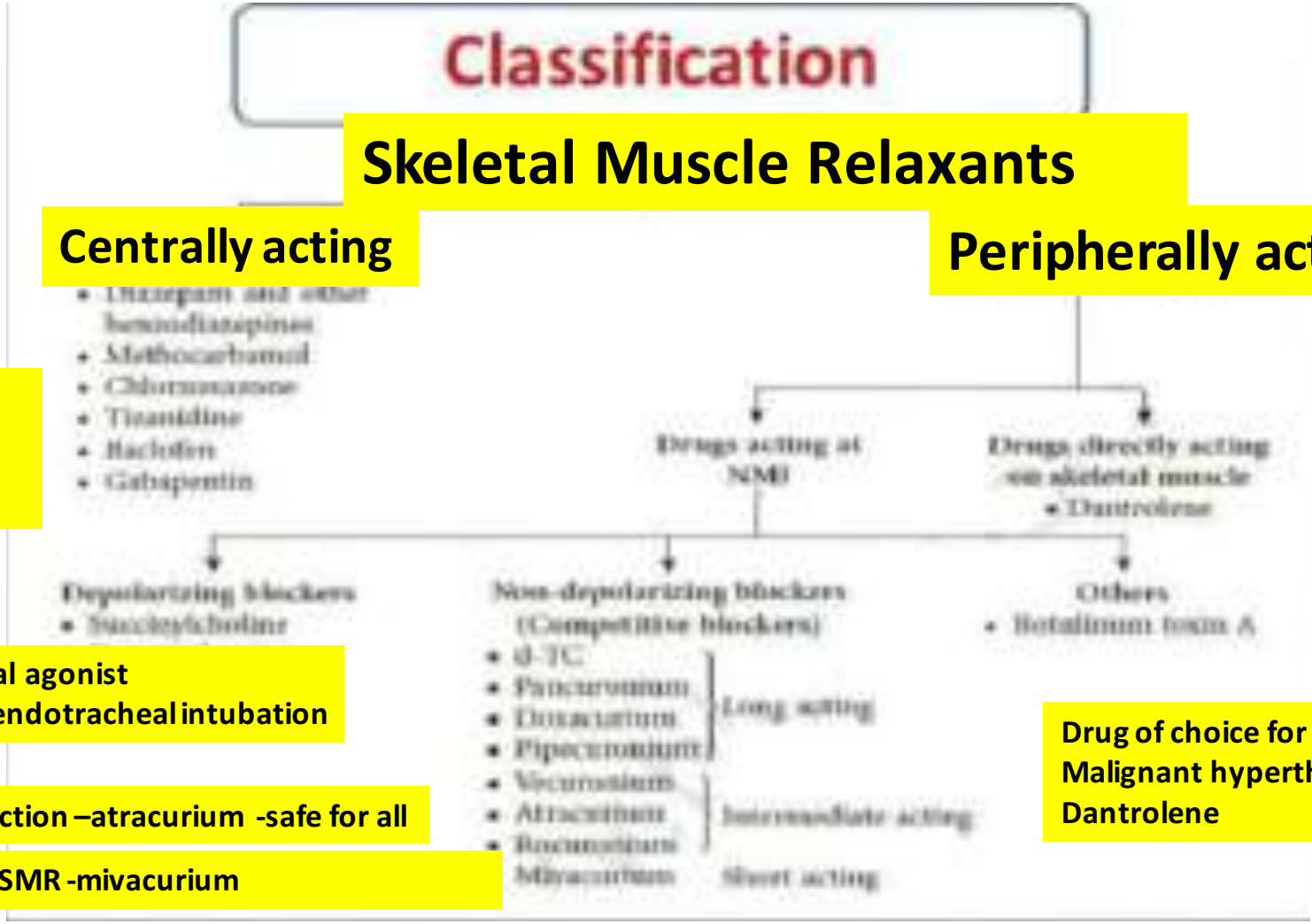
for surgery

Centrally acting 1)–to relieve painful muscle spasm

spastic neurological disorders

to be used with caution in pregnancy and renal failure

Contraindicated in Myasthenia Gravis



Acting on GABA B Receptor - Baclofen

Partial agonist
Use-endotracheal intubation

Hoffman's reaction –atracurium -safe for all

Shortest acting SMR -mivacurium

Drug of choice for Malignant hyperthermia- Dantrolene

Classification SAQ

Peripherally acting Centrally acting

↓

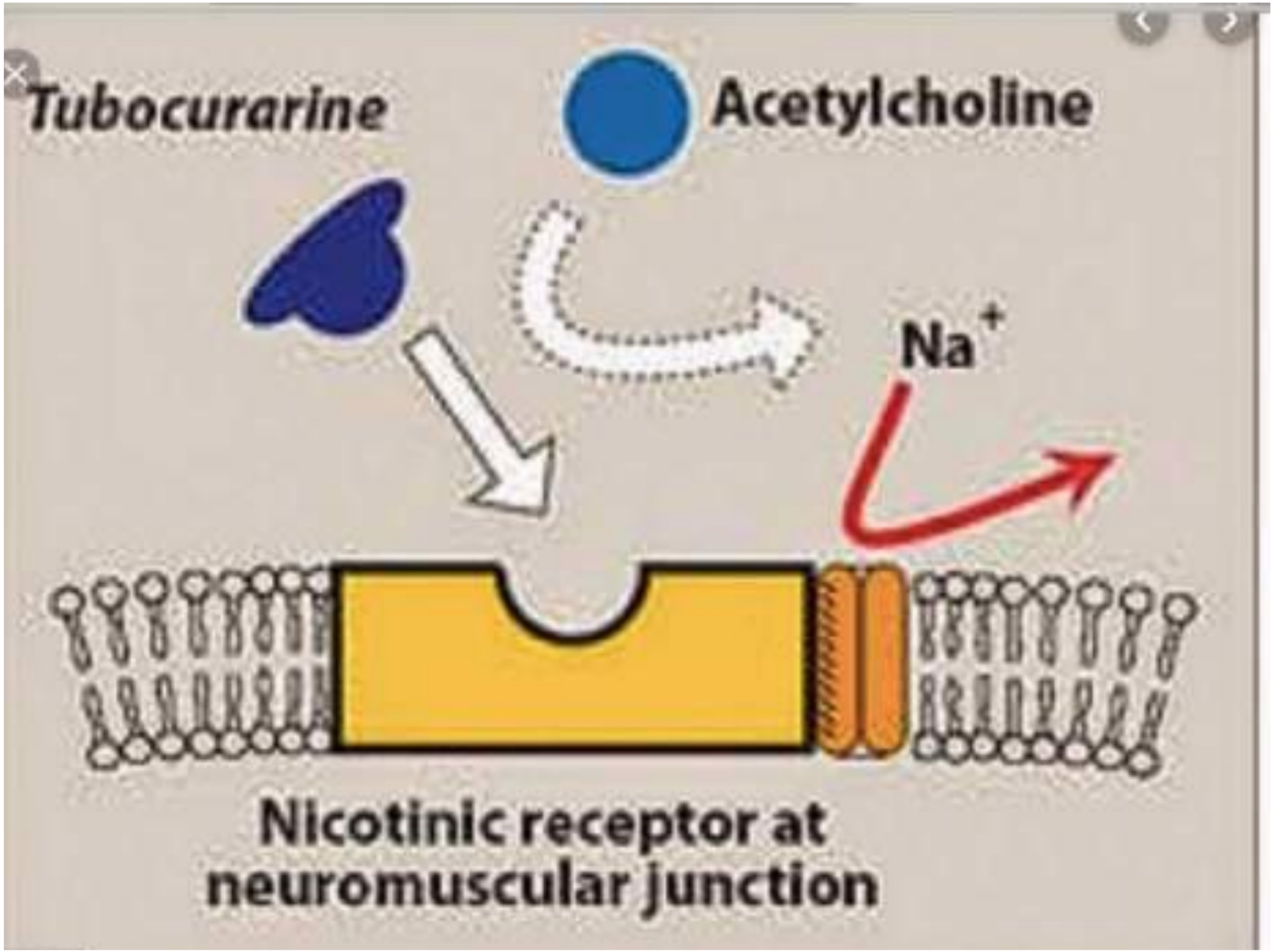
Nicotinic blockers: Neuromuscular (NM) blockers (Competitive Antagonists) –non depolarizing

d-tubocurarine, pancuronium, vecuronium , atracurium mivacuranium

Partial agonists/depolarizing: Succinylcholine suxamethonium

Directly acting: Dantrolene

)


Tubocurarine
Acetylcholine
Na+
Nicotinic receptor at
neuromuscular junction

Competitive blockers (Nicotinic blockers)

(reversed by edrophonium neostigmine)

MOA--Block nicotinic receptor

Ach action is prevented

(see next slide)

Long acting: Cisatracurium, pancuronium ***(40-80*** min)

Intermediate: ***Atracurium****(Hoffman elimination – safe in Hepatic,renal failure and in neonate,old) MCQ*

Vecuronium, rocuronium(***20-40*** min), d tubocurarine (dTC)(***30-60 min)***

Short: Mivacurium(12-20 min)--MCQ

MOA OF d TUBOCURARINE

Drug binds to R on MEP—motor end plate

Ach thus can not bind with R

Muscles show motor weakness first and then flaccid paralysis follows

As it is a **competitive antagonism** –if concentration of agonist Ach is increased ,block can be reversed

How to do it ?—

by Anticholinesterase drugs that prevent breakdown of Ach – –neostigmine

Centrally acting

Benzodiazepines: Diazepam

Mephenesin group: Chlorzoxazone
chlormezanone
carisoprodol
methocarbamol

Central alpha-2 agonist: Tizanidine

(GABA-B agonist/mimetic) Baclofen


NDC 55390-039-10
VECURONIUM
BROMIDE
FOR INJECTION
FOR IV USE ONLY
20 mg*
*1 mg/mL when
reconstituted to 20 mL
Rx ONLY.


NDC 0781-3153-80
Cisatracurium
Besylate Injection
200 mg/20 mL*
(10 mg/mL)
For Intravenous Injection
20 mL Single Dose Vial
For ICU use only
℞ only
SANDOZ


5 mL
Pancuronium
Bromide Injection
1 mg/mL 5 mg/5 mL
IV
PARALYZING AGENT PARALYSANT
SANDOZ

Therapeutic uses
non depolarizing agents

- Adjuvant to general anesthesia
- Assisted ventilation – critically ill cases in ICU – To reduce chest wall resistance to inflation
- Prevent convulsions and trauma from ECT
- Tetanus
- Status epilepticus

Drug Interactions

Additive effect—
curarimimetic effect

Halothane, enflurane, ether--MCQ

Aminoglycoside antibiotics

ADR of non depolarizing blockers

Many of them release *histamine* →

Hypotension, cardiovascular collapse

Bronchospasm, precipitate asthma

Flushing– dTC, atracurium, mivacurium

Neuromuscular blockade

Respiratory paralysis, apnea

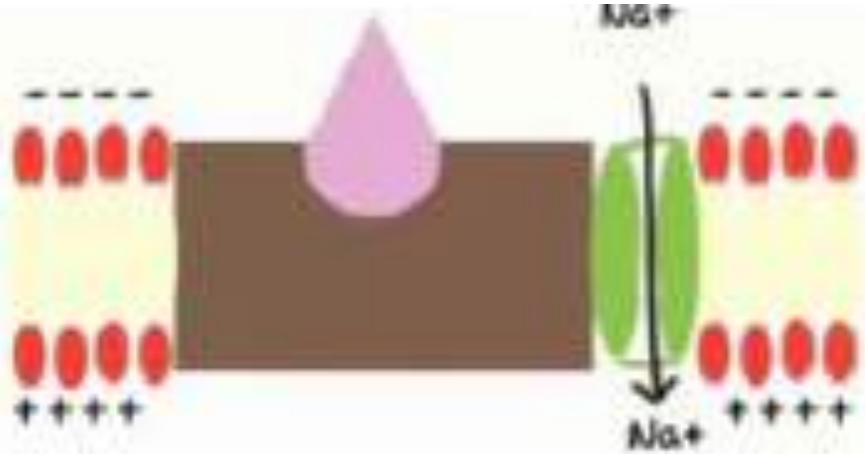
Malignant hyperthermia (less common)

Depolarizing agent – succinylcholine

Phase I block: react with the receptor at muscle end plate and produce depolarization of the excitable membrane. (initial fasciculations) (*partial agonist*- less intrinsic activity)

Phase II block: The receptor sensitivity is decreased (**desensitization block**), leading to flaccid paralysis of the muscle

succinylcholine



Phase I
Depolarising phase

initial fasciculations

Phase II
Desensitising phase

flaccid paralysis

MOA OF SUCCINYLCHOLINE

Partial agonist

Low intrinsic activity

Does not allow agonist Ach to act

Low intrinsic activity means action like agonist Ach but v low

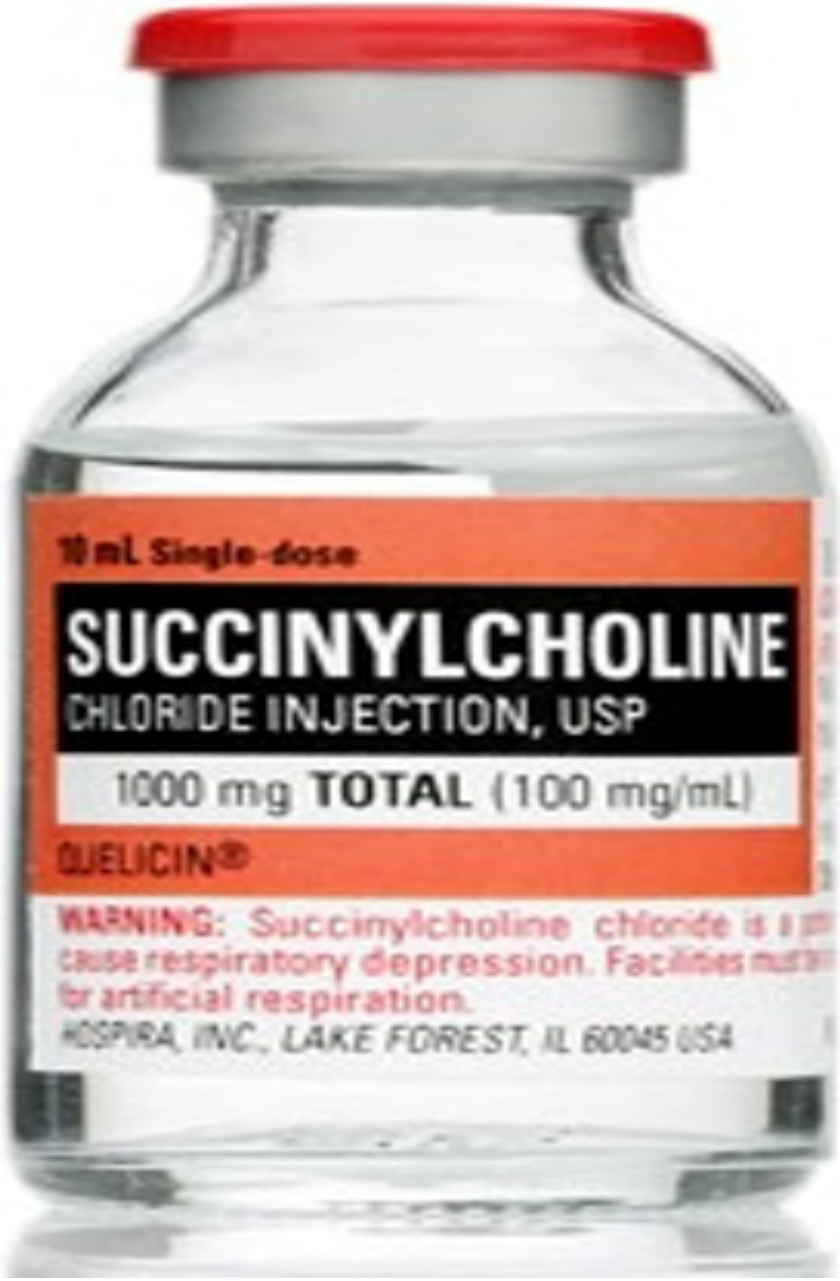
Thus depolarization occurs and muscles initially show fasciculations – twitching

Drug is destroyed much slower than Ach –

This leads to persistent depolarization during which muscle becomes insensitive to Ach released from nerve ending and remain paralyzed

Giving Anti CHE drugs like neostigmine does not reverse the block

In fact may get enhanced as giving neostigmine will increase local concentration of Ach


10 mL Single-dose
SUCCINYLCHOLINE
CHLORIDE INJECTION, USP
1000 mg TOTAL (100 mg/mL)
QUELICIN®
WARNING: Succinylcholine chloride is a
cause respiratory depression. Facilities must
for artificial respiration.
HOSPIRA, INC., LAKE FOREST, IL 60045 USA

Succinylcholine – partial agonist

Rapid onset(1-1.5 min)

Short duration(8-10 min)

(Rapid breakdown by plasma cholinesterase)

Indications-

Useful for *rapid endotracheal intubation*
required during induction of anesthesia

Laryngoscopy, oesophagoscopy, bronchoscopy, reductions of fractures, dislocations,

to treat laryngospasm

Also during ECT

Succinylcholine ADR

1)Deficiency of inactivating enzyme (incidence- 1:2500)
→ prolonged muscle relaxation → diaphragm paralysis → **succinylcholine apnea**
(Apnea > 15 min is considered abnormal)

