

Organophosphorous poisoning

Insecticidal

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- Derivatives of phosphoric or phosphonic acid
 - Chemical organic insecticide
 - **A**lky~~l~~ : linear side chain
 - **A**r~~r~~yl: ring side chain

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- Absorbtion
 - Distribution: lipophilic -> BBB
 - Metabolism
 - Elimination

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- Action resemble that of **physiostigmin** and **neostigmin**

Mechanism of action

- AChE....role : $\text{Ach} + \text{H}_2\text{O} \rightarrow \text{choline} + \text{acetate}$
- Powerful inhibitors of **carboxylic esterase enzymes** including **acetylcholinesterase [true cholinesterase] and pseudocholinesterase.**
- phosphate group + hydroxyl group of Serine residue at enzyme's active[esteratic] site (**strong bond**) → Deactivation of ChE → accumulation of Ach at ganglionic, parasympathetic and neuromuscular synapses → overstimulation

Ach

H₂O

Anionic site Esteratic site

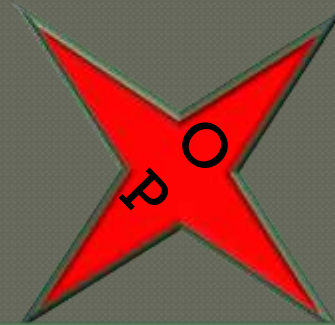
acetylcholinesterase

choline



**Acetic
acid**

Deactivation of ChE

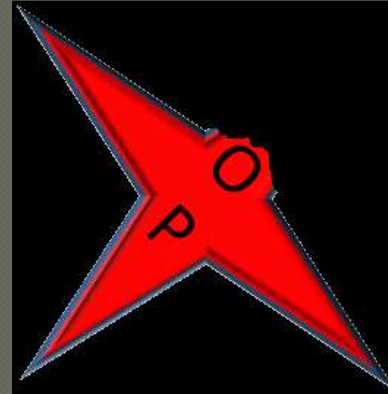


Anionic site Esteratic site

acetylcholinesterase

Deactivation of ChE

Ach



Anionic site Esteratic site

acetylcholinesterase

○ Types of receptors

- Muscarinic : located on effector tissues in ANS [all parasympathetic and few sympathetic effector tissues]
- Nicotinic : Located on the postganglionic cell membranes of sympathetic and parasympathetic nervous system, skeletal NM junction.

toxicity

- Muscarinic effects: on organs/system
 - GIT
 - Urinary bladder
 - Pupils
 - RS
 - Cvs
 - Glands
 - Ciliary body

DUMBBELS

- **D**iarrhoea
- **U**rination
- **M**iosis
- **B**ronchorrhea bronchoconstriction
- **B**radycardia
- **E**mesis
- **L**acrymation
- **S**alivation, **S**weating

Killer “ B ”

Nicotinic effects

- Striated muscles
- Sympathetic ganglia: opposite to muscarinic effects.

However muscarinic effects are prevalent.

MATCH

- **M**uscle weakness
- **A**reflexia
- **T**achycardia
- **C**ramps
- **H**ypertension

CNS manifestation

- Drowsiness
- Restlessness
- Slurred speech
- Weakness
- Ataxia
- Tremors
- Confusion, convulsion, coma
- Headache, hyperthermia

○ **DR'S WATCH**

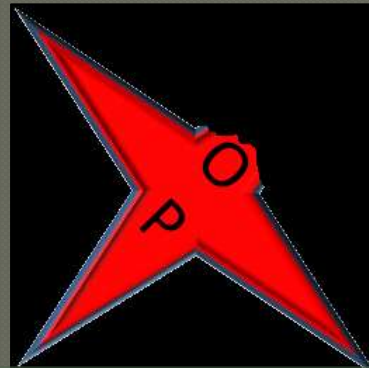
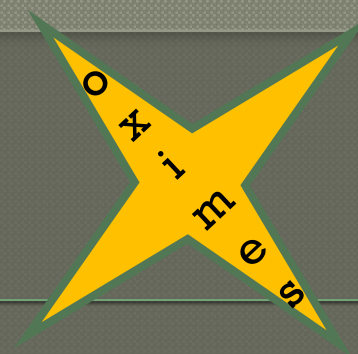
DIAGNOSIS

- Cholinesterase level [25% decrease]
 - RBC
 - Plasma
- Hyperglycemia
- Hyperamylasemia
- P-Nitrophenol test of Urine
- Glycosuria
- TLC

Management

- Prevent further