Abnormal plasma pseudocholinesterase –poor ability to hydrolyse the drug

No antidote is available

Treat with: **Blood transfusion**, artificial respiration

2)Malignant hyperthermia, muscle rigidity – Halothane
Treatment : Cooling,
drug of choice -dantrolene
blocks Calcium release→ decreases heat production, relaxes muscle tone

Succinylcholine ADR

3)Increased K release from intracellular stores→
Hyperkalemia

Cardiac arrhythmia

4)Post-operative muscle soreness

5)Drug interaction in vitro--

Do not mix in a syringe/infusion with thiopental (ultra short acting barbiturate -GA drug)

Dibucaine number

Dibucaine - local anaesthetic drug
inhibits ----
Normal pseudocholinesterase enzyme-
80% inhibition
Normal value: 73-90%

Abnormal enzyme - percent inhibtiton (20%)

The test is called "dibucaine number". MCQ

Test for abnormal pseudocholinesterase enzyme

Compare and contrast

D tubocurarine

And

Succinylcholine

Imp SAQ

D-tubocurarine	Succinylcholine
Competitive block/non depolarizing	Depolarizing block
Competitive antagonist	Partial agonist
Neostigmine reverses the block	No effect
Histamine release (dTC,miva, atracurium)	Slight
Hypotension, asthma, flushing, bronchospasm	Not much

D-tubocurarine	Succinylcholine
Ether, enflurane accentuate the block	No effect
No fasciculations, flaccid paralysis	Initial fasciculations, flaccid paralysis
Fingers, eyes → limbs → neck -> face -> trunk → respiratory	Neck, limbs → Face, jaw, eyes, pharynx → Trunk → respiratory
Longer action	Shorter action
Duration:15-40 min	8-10 min
Onset: 4-6 min	1-1.5 min

D-tubocurarine	Succinylcholine
No arrhythmias	Yes
Adjuvant in longer surgeries Tetanus Status epilepticus	short procedures ET intubation, Scopy - Laryngo/ broncho, (fracture dislocations/reduction),ECT
- Malignant hyperthermia	Atypical pseudoChE, Apnoea- dibucaine no., malignant hyperthermia
Treat overdose with - Neostigmine/Edrophonium plus atropine	Treat overdose with – Artificial respiration, fresh blood

Dantrolene

Direct action - skeletal muscle

RyR (Ryanodine receptor) Ca channels (sarcoplasmic reticulum). MCQ

Prevents opening of Ca channels

P/O: to reduce spasticity in upper motor neurone disorders, hemiplegia, paraplegia, cerebral palsy, multiple sclerosis

I/V: drug of choice for malignant hyperthermia (blocks Ca release from sarcoplasmic reticulum) MCQ

D for Dantrolene
and
D for Direct action on muscle fibres

CENTRALLY ACTING MUSCLE RELAXANTS

Centrally acting

Benzodiazepines: Diazepam

Mephenesin group: Chlorzoxazone
chlormezanone
carisoprodol
methocarbamol

Central alpha-2 agonist: Tizanidine

: (GABA-B agonist/mimetic) Baclofen MCQ

Centrally acting	Peripherally acting
Decrease muscle tone without reducing voluntary power	Cause muscle paralysis, voluntary movements lost
Selectively inhibit polysynaptic reflexes in CNS	Block neuromuscular transmission
Cause some CNS depression	No effect on CNS
Given orally, sometimes parenterally	Practically always given i.v.
Used in chronic spastic conditions, acute muscle spasms, tetanus	Used for short-term purposes (surgical operations)

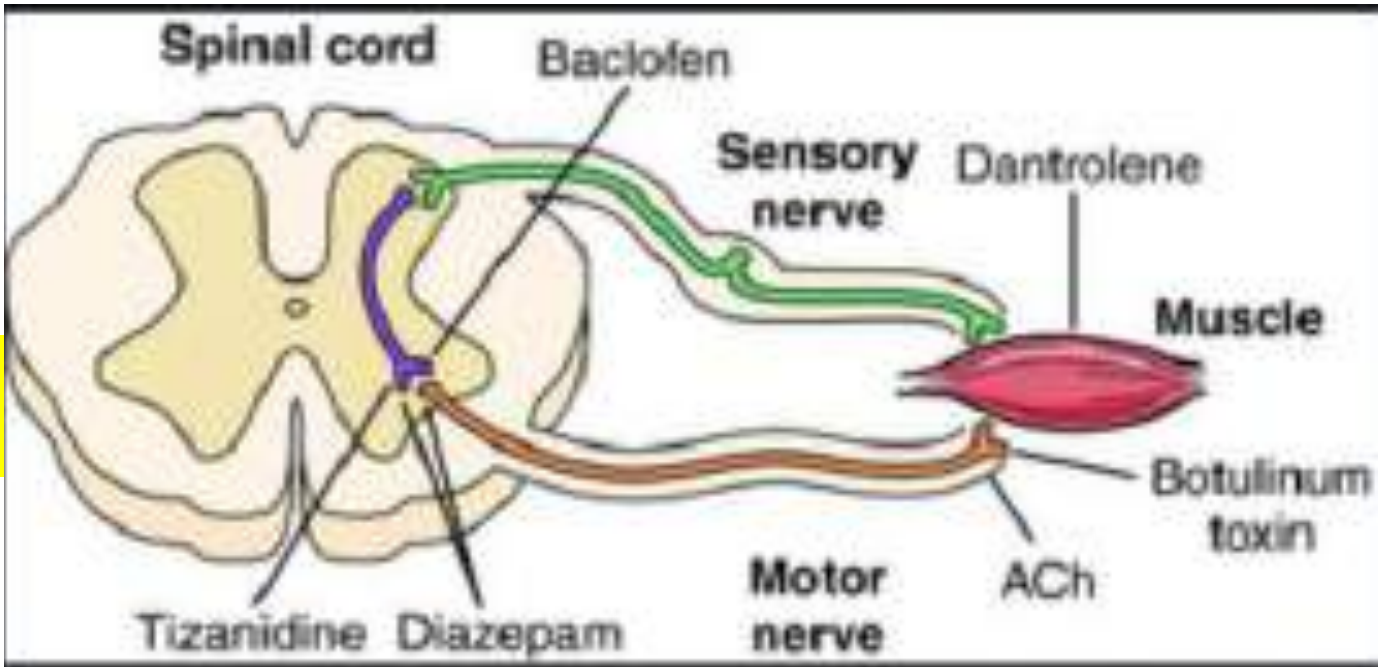
Centrally acting - Baclofen

- GABA derivative- Baclofen: selective $GABA_B$ agonist
- G-protein coupled
- Increases K conductance, alters Ca flux
- Primary site: spinal cord
- Mainly corrects flexor spasticity

- Spasticity, multiple sclerosis, ALS(amayotrophic lateral sclerosis), spinal injuries, muscle spasms, trigeminal neuralgia, tardive dyskinesia(random involuntary movements of face,jaw)

B for Baclofen
and
B for $GABA_B$

Acts on spinal cord
Corrects flexor spasticity



THERAPEUTIC USES:Centrally acting

1)Acute muscle spasms: overstretching, sprain, tearing of ligaments-tendons, dislocation, bursitis, rheumatic diseases

Often combined with NSAIDS, OPIOID Derivatives

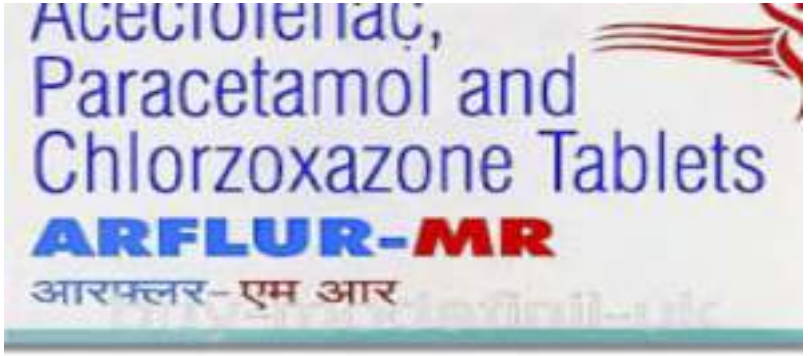
2)Torticollis, lumbago, backache, neuralgias

3)Hemiplegia, paraplegia, spinal injuries, multiple sclerosis, cerebral palsy

4)Tetanus

5)Status epilepticus

6)Spasticity, ALS, spinal injuries



Combination of NSAIDs and central muscle Relaxants –widely used in clinical practice

MCQs

1)Which of the following drug undergoes HOFMANN elimination -Atracurium

2) shortest acting nondepolarizing skeletal muscle relaxant-Mivacurium

3)Postoperative muscle soarness is side effect of - Succinylcholine

4)Muscle relaxant that could be used in renal or hepatic failure is -atracurium

5)Directly acting agent dantroline

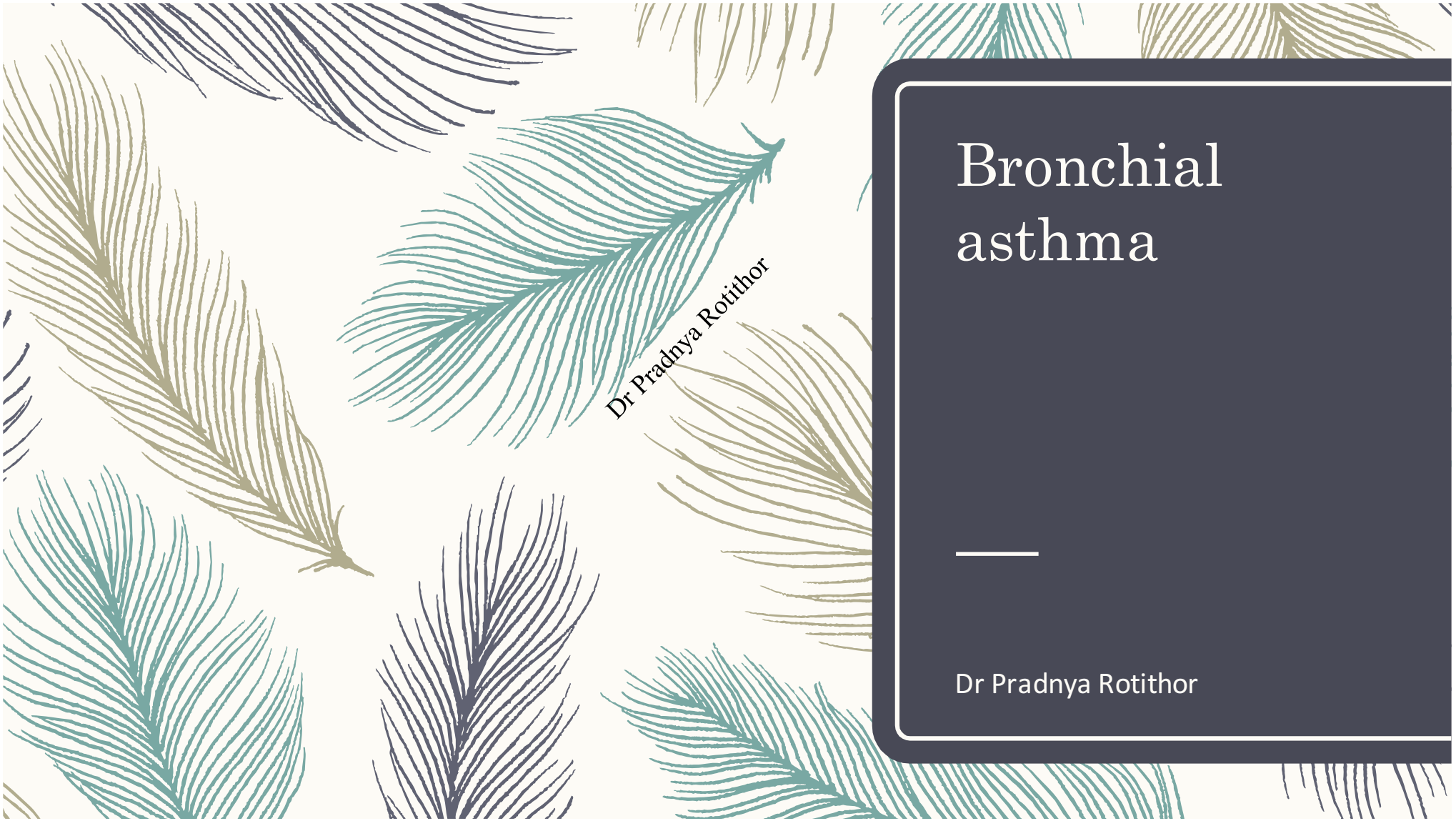
6)Drug of choice for malignant hyperthermia-dantrolene

7)Ideal treatment for faulty peudocholinesterase ADR of succinyl choline fresh blood transfusion

What to Remember !!

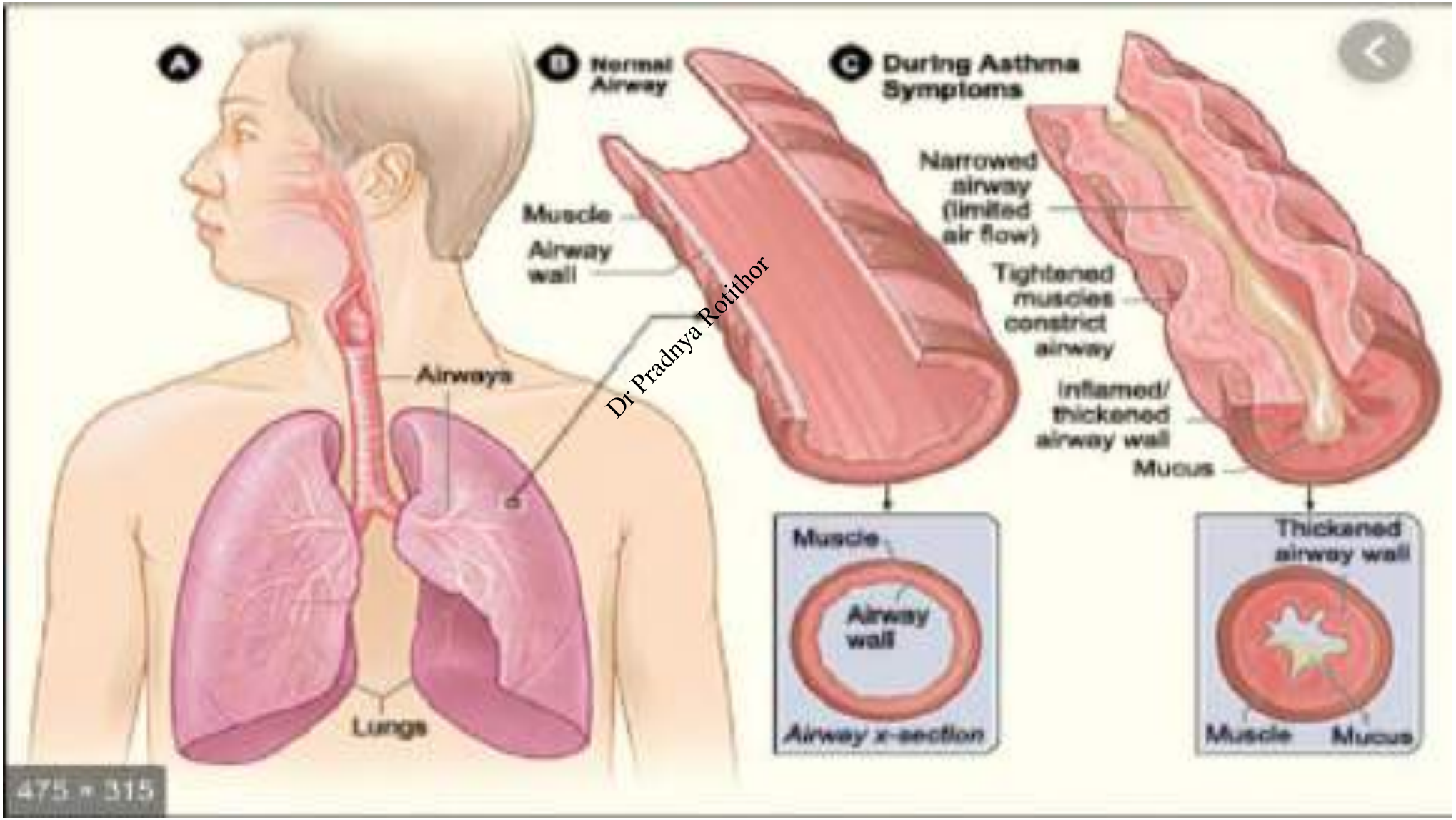
- Skeletal Muscle Relaxants - Classification
- Mechanism of non-depolarizing
- Mechanism of Depolarizing – Phase 1 and phase 2
- Succinylcholine apnoea and malignant hyperthermia
- Few Drug Interactions of SMRs
- Centrally acting Muscle relaxants – names


Thank you

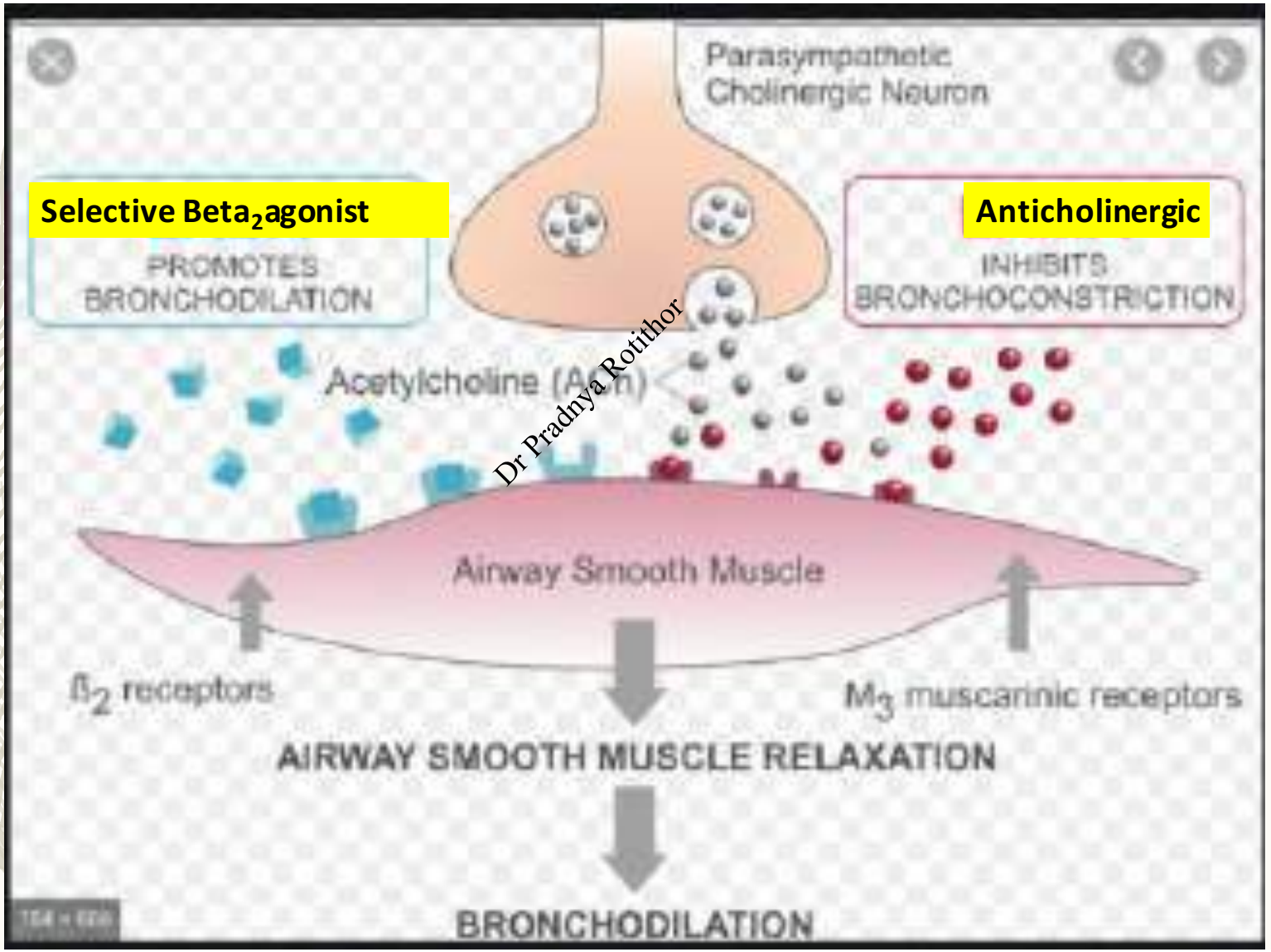


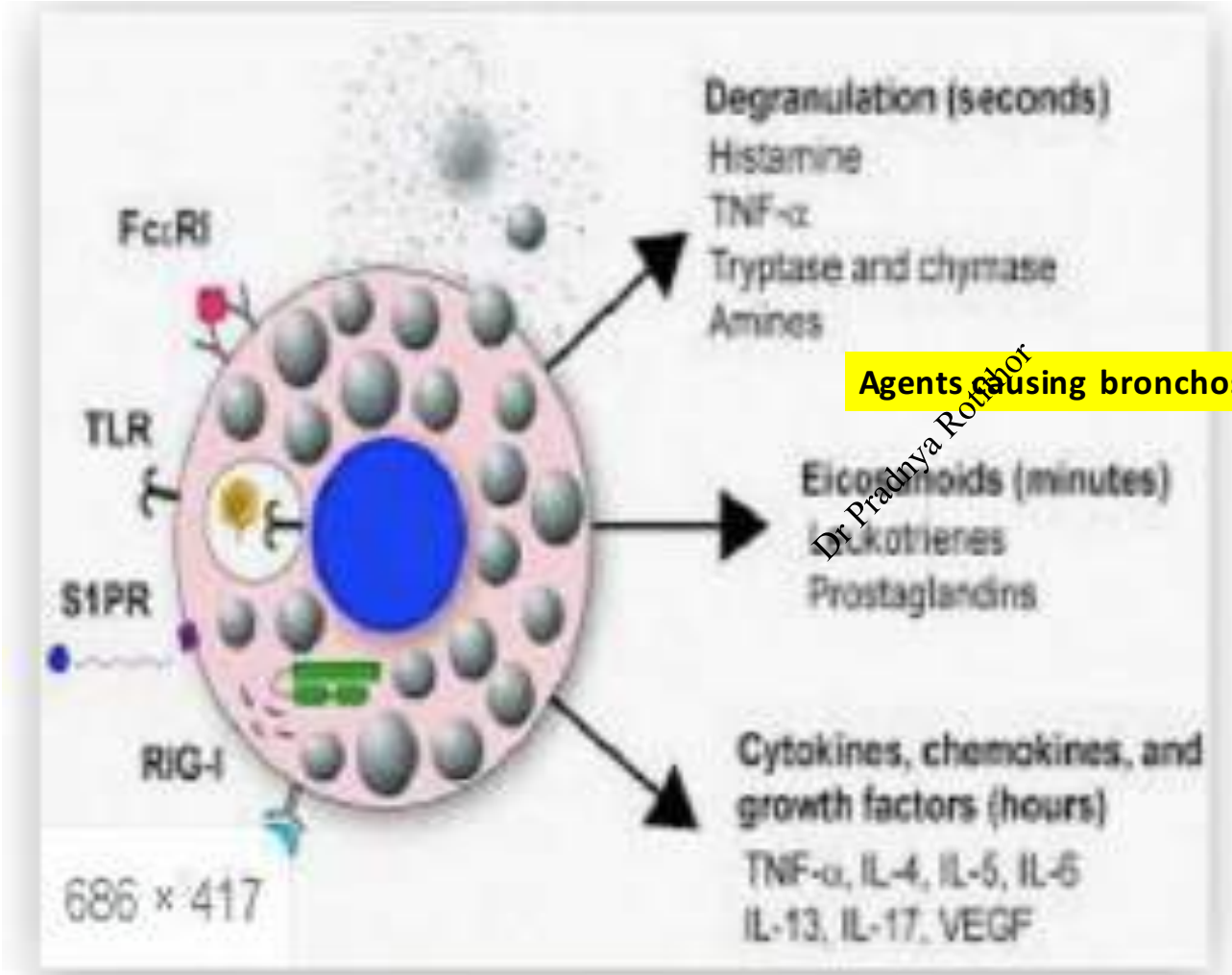
Bronchial asthma

Dr Pradnya Rotithor



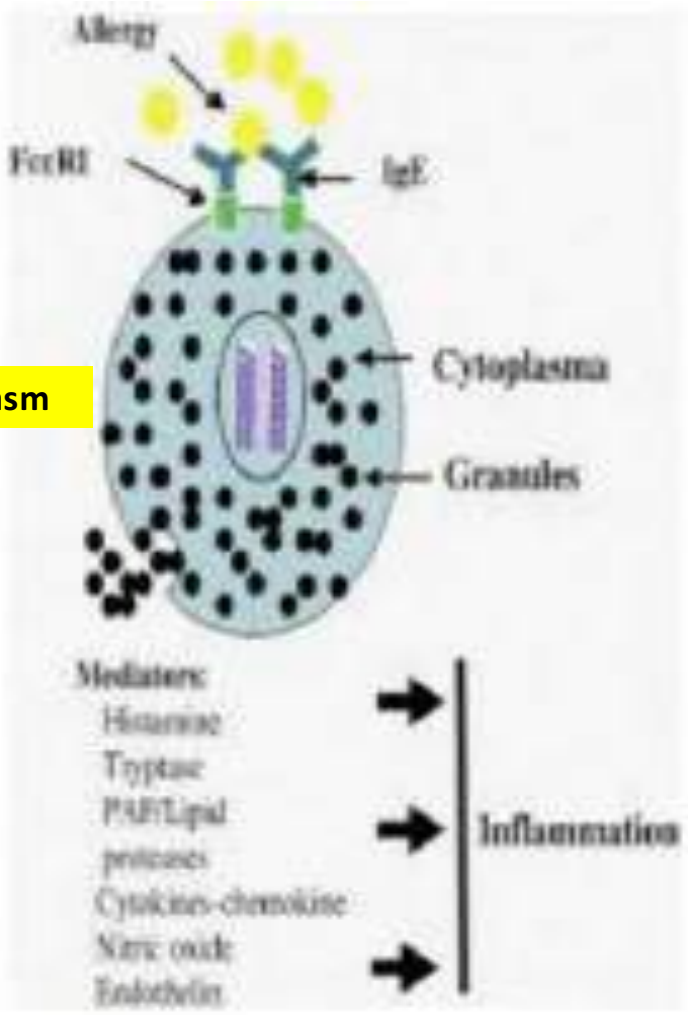

Bronchial Asthma Symptoms
Irregular sleeping
Poor tolerance to exercise
Easy fatigability
Panting
Abnormal palpitations
http://papahealth.com/
400 × 357





Mast cell activation in response to ...

Agents causing bronchospasm



mast cells in allergic infla...

Bronchial asthma

– **SHORT TERM RELIEVERS**

1. Bronchodilators

– -**Beta stimulants**: salbutamol, terbutaline,

– -**Xanthine alkaloids/methyl xanthines** - Aminophylline, Deriphylline

– -**Antimuscarinic drugs**: Ipratropium, tiotropium

2. Intravenous corticosteroids: Hydrocortisone, dexamethasone, betamethasone

3. Adrenaline

– **LONG TERM CONTROLLERS**

– -**inhalational Corticosteroids** (Beclomethasone) / rarely oral

– -**Leukotriene receptor antagonists** (Montelukast)

– -**Mast cell stabilizers** (Cromolyn)

– -**Long acting beta stimulants** (Salmeterol, Formoterol)

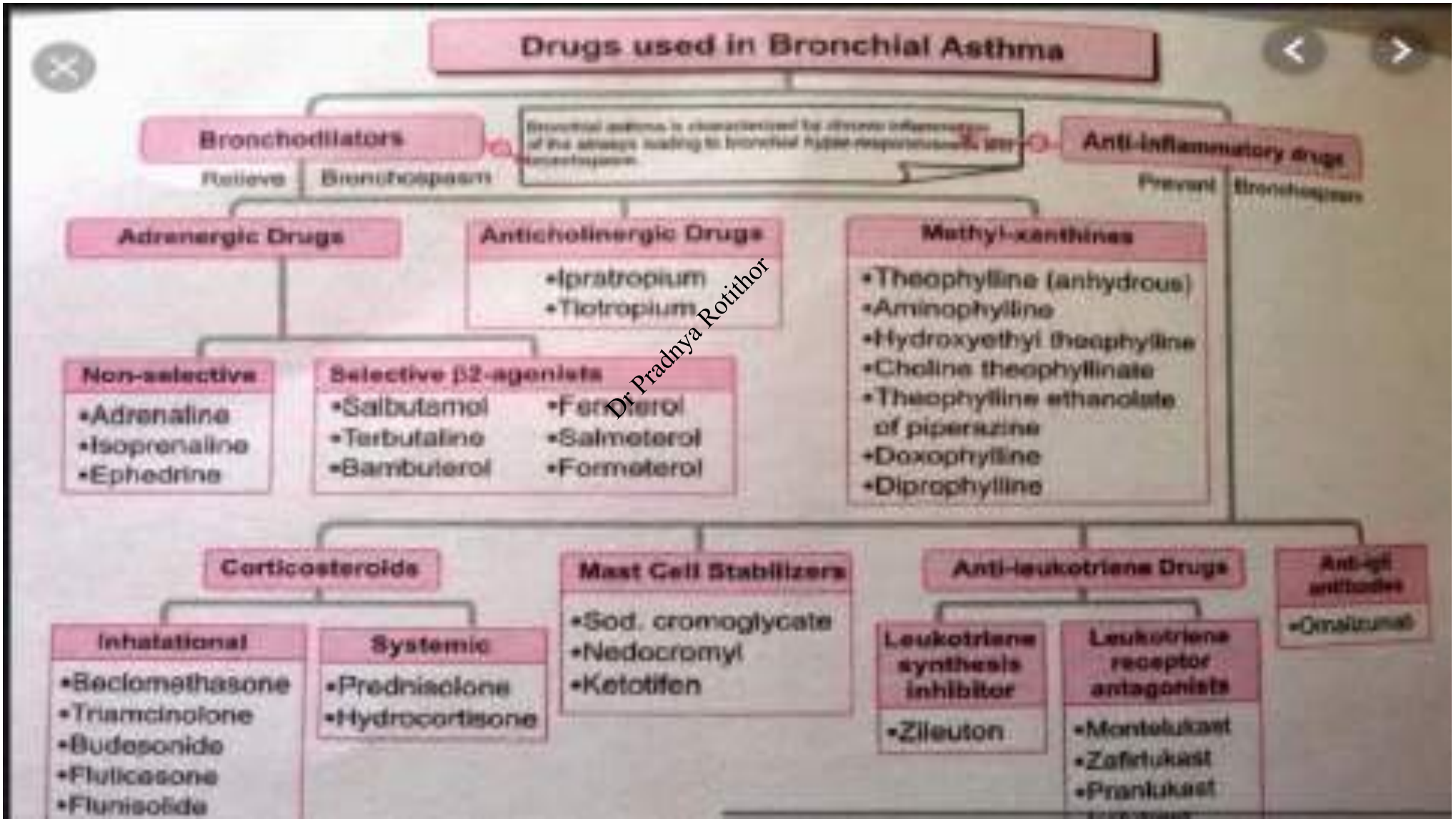
classification

- **Aim in acute attack –reverse the bronchospasm**
- **Hence bronchodilators are used (and steroids -used in emergency)**

- **In chronic or long term management –aim is to prevent bronchospasm –drugs that prevent inflammation and bronchial hyperactivity (and long acting beta2 agonists)**

- **Relievers - *Bronchodilators***
  - β_2 agonists
    - **short-acting**: salbutamol, terbutaline
    - **long-acting**: salmeterol, formoterol
  - **Anticholinergics (muscarinic antagonists)**: ipratropine
  - **Xantines (theophyllines)**: aminophylline

- **Preventers - *Anti-inflammatory drugs***
- **Glucocorticosteroids:**
  - **Inhaled steroids**: beclomethasone, budesonide, fluticasone
  - **oral steroids**: hydrocortisone, prednisone, *dexamethasone*
- **Leukotriene (LT) receptor antagonists (leukotriene modifiers):**
  - **LT antagonists**: montelukast (孟鲁司特), zafirlukast (扎鲁司特)
  - **5-lipoxygenase inhibitors**: zileuton (齐留通)
- **Inhibitors of mediator release**: cromolyn sodium, nedocromil



Beta stimulants

- **Epinephrine:** Acute attack of bronchial asthma: physiological antagonist of histamine, bronchodilator

- **Ephedrine** – noncatacholamine - CNS stimulant

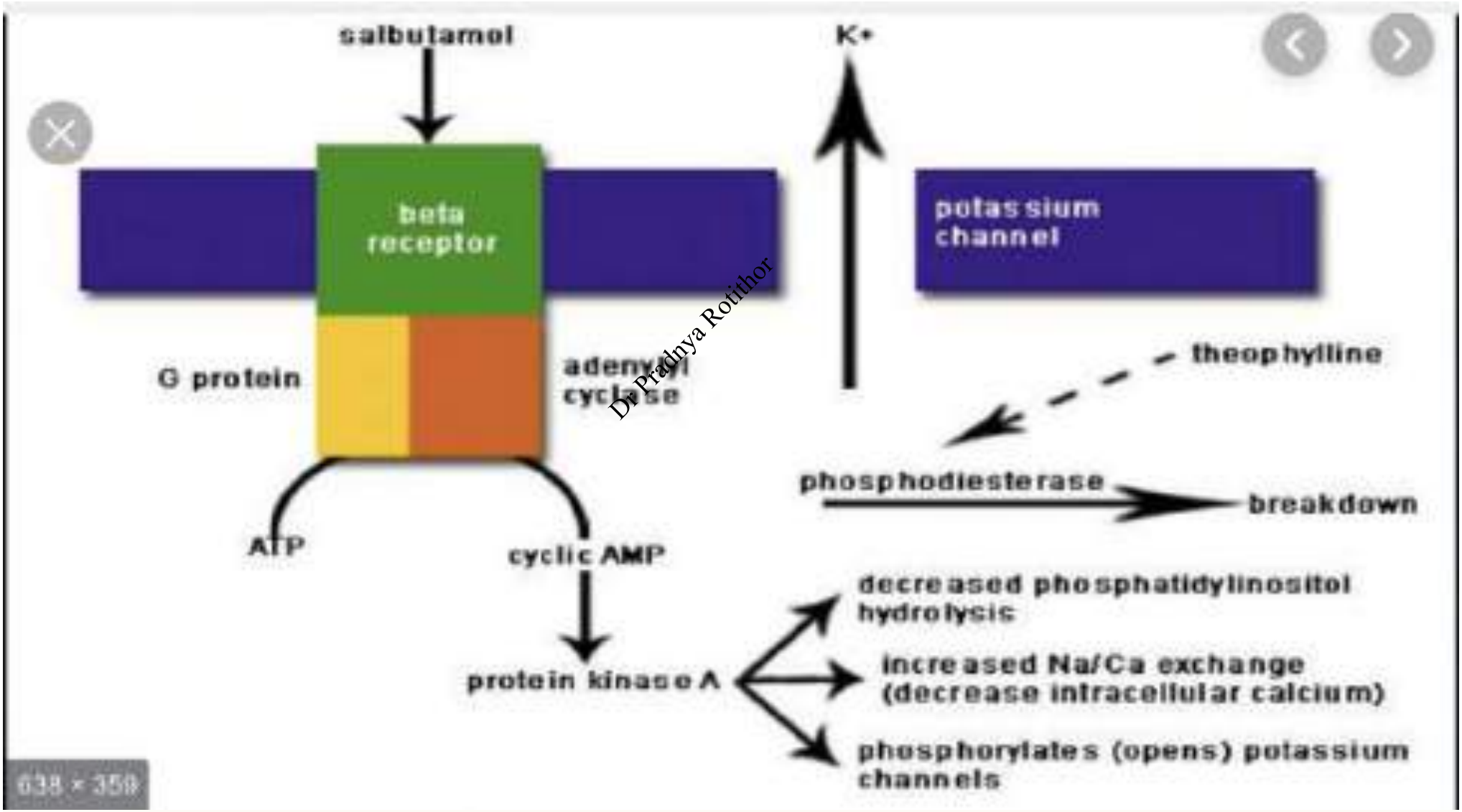
- **Isoprenaline:** sublingual – NONSELECTIVE
- Also beta -1 agonist: cardiac adverse effects

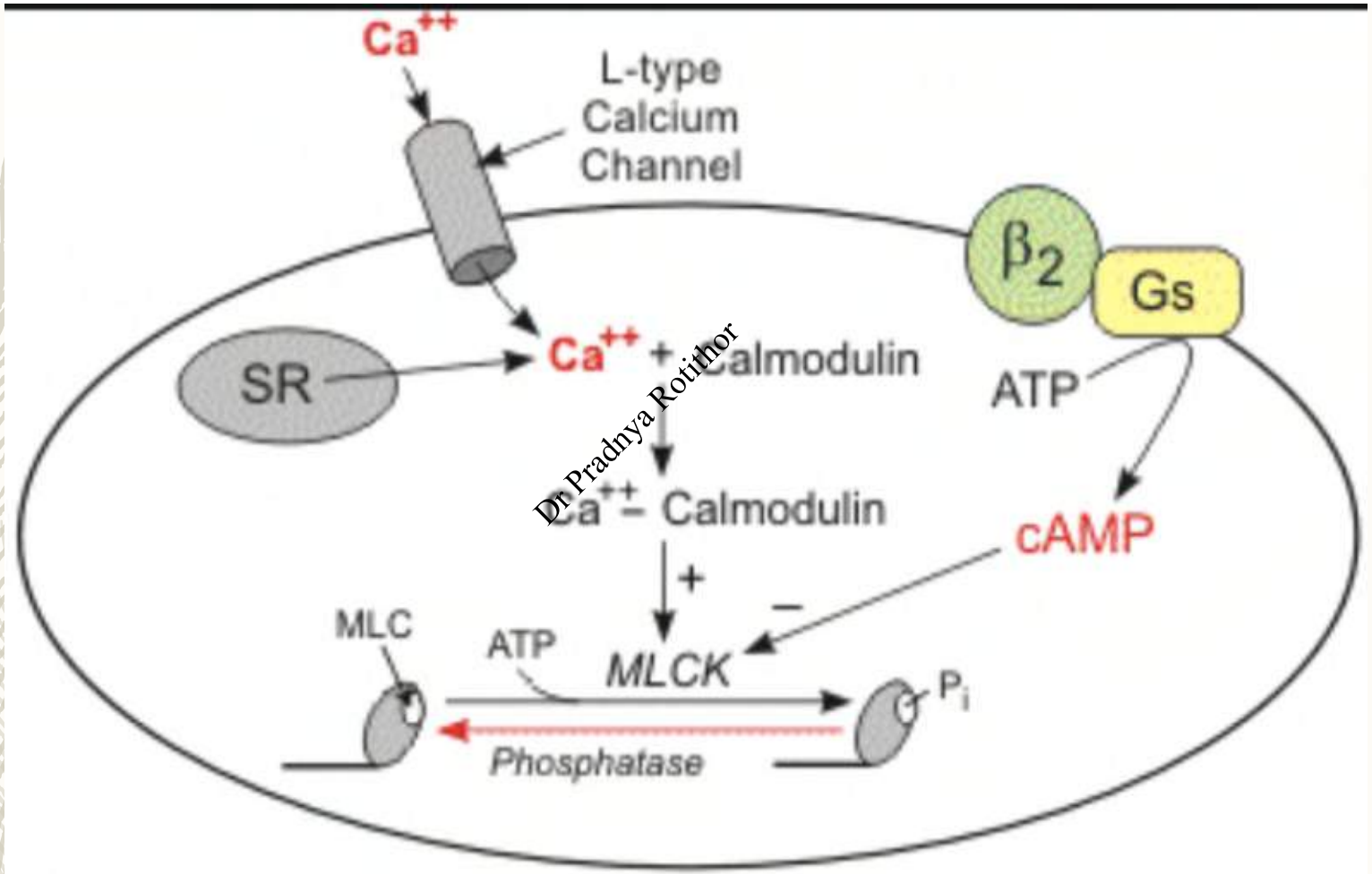
Selective beta-2 stimulants

- **Short acting**
- **Salbutamol** (albuterol) inhalation oral injectable
- Terbutaline, Levosalbutamol
- Pirbuterol, Bitolterol, metaproterenol
- **Long acting**
- **Salmeterol, formoterol**: inhalation
- Long term prevention

Mechanism of action

- Activation of beta2-adrenergic receptors
- Activation of adenyl cyclase
- Increase in intracellular concentration of cyclic-3′,5′-adenosine monophosphate (cyclic AMP)
- Activation of protein kinase A
- Inhibits phosphorylation of myosin
- Decreased intracellular ionic calcium concentrations
- **Relaxation**
- ----------
- Additional action--
- Raised cyclic AMP also decrease release of histamine from mast cells





Abbreviations: SR, sarcoplasmic reticulum; Gq, Gs-protein; MLC, myosin light chain; MLCK, myosin light chain kinase; Pi, myosin phosphorylation

ADR OF SALBUTAMOL

- Muscle tremors
- Palpitation
- tachycardia
- Anxiety
- Restlessness
- Dry mouth
- Ankle oedema
- cardiac side effects are less prominent

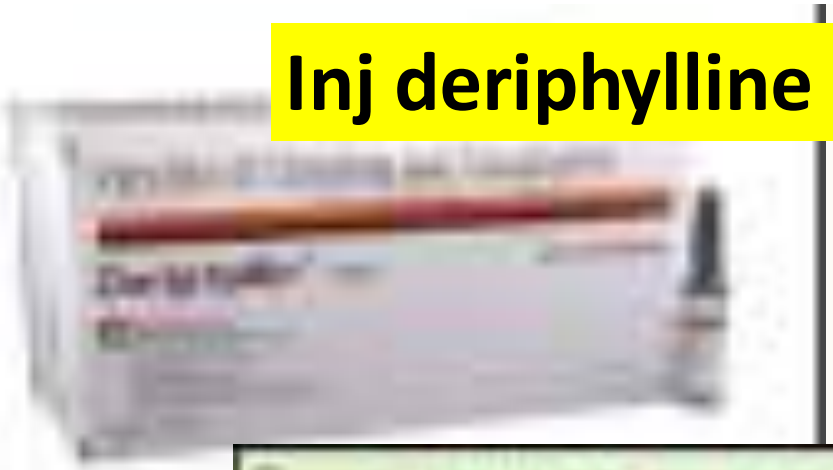
XANTHINE DERIVATIVES

- **PDE III inhibitors: Increase cAMP**
- **Theophylline, theobromine, caffeine**
- **Aminophylline : theophylline ethylene diamine:**
- **250 mg in 20 ml of 20% glucose: slow intravenous: Acute attack of bronchial asthma**

- **Inhibit adenosine receptors**
- Theophylline 100-200 mg tid or SR
- **DERIPHYLLINE**

- **Tremors, nervousness, cardiac stimulation**

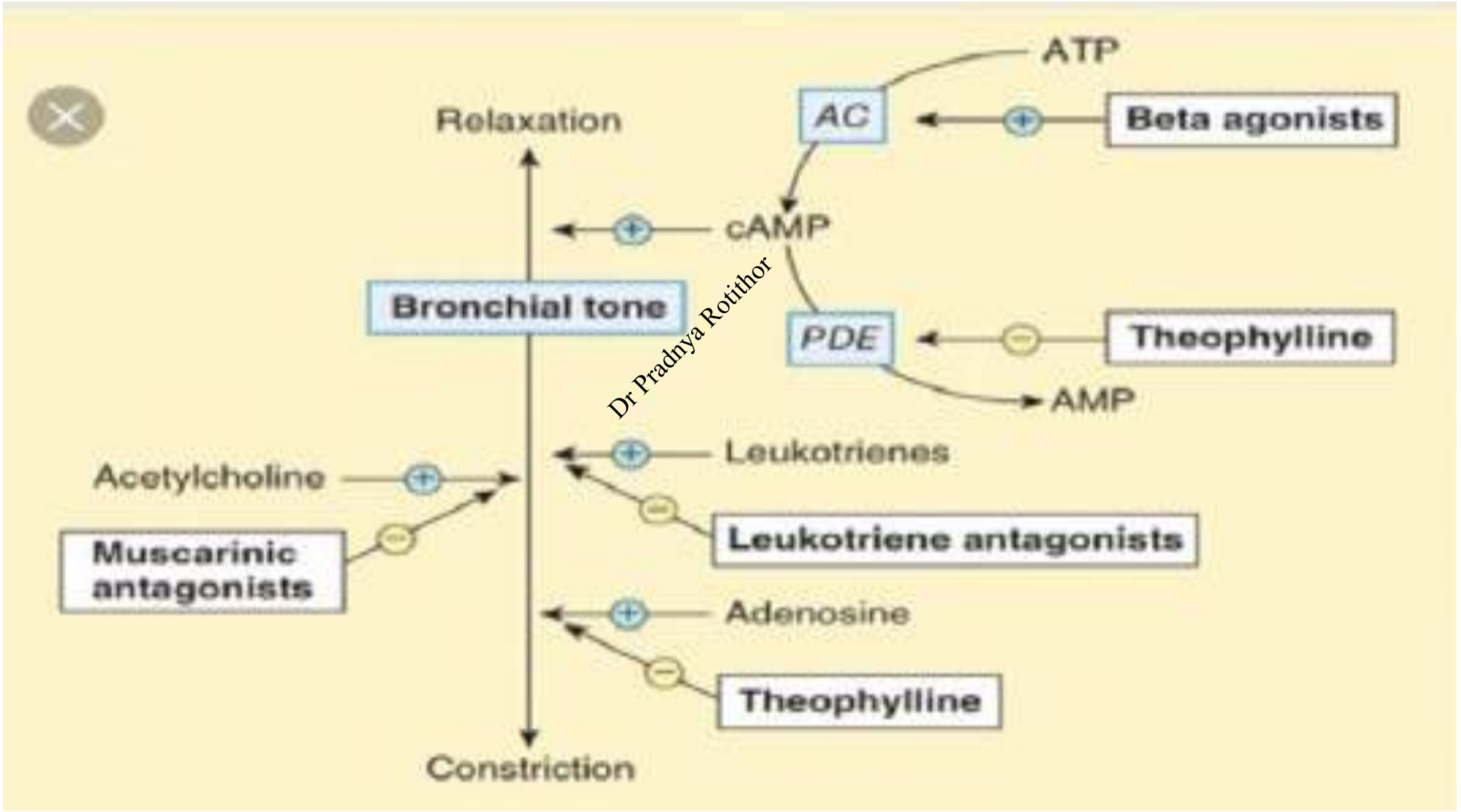
Inj deriphylline



Tab deriphylline

Xanthine Bronchodilators: Mechanism of Action

- Increase levels of energy-producing cAMP
- Inhibit phosphodiesterase
  - Enzyme that breaks down cAMP
- Result
  - Smooth muscle relaxation
  - Bronchodilation
  - Increase airflow (oxygen/carbon dioxide) in the lungs
  - Cause cardiac life-threatening side effects



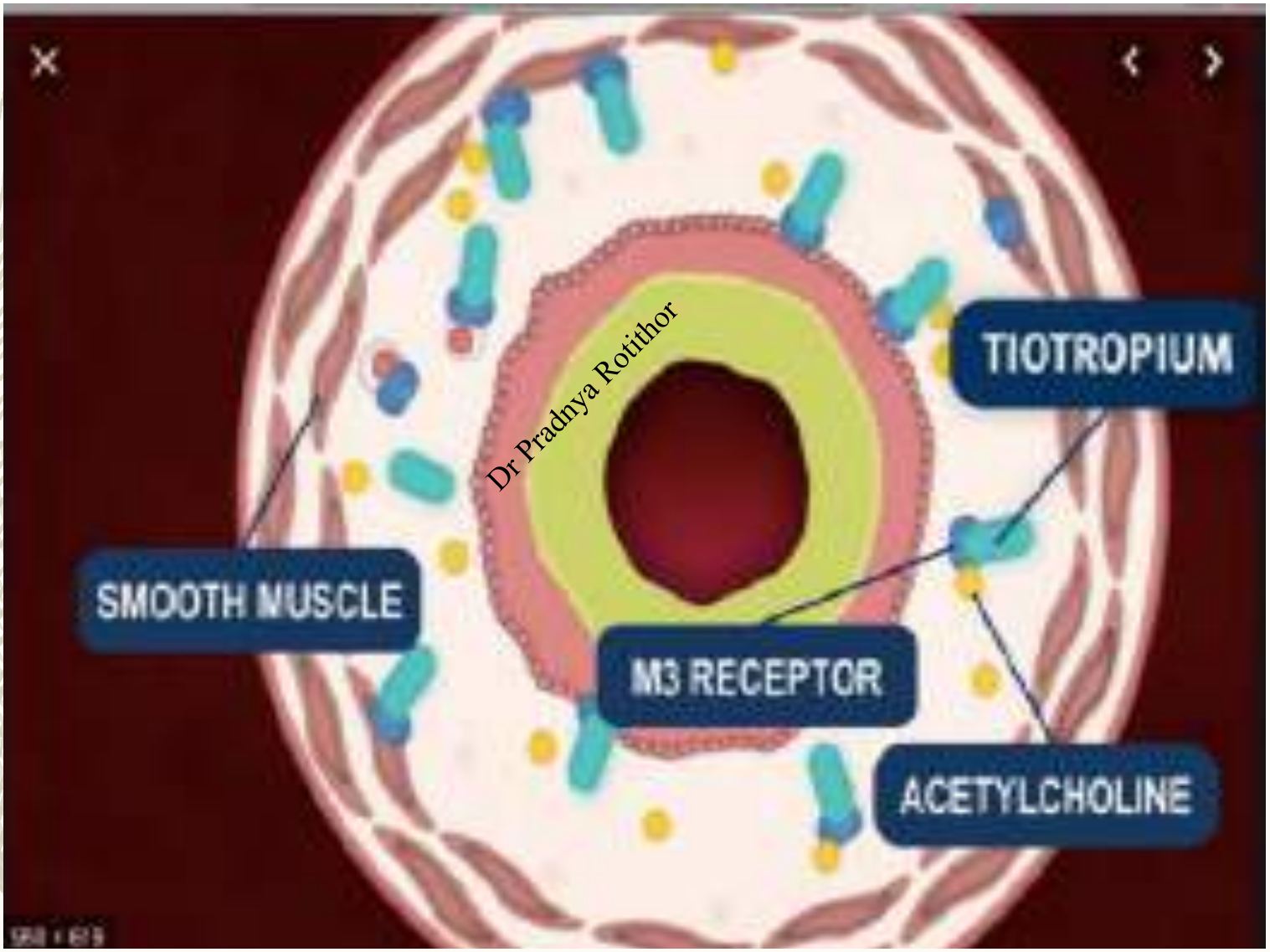
Anti-cholinergics /Anti-muscarinics

–Atropine substitutes

- **Ipratropium bromide**
- **Tiotropium bromide– Longer acting, slow onset**

- LONG ACTING
- Less DRYNESS as compared to atropine

- COPD, chronic smokers



LONG TERM CONTROLLERS

- Inhaled corticosteroids
- Drugs acting on leukotrienes
- Mast cell stabilizers
- Long acting beta stimulants used locally – formoterol, salmeterol

Anti asthmatic drugs

Bronchodilators

(Quick relief medications)

treat acute attack of asthma

- Short acting β2-agonists
- Antimuscarinics
- Xanthine preparations

Anti-inflammatory Agents

(Prophylactic therapy)

reduce the frequency of attacks

- Corticosteroids
- Mast cell stabilizers
- Leukotrienes antagonists
- Anti-IgE monoclonal antibody
- Long acting ß2-agonists

INHALED STEROIDS

- Decrease the bronchial hyper-reactivity /hyper-responsiveness
- Anti-inflammatory, decrease mucosal edema
- Decrease the inflammatory cytokines
- Decrease lymphocytic and eosinophilic infiltration
- Afford more complete and sustained symptomatic relief
- Prevent episodes of acute asthma
- Reduce need for rescue beta 2 agonist inhalation
- Budesonide, fluticasone propionate
- BECLOMETHASONE DIPROPIONATE
- triamcinolone, flunisolide,ciclesonide, mometasone

ADR OF INHALATIONAL STEROIDS

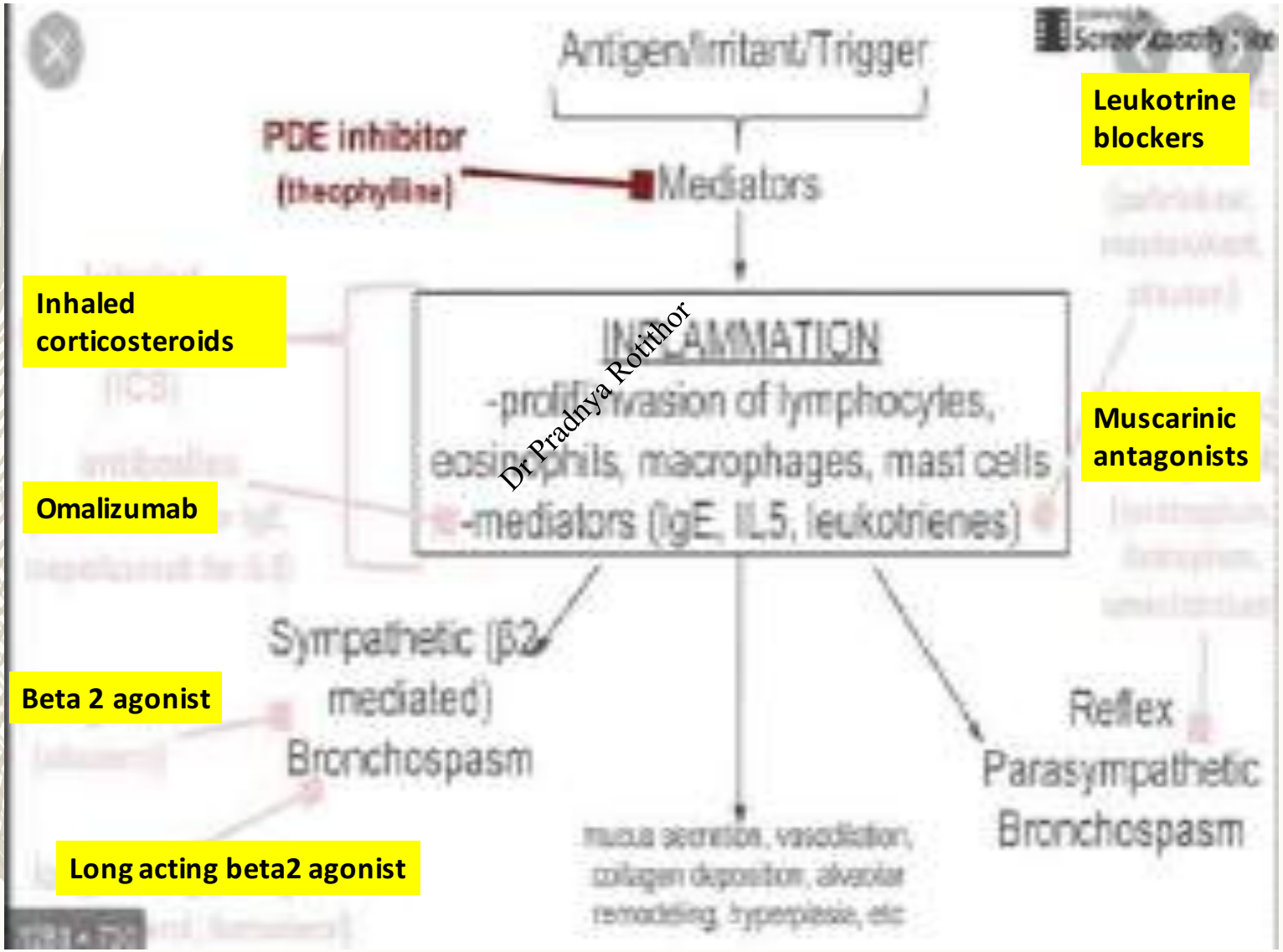
- Local effects
- **Oropharyngeal candidiasis (Use Nystatin – antifungal),**
- **hoarseness of voice,**
- **dysphonia**
- Systemic ADR—appear at
- dose> 600mcg/day
- **Osteoporosis, cataracts, slow growth, hyperglycaemia**
- **Pituitary adrenal suppression**

- ***Inhaled steroids are safe during pregnancy***

Combined inhaler –steroids with beta 2 agonist

Offers more complete symptomatic relief

reduces attacks of acute asthma



Steroids in emergency

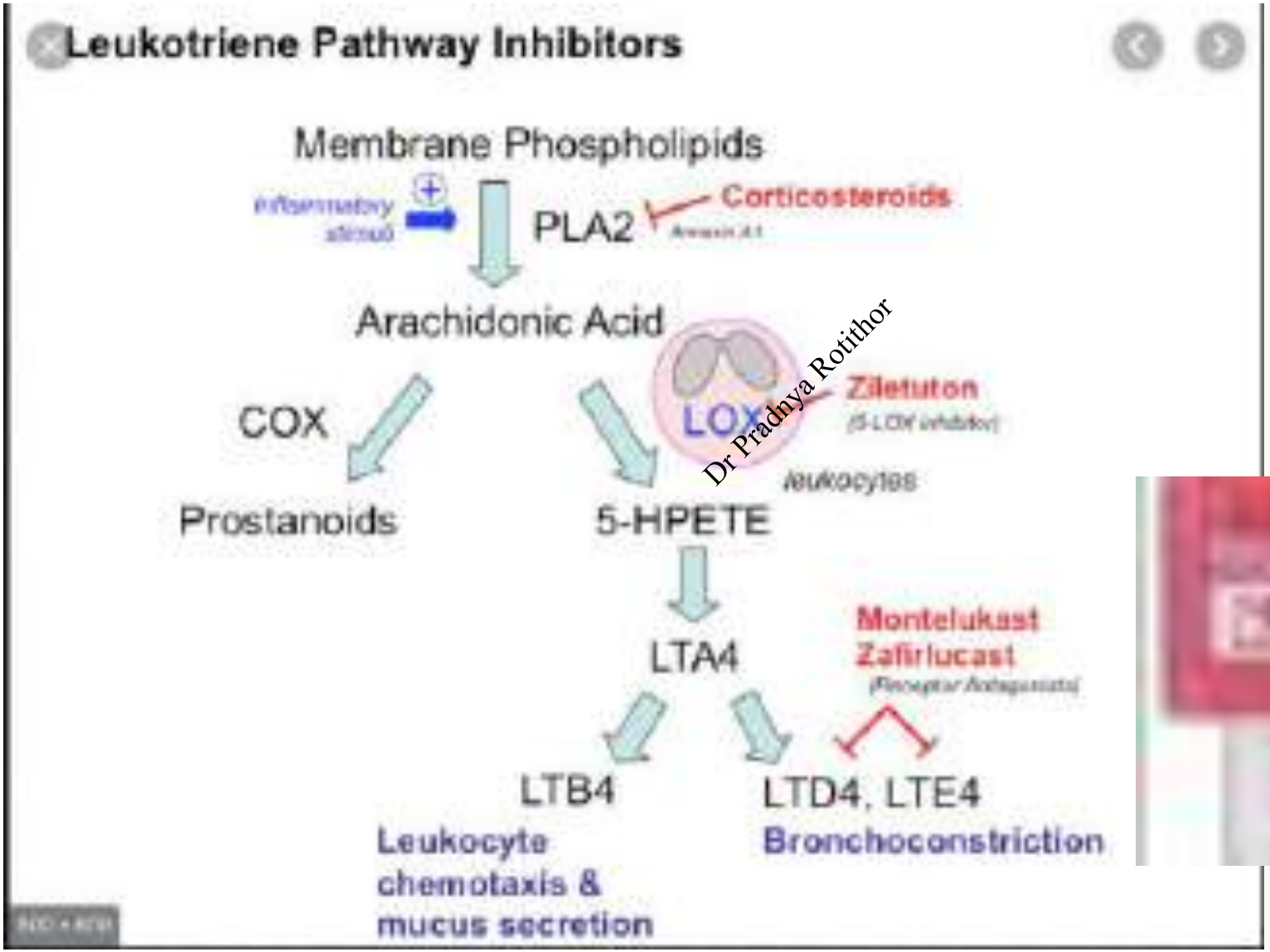
- STATUS ASTHMATICUS
- Hydrocortisone hemisuccinate
- 100 mg IV
- Dexamethasone
- Betamethasone
- IV

Drugs acting on leukotrienes

- Cysteinyl Leukotrienes LT C4 D4 E4
- Hyperreactivity, edema, increased mucus secretion
- LTB4: Neutrophil infiltration
- ASPIRIN INDUCED ASTHMA

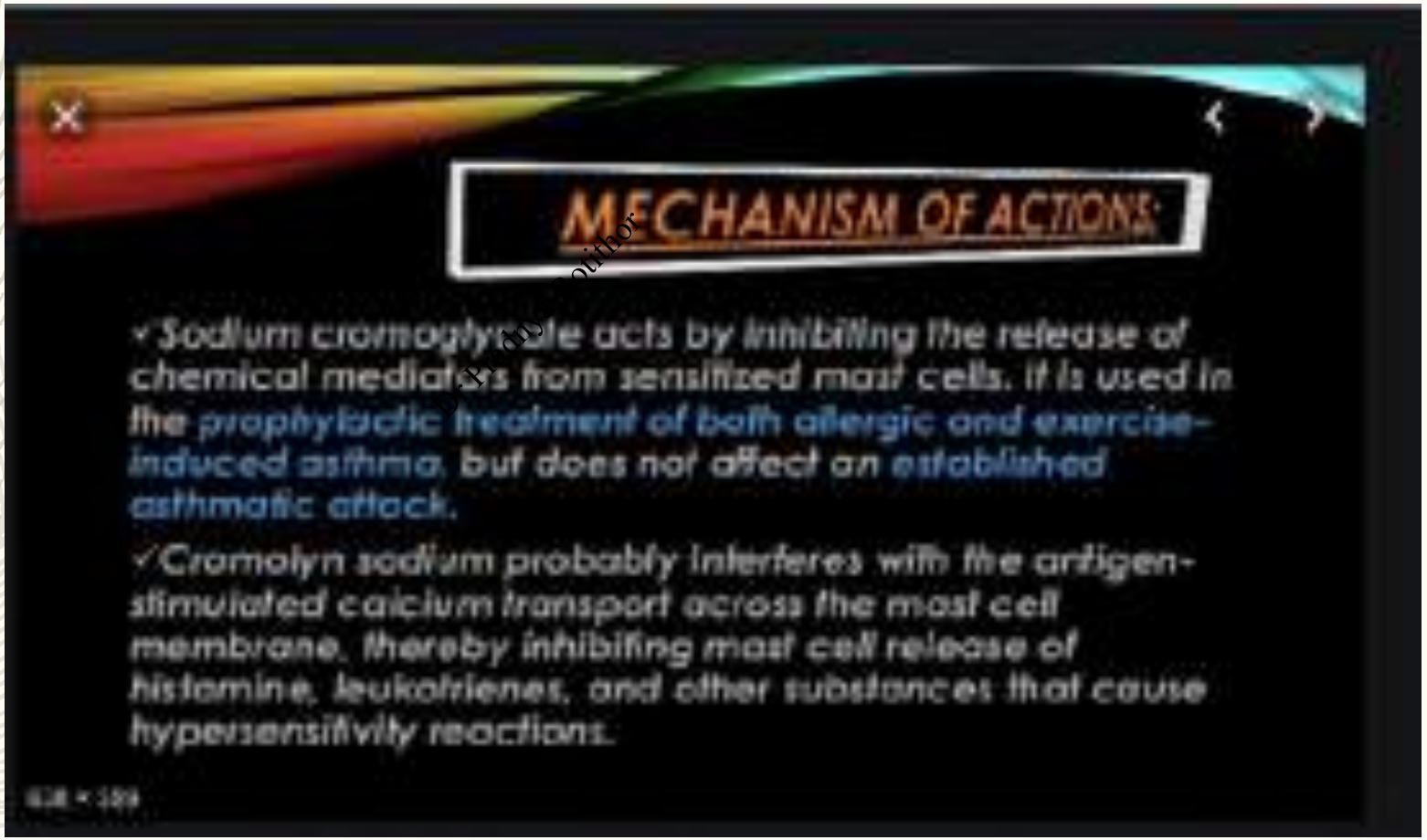
- 5 lipoxygenase inhibitor: decreases LT synthesis Zileuton 600 mg qid ORAL. Short duration, hepatotoxicity
- LT1 receptor antagonist: Zafirlukast, Montelukast: 5-10-20 mg od /bd – oral – valuable in children

Leukotriene Pathway Inhibitors



MAST CELL STABILIZERS

- **Cromolyn sodium (Disodium chromoglycate)**
- **Nedocromil sodium**
  - Asthma
  - Rhinitis (nasal drops), conjunctivitis (eye drops)
- **ASTHMA**
  - ONLY INHALATION – no tablets, no injection
  - For prevention
- **NOT USEFUL AFTER ATTACK**


MECHANISM OF ACTIONS:
✓Sodium cromoglycate acts by inhibiting the release of chemical mediators from sensitized mast cells. It is used in the prophylactic treatment of both allergic and exercise-induced asthma, but does not affect an established asthmatic attack.
✓Cromolyn sodium probably interferes with the antigen-stimulated calcium transport across the mast cell membrane, thereby inhibiting mast cell release of histamine, leukotrienes, and other substances that cause hypersensitivity reactions.

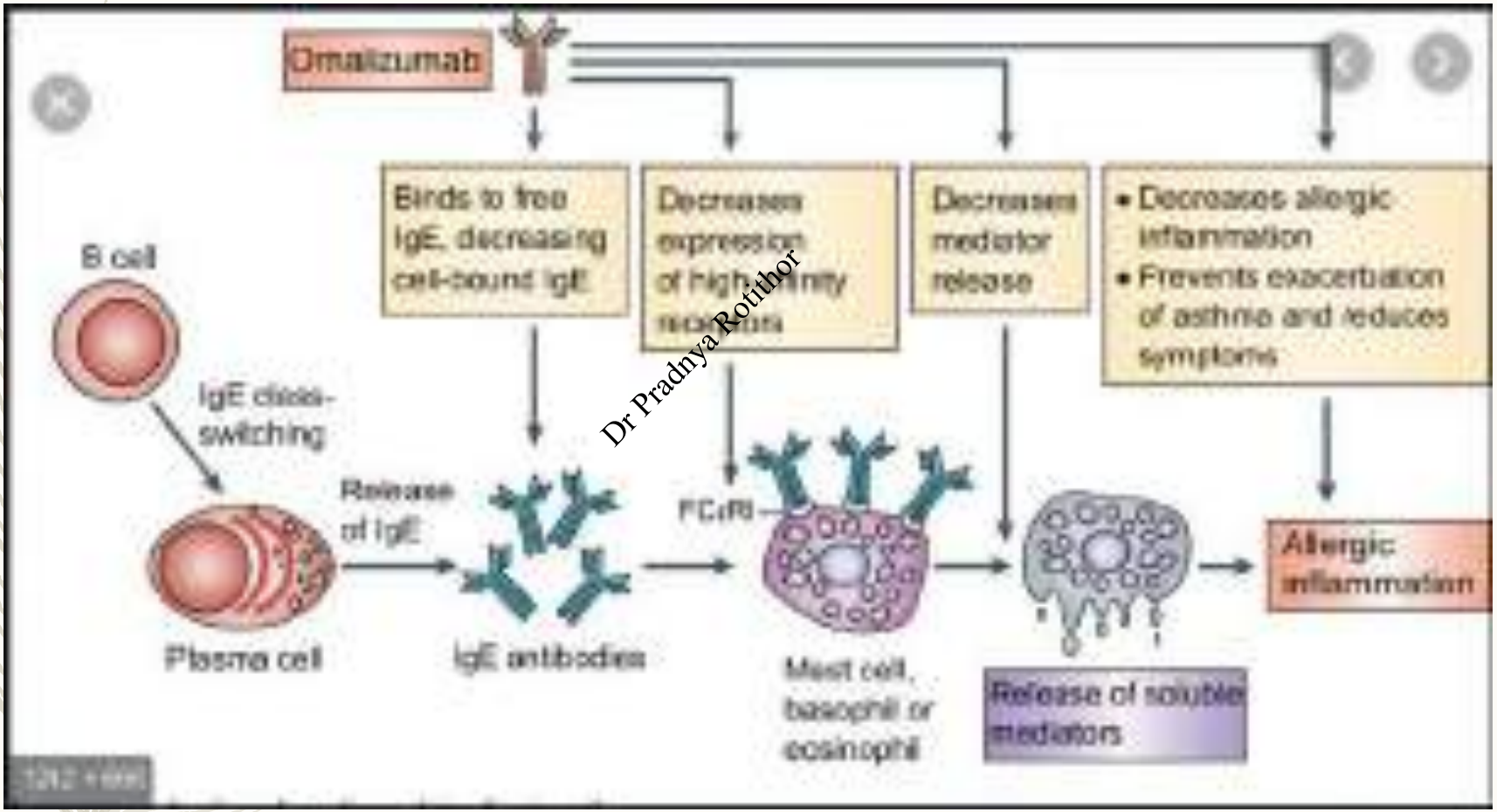
Cromolyn sodium

- 1. Does it dilate the bronchus? x
- 2. Does it prevent antigen-antibody reaction? x
- 3. Does it prevent combining of antigen to antibody? x
- 4. Does it block histamine receptors? (i.e. is it an antihistamine?) x
- 5. Does it prevent degranulation of mast cells? Y

Newer agents and future

- Omalizumab: Anti IgE antibody:
- Inhibits binding of IgE to mast cells
- Expensive –reserved for resistant cases with raised IgE levels

- FUTURE
- K channel openers: CROMAKALIM
- MAb against IL-4,5, cytokines



Pharmacotherapy
of cough

- Mechano receptors in throat
- Stretch receptors in lungs
- Cough centre –in medulla

- Productive cough drains the air passage and is thus useful
- Should not be suppressed
- non productive-due to irritation

Cough is a Protective reflex

It is a symptom

Drugs used in management of cough

1. Pharyngeal demulcents: soothening agents
   Glycerine, liquorice
2. EXPECTORANTS: (Mucokinetic agents)
   - a. Direct acting: Na-K citrate, KI, guaiphenesin
   - b. Reflex acting: NH4Cl, KI
   - c. Mucolytics: Bromhexine,ambroxol
     acetylcysteine carbocisteine
3. Antihistamines—cpm,promethazine, diphenhydramine
4. ANTITUSSIVES: (Cough Suppressants) (for dry cough) opioid or non opioid
5. Adjuvants –bronchodilators –salbutamol terbutaline

Classification

ANTITUSSIVES/COUGH SUPPRESSANTS

a. Opiods and related drugs

- Codeine
- Hydrocodone
- Pholcodeine
- Morphine
- Ethylmorphine

b. Non-opioids

- Dextromethorphan
- Caramiphene
- Noscapine

c. Antihistamines

- Chlorcyclizine
- Diphenhydramine
- promethazine

EXPECTORANTS

a. Directly acting:

Sodium and potassium salts of iodine , citric acid or acetic acid , guaicol, tolu balsam, terpene hydrate, Guaiphenesin

b. Reflexly acting :

i) Saline expectorants : NH_4Cl, $NaHCO_3$

ii) Ipecacuanha syrup

c. Mucolytics :

i) Bromhexine

ii) Acetylcysteine

iii) Carbocisteine

Pharyngeal demulcents :

Lozenges, cough drops , linctuses containing syrup, glycerine , liquorice

Anti-tussives (cough suppressants)

- a) Opioids: Codeine, Pholcodeine
- b) Nonopioids: (Nonnarcotic antitussives)

  Noscapine

  Dextromethorphan MCQ

  Carbetapentane

  Oxeladin

  Pipazethate

Nonopioids - Less CNS depression

MOA

- **Demulcents-** sooth the throat and reduce the afferent impulses

- **Expectorants**– enhance the secretions
  - increase muco ciliary action
  - help to expel out

- **Mucolytic** –break the fibres in the mucus
  - make the mucus less viscid

- **Antitussive** –increase the threshold of cough centre or
  - decrease the peripheral affernt signals
  - or both

Antitussives

- Opioids (Codeine/ pholcodeine):
- *Codeine:*
  - An opium alkaloid; less potent than morphine.
  - Codeine, hydrocodone and hydromorphone are decrease sensitivity of central cough center to peripheral stimuli and decrease mucosal secretions.
  - Suppresses cough center (for 6 h).
  - The antitussive action is blocked by naloxone.
  - Abuse liability is low, but present; constipation is the chief drawnback.
  - Higher doses respiratory depression and drowsiness can occur- driving may be impaired.
  - Dose: adult 10-30 mg frequently used as syrup codeine phos. 4-8 ml.
- *Pholcodeine:*
  - Similar in efficacy as antitussive to codeine.
  - Long acting codeine (12 h); Dose: 10-15 g
- *Ethylmorphine:*
  - Similar to codeine; Dose: 10-15 mg.

Antihistamines

do not have specific antitussive action

act as sedative and anticholinergic-antisecretory

only first generation H1 antihistamines are useful to some extent

second generation drugs –no action as these lack anti cholinergic action

Bromhexine

potent mucolytic --MCQ

~~mucokinetic~~

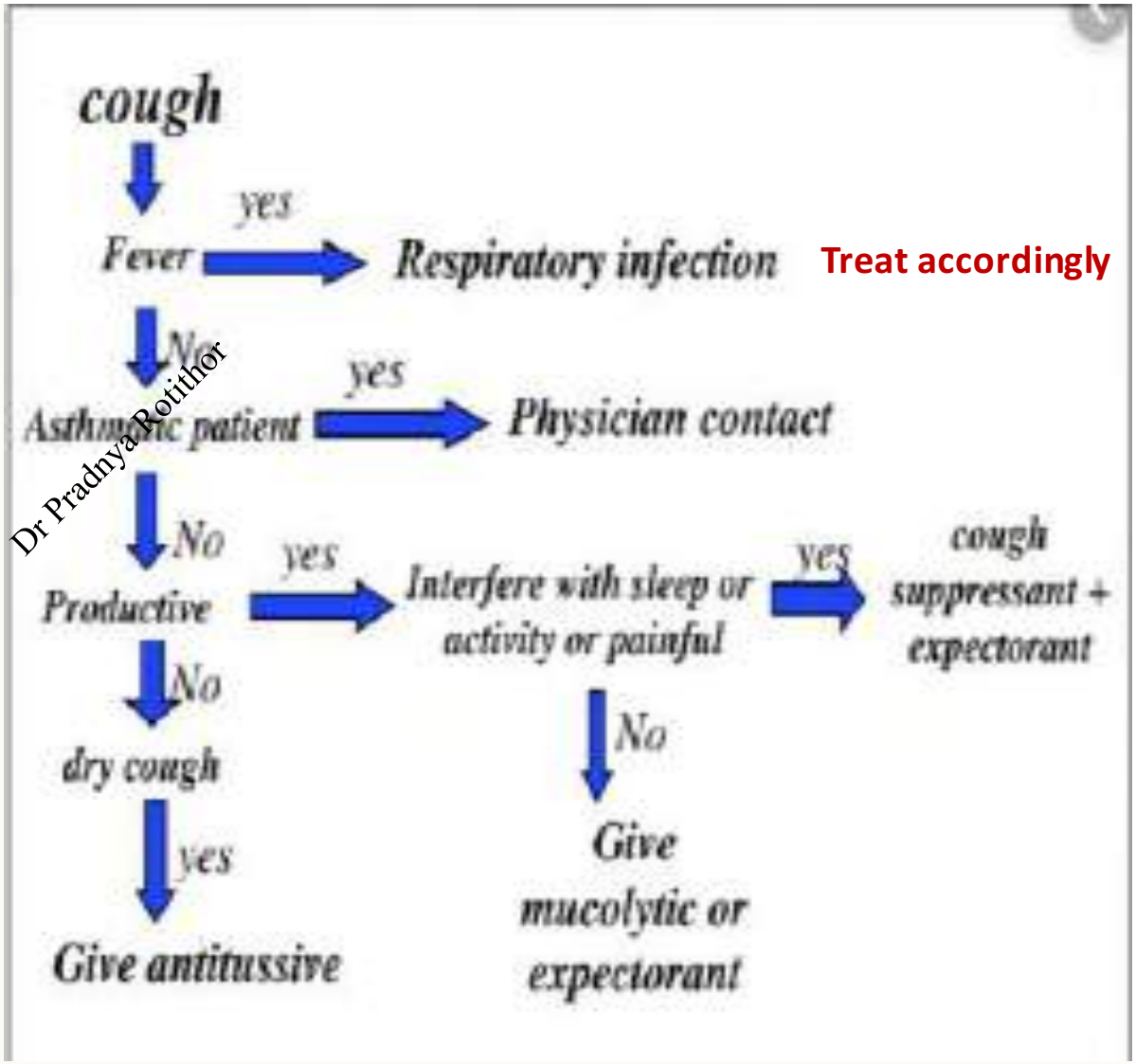
MOA

depolymerises mucopolysaccherides

liberate lysosomal enzymes

thus breaks network of tenacious fibres

How to select a cough syrup?



Bromehexine
guaiphensin
terbutaline

Mucolytic
Expectorant
bronchodilator

Codeine and cpm

Opioid antitussive and H1 antihistamine

Justicia adhatoda

active ingradiant :Bromhexine

mucolytic

Salbutamol guaiphensin

Bronchodilator expectorant

Needs to be put directly into resp tract
Tracheostomy

Antitussive - dextromethorphan

Thank you

Mount Fuji

LOCAL ANAESTHETICS

DR PRADNYA ROTITHOR

PRACTISING DENTISTRY

WITHOUT LOCAL ANAESTHESIA

IS

UNTHINKABLE

LOCAL ANAESTHETICS

Definition – drugs which
upon **topical application**
or
local infiltration to peripheral nerve
block generation and conduction of nerve impulse
in the part supplied by the nerve.

reversible loss of all sensations
without causing structural damage
Without loss of consciousness

mixed nerve - sensory loss
muscle paralysis
loss of autonomic control

	General	Local
Administration	Systemic	Local
Route	Inhalation/Intravenous	Infiltration, Conduction,Spinal, Epidural
Consciousness	Lost	Not lost
Site of action	CNS	Local nerves / nerve roots
Area affected	Whole body	Area of supply
Vital functions	Care is essential	Less
CNS	Depression	Least affected
CVS, RS	Depression	Least affected
Systemic toxicity	Yes	Minimal expected
Use	Major surgery	Comparatively minor surgery or procedures
Drugs	Halothane, Enflurane, Sevoflurane Thiopental, Propofol, Etomidate	Lidocaine, Bupivacaine, Prilocaine, Amethocaine

CLASSIFICATION

1) injectable ---

short duration low potency—

procaine chloroprocaine

intermediate duration and potency-

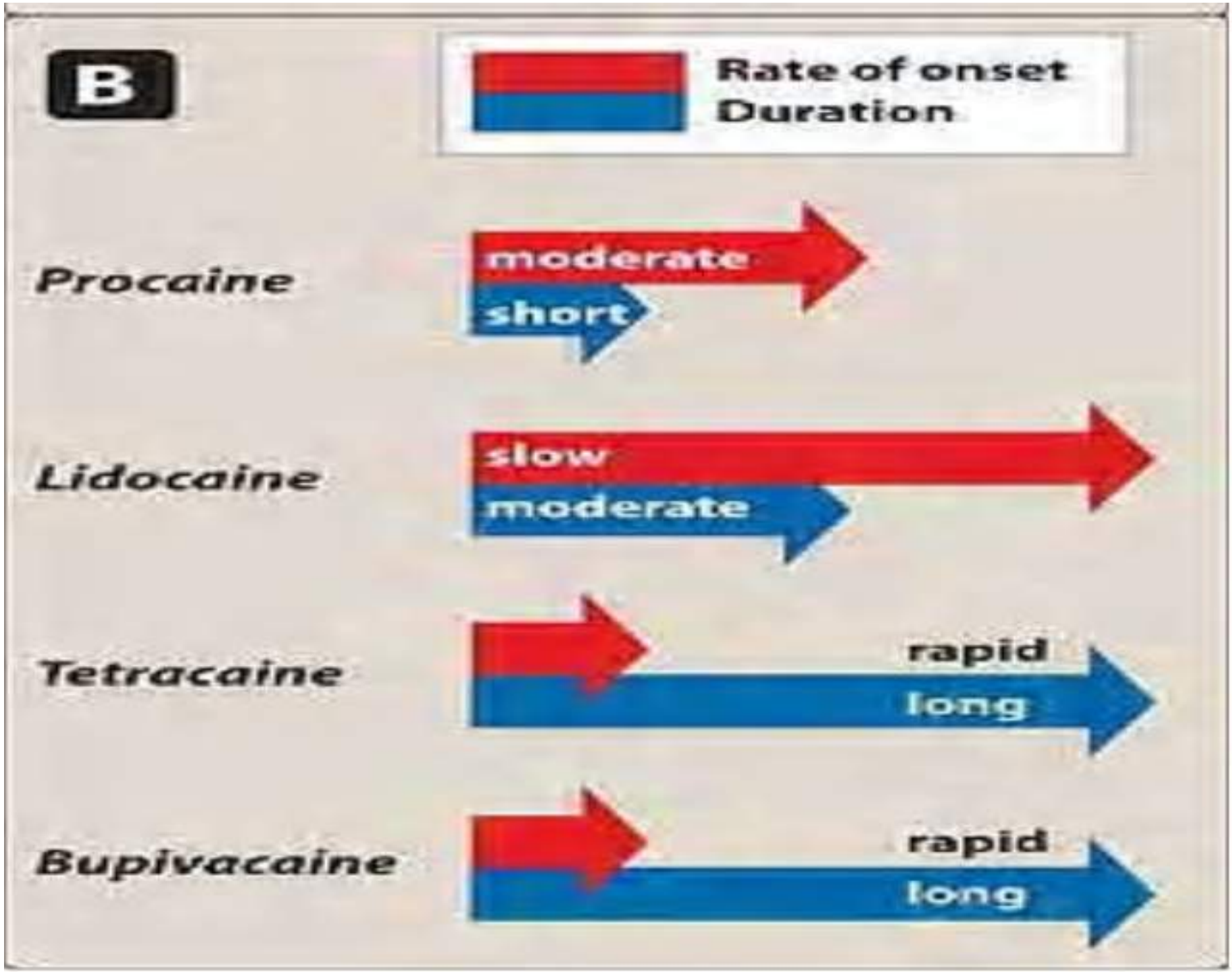
lignocaine, prilocaine

mepivacaine

long acting high potency–

bupivacaine tetracaine

dibucaine etidocaine


B
Rate of onset
Duration
Procaine
moderate
short
Lidocaine
slow
moderate
Tetracaine
rapid
long
Bupivacaine
rapid
long

2) surface anaesthetics

soluble–

Cocaine **lignocaine**

tetracaine **benoxinate**

insoluble–

Benzocaine. **oxethazaine**

butylaminobenzoate[butamben]

classification

- **Amide type**
- **Long acting** -- bupivacaine levobupivacaine
- Etidocaine dibucaine ropivacaine
- **Intermediate acting** –lignocaine prilocaine

- **Ester type** –
- **Long acting** –tetracaine **Intermediate** –cocaine
- **Short acting** –procaine chlorprocaine
- Benzocaine butamben proxymetacaine
- **Miscellaneous** –oxythazaine dylocaine

Easter linked LA

Short duration

Less analgesia

More likely to cause hypersensitivity reaction

Because of PABA conversion

Hence not used for infiltration

More often used as surface agents

Esters versus amides

CROSS REACTIVITY WITHIN GROUP

Ester linked (C=O)

Procaine, chloroprocaine, tetracaine, benzocaine, cocaine

(rapidly hydrolyzed by plasma choline-esterase – short action)

More incidence of hypersensitivity reactions (conversion to PABA)

Amide linked: (Preferred)(NH-C=O)

Lidocaine, prilocaine, etidocaine, mepivacaine**, bupivacaine**, **ropivacaine**, articaine, dibucaine (cinchocaine)

(metabolized by hepatic amidases)

(high first pass metabolism)

Have a look at the spellings !!

Ester-linked ↑ Hypersensitivity reactions (conversion to PABA)	Amide-linked (preferred)
Procaine Chloroprocaine Tetracaine Benzocaine *Cocaine*	Lidocaine Prilocaine Etidocaine Mepivacaine Bupivacaine Ropivacaine Articaine Dibucaine (Cinchocaine)

FACTORS AFFECTING LA

nerve fibre ---type and diametre .

Smaller superficial unmyelinated fibres are more sensitive blocked earlier than larger ones – pain

Myelinated nerves are blocked faster than nonmyelinated nerves .**more Na** ch near nodes of Ranvier

Fibres in **outer layer** are blocked earlier than inner or core fibres

Order of blockade ---pain ---temp sense –touch –deep pressure sense .

On tongue –bitter taste is lost first –sweet –sour – salty .

Nerve fibres that are blocked first are last to recover

Presence of infection/inflammation—↓effect

With adrenaline or without adrenaline

LA drugs --- varying degrees of water and lipid solubility

Nerves –lipid rich

Lipid solubility –neuronal penetration

Water solubility –from injection site →site of action

High lipid low water solubility drugs –less effective

MECHANISM OF ACTION

- **Block generation and conduction of nerve impulse**

By

blocking voltage gated Na + channels

By

Receptor binding –intracellular end of Na channels

This prevents ↑ Na+ permeability of cell membrane

and **depolarisation does not occur**

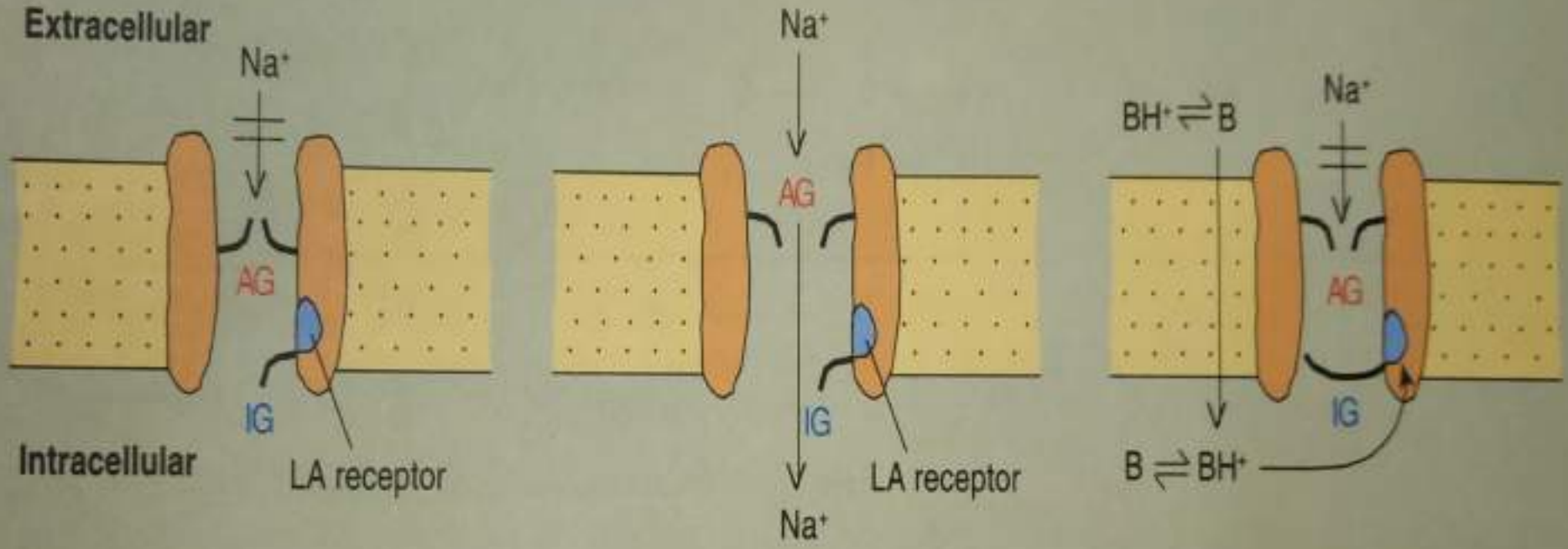
AP is not developed

Membrane stabilizing effect –as resting potential is not affected

↑extracellular K facilitates Ca opposes LA action

Mechanism of action

- **Unionized form enters the cell membrane**
- **Gets converted into cationic form**
- **BLOCKS Voltage gated Na^+ channels** *from inner side of the cell membrane*
- **Inhibit Na entry →**
- **Inhibit depolarization: (DEPOLARIZATION BLOCK)**
- **Block generation of nerve impulse: (GENERATION BLOCK)**
- **Slow the conduction of nerve impulse: (CONDUCTION BLOCK)**
- **MEMBRANE STABILIZING EFFECT**



Resting or Closed State

The Activation Gate (AG) closed. The LA receptor is located in the trans-membrane pore of Na^+ channel.

Activated or Open State

Brief depolarisation opens AG and allows Na^+ permeation.

Inactivated or Blocked State

Ionised (BH^+) form of LA binds to LA receptor. IG closes, flow of Na^+ ceases.

Fig. 16.2 A Model of Voltage-Gated Na^+ Channel Depicting the Site and Mechanism of Local Anaesthetic Action.

LOCAL ACTION

- During inflammation (**infected tooth**)LA fail to relieve pain adequately due to –(-**VIVA Q)**
- **Low PH** –acidic PH produces **more ionization which hinders diffusion of drug**
- **Increased blood flow** rapidly removes LA drugs from site
- **Inflammatory products** may oppose action of LA

Lidocaine / Lignocaine / Xylocaine

- Most widely used: All methods / all types of blocks
- Amide -Less chances of hypersensitivity
- Fairly rapid onset (2-5 min), fairly long duration (60-120), minimal local irritation
- Duration still prolonged by adding epinephrine

- INTRAVENOUS- ANTIARRHYTHMIC – Class IB

- Can cause corneal irritation
- Can cause CNS depression (mental clouding, drowsiness)

ADVANTAGES OF LA WITH ADRENALINE

- **Epinephrine (alpha receptors) →**

1. **Vasoconstriction → Decreases blood flow → Decreases rate of entry of LA → Keeps entering over a long period of time → Long duration of anesthesia – TIME SYNERGISM**

- **Prolongs** action by decreasing **rate of removal** from local site into systemic circulation due to ***vasoconstriction***
- Enhances **intensity** of block
- **Reduces systemic toxicity** of LA drugs
- Provides **bloodless field** for surgery

Disadvantages

1]may raise BP , promote arrhythmias

2] postop tissue oedema and necrosis , **delayed wound healing** –as ***vasoconstriction*** reduces oxygeon supply to tissues

3)injection is **more painful**

4)contraindicated for patients with H/O MI

5) can not use on **end arteries** –fingertips ,pinna

,penis –circumcision **XXX**

ADVERSE EFFECTS

CNS –Dizziness light headedness auditory and visual disturbances disorientation twitchings involuntary movements and finally convulsions ---Rx –inj diazepam

CVS –bradycardia hypotension arrhythmias

Delayed wound healing

Tissue necrosis

Use of vasoconstrictors is contraindicated where there are end arteries –fingertips penis pinna

Ester linked .—may cause rash ,dermatitis

Methylparaben -- preservative allergy reactions

TYPES OF LA

Surface anaesthesia –

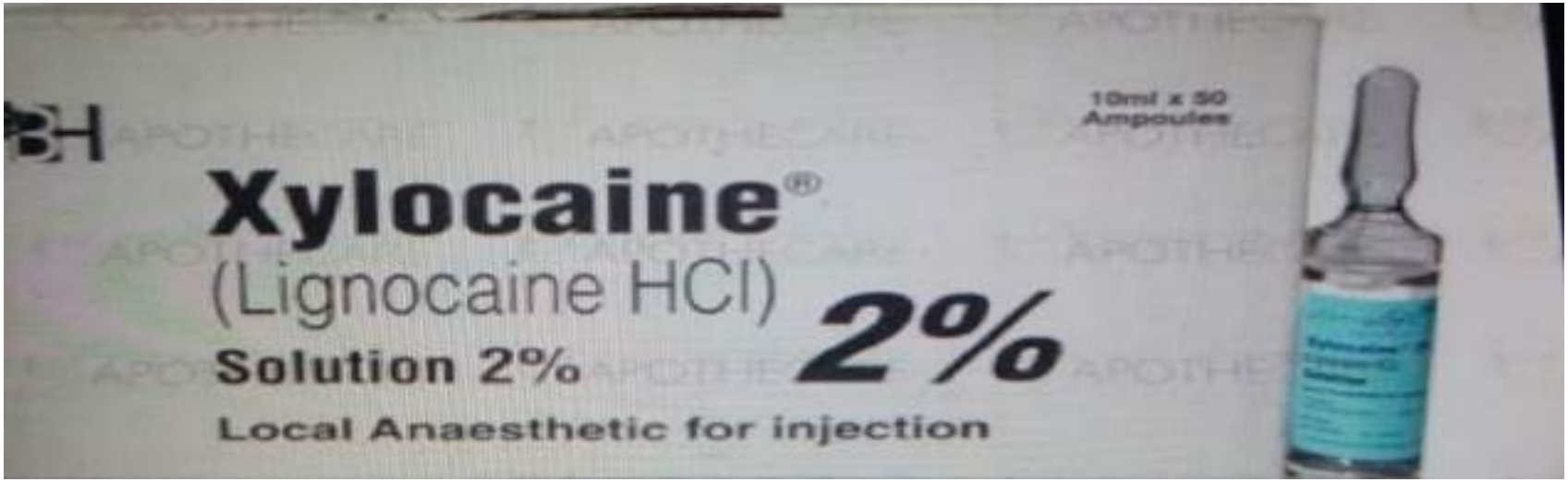
Infiltration anaeshtesia

Conduction block

---field block / nerve block

Spinal **Epidural**

Surface/Topical: Mucus membranes, abraded/ intact
Infiltration anesthesia: (S/C / deeper Injection) **Field block:** **Nerve/trunk/Plexus block:**
Spinal anesthesia (Subarachnoid space)
Epidural anesthesia (Epidural space)
Intravenous regional anesthesia (Bier block) Short surgical procedures (< 60 min) Limbs


10ml x 50
Ampoules
Xylocaine®
(Lignocaine HCl)
2%
Solution 2%
Local Anaesthetic for injection

Surface/Topical: Mucus membranes, abraded/ intact skin

Eye: Lidocaine, Benoxinate, proparacaine, tetracaine

Skin,mm: Lidocaine,Dibucaine, Dyclonine HCl, Pramoxine HCl

Intact skin: Eutectic mixture: Lignocaine + Prilocaine(2.5% each)

Infiltration anesthesia: (S/C / deeper Injection)

(Lidocaine, Prilocaine, Etidocaine, Mepi/Bupi/Ropivacaine)

Field block: (Proximal to site): Forearm, scalp, abdominal wall

Nerve/trunk/Plexus block: (Larger field): Brachial plexus, inferior alveolar nerve (lower jaw tooth extraction), cervical block, lingual block, femoral nerve block

Spinal anesthesia (Subarachnoid space)

Epidural anesthesia (Epidural space)

Intravenous regional anesthesia (Bier block)

Short surgical procedures (< 60 min) Limbs

Lidocaine
Tetracaine
Bupivacaine
Ropivacaine
Prilocaine
Etidocaine

r Pradnya Rotithor

Individual drugs

Cocaine –ocular anaesthesia in 1884

should never be injected

not used now

Procaine -1905 first synthetic LA

McQ –procaine is NOT a surface anaesthetic

now replaced by lignocaine

lignocaine

- 1948
- Most widely used drug
- Versatile drug
- Good for both surface and injectable LA
- **Surface application ,infiltration ,nerve block,epidural spinal and iv regional block LA**
- Cross sensitivity with –ester LAs not seen
- Vasodilatation occurs at the site of injection

- Prilocaine –similar to lignocaine
- But no vasodilatation
- May cause **methamoglobinaemia**
- Uses—infiltration
- nerve block
- iv regional

Eutectic lignocaine/prilocaine

- Unique preparation –**anaesthetises intact skin**

  On surface application **upto 5mm depth** lasting 1-2 hrs

Uses –superficial procedures like –

iv -cannulation

split skin graft harvesting

EMLA –2.5% Lignocaine + 2.5% prilocaine

NDC 76478-289-05 **Rx only**

EMLA®

CREAM (lidocaine 2.5% and prilocaine 2.5%)

For Topical Use Only

5 Grams

OAK

Contains no preservatives.
Apply to intact skin. See package insert for full prescribing information.

(01) 003 76478 289 05 7

Store at 20° to 25°C (68° to 77°F) [see USP Controlled Room Temperature].
Distributed by: **Akorn, Inc.**
Lake Forest, IL 60045
Mfd. for: **Oak Pharmaceuticals, Inc.**

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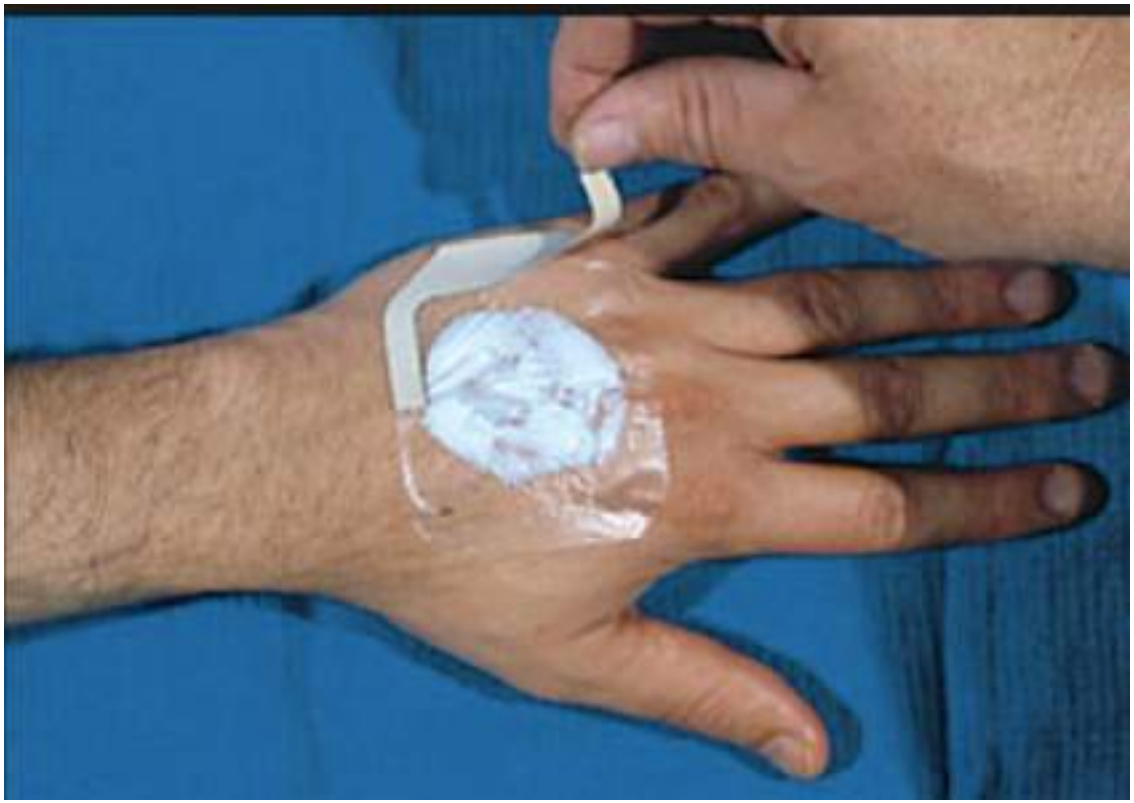


Tetracaine

PABA ESTER

absorption from tracheobronchial spray is high

Uses –**topical application** in eyes nose throat tracheobronchial tree

Bupivacaine

(MCQ)—**most cardiotoxic** LA drug—

prolongs QT interval ,ventricular tachycardia

Contraindicated for iv regional LA

Potent long acting amide linked LA used as--

Infiltration **Nerve block** **Epidural**

Contraindicated for iv regional LA

Ropivacaine –same as bupivacaine but less cardio toxic


30 mL Single-dose
Preservative-Free
Bupivacaine
HCl Inj., USP
0.5% (5 mg/mL)
For NERVE BLOCK, CAUDAL and
EPIDURAL ANESTHESIA.
Not for spinal anesthesia.
HOSPIRA, INC., LAKE FOREST, IL 60045 USA
LOT 34-366-DK


BUPIVACAINE
HYDROCHLORIDE
SENSORCAINE®
0.5% Heavy
5mg/mL

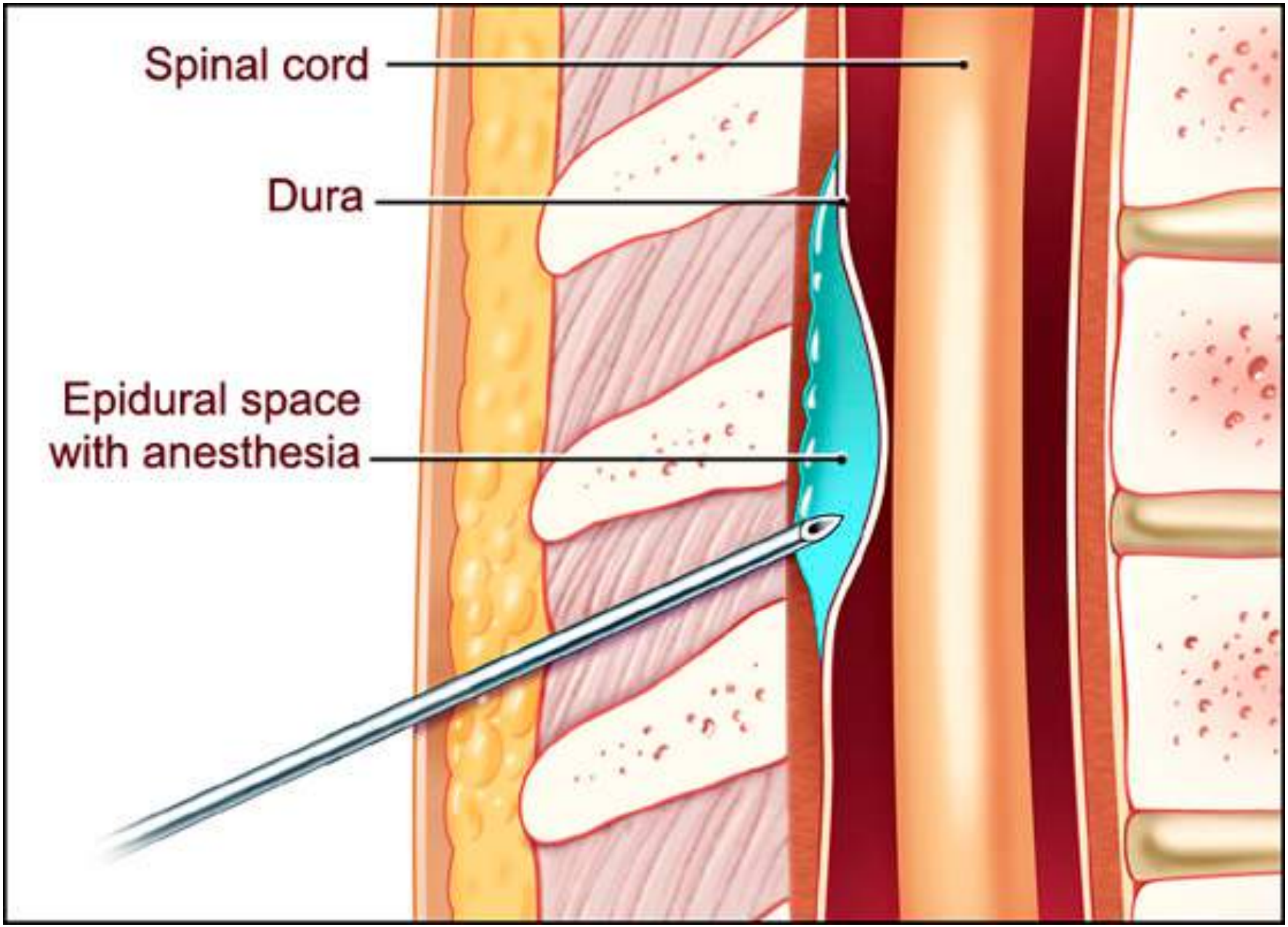
bupivacaine

Epidural –most popular in labour analgesia – vaginal delivery

High lipid solubility ,spreads more in tissue than in blood ,less likely to reach foetus to produce depression

.25 to .5% solution –epidural

.75% may cause cardiac arrest hence NOT used


Spinal cord
Dura
Epidural space
with anesthesia

Benoxinate –0.4% solution used as surface anaesthetic in eye
Less irritant to eye

Oxythazaine –even at low gastric ph it ionises to a small extent --**MCQ**

topical use in GIT –symptomatic relief in gastritis

Mucaine gel antacid preparation

PRECAUTIONS

Take history –allergy to LA in past if any
current medicines pt is taking

Perform --Test for allergy

Aspirate lightly **before injecting** to r/o intravascular entry

Inject slowly

Wait patiently –latent period

Watch for facial twiching **, pulse** –tachycardia

Do not exceed the dose especially in children

Prior instruction to patient –4 hr NBM/light diet --optional

Drug interactions –beta blockers reduce hepatic metabolism of LA s

Remember contraindications for use of adrenaline

LA IN DENTISTRY

nerve block for branches of lingual nerve

Or infiltration /regional block for various operatives

Total dose needed is smaller

--so chances of toxicity are less

but safety margin is less in children as dosage is almost similar to adults

topical application for painful oral ulcers and other superficial lesions

LA lasts for **shorter** duration in **upper jaw** due to high vascularity

Pulpal anaesthesia is brief than in soft tissues

2% lignocaine with 1: 80000 adrenaline --standard dental preparation

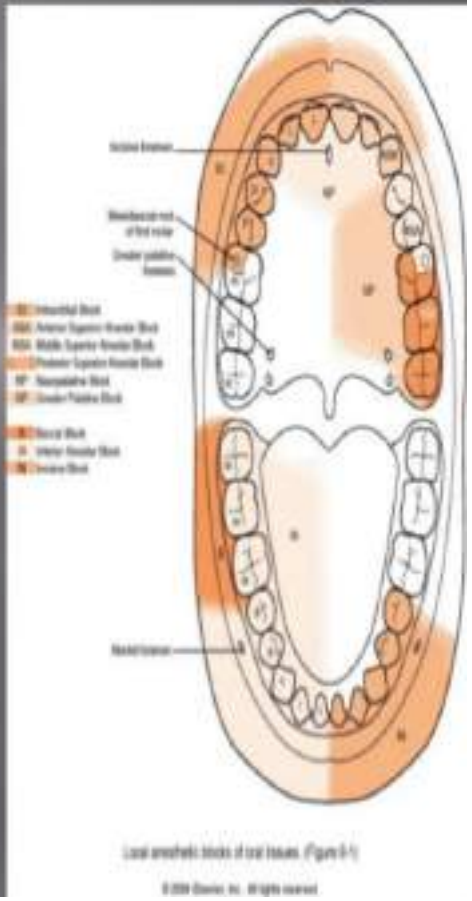
Types of Nerve Anesthesia

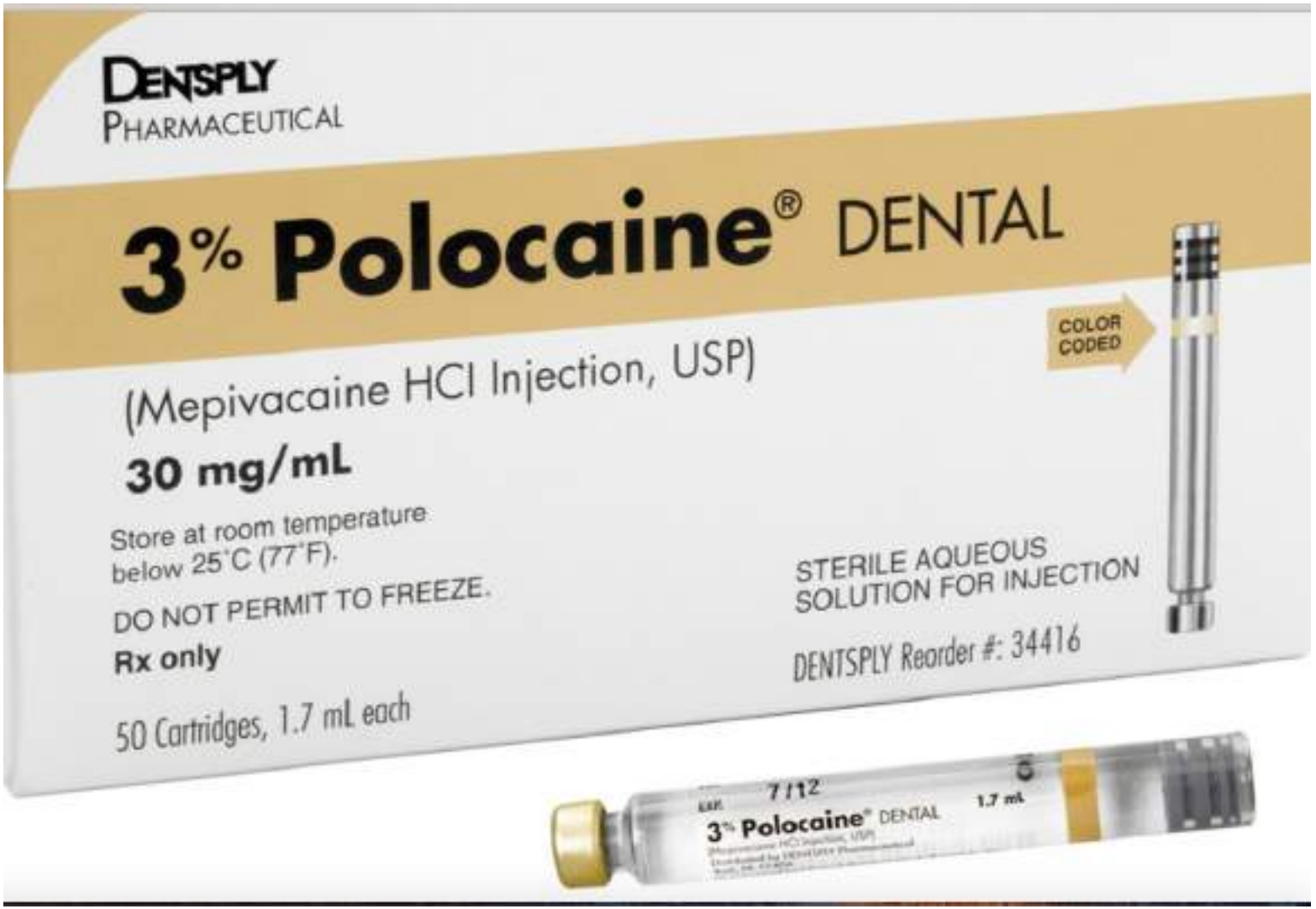
Maxillary

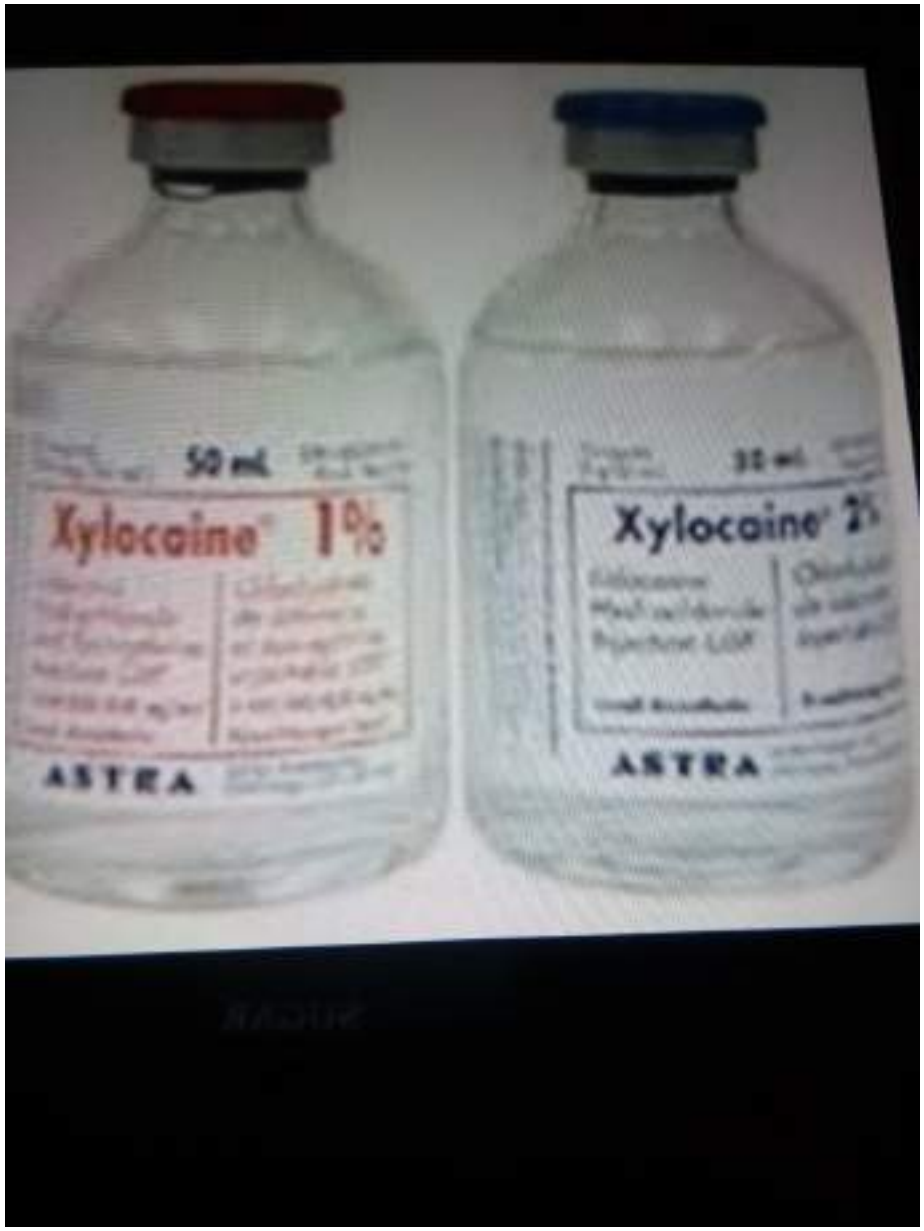
A. posterior superior alveolar block
B. middle superior alveolar block
C. anterior superior alveolar block
D. greater palatine block
E. infraorbital block
F. nasopalatine block

Mandibular

A. inferior alveolar block
B. buccal block
C. mental block
D. incisive block
E. Gow-Gates mandibular nerve block




DENTSPLY
PHARMACEUTICAL
3% Polocaine® DENTAL
(Mepivacaine HCl Injection, USP)
30 mg/mL
Store at room temperature
below 25°C (77°F).
DO NOT PERMIT TO FREEZE.
Rx only
50 Cartridges, 1.7 mL each
COLOR
CODED
STERILE AQUEOUS
SOLUTION FOR INJECTION
DENTSPLY Reorder #: 34416
7112
3% Polocaine® DENTAL
1.7 mL



precaution to cope with any adverse reactions.

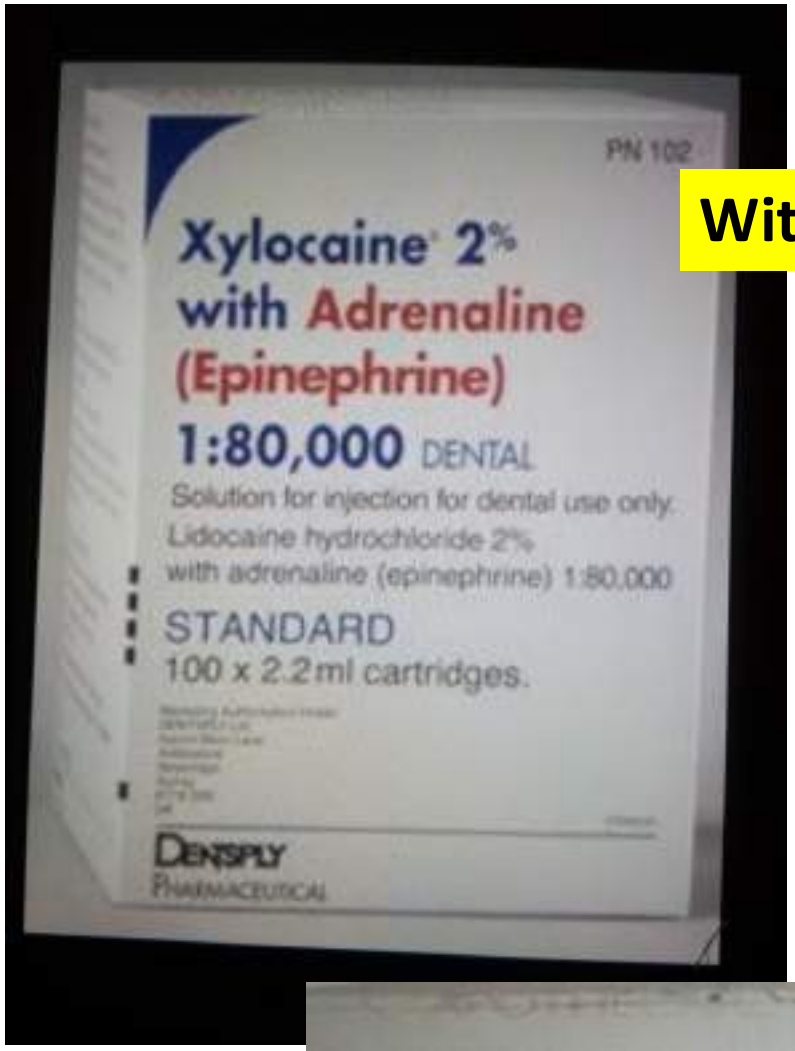
Each ml contains:

Lignocaine Hydrochloride I.P.	21.3 mg
Sodium Chloride I.P.	6.0 mg
Methylparaben I.P. (as preservative)	1.0 mg
Water for Injection I.P.	q.s.

Dose: As directed by the Physician.

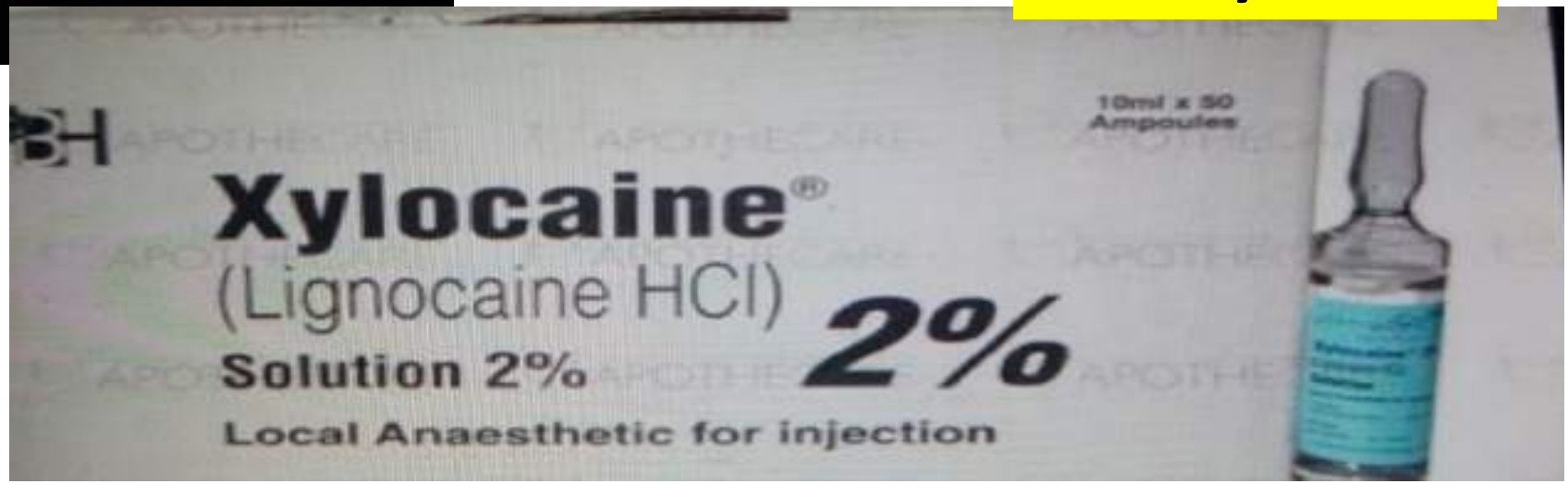
Store in a cool place, protected from light.

MAXIMUM 10 WITHDRAWALS



With epinephrine

Plain xylocaine



MUHS --LAQ

- Classify local anaesthetics .Describe the mech of action ,adverse effects and various routes of application of lignocaine.

- What are the advantages and disadvantages of combining adrenaline with lignocaine as LA

SAQ

- Explain rationale of combining lignocaine with adrenaline.
- Mention any 4 local anaesthetic agents .Describe mode of action and adverse effects of lignocaine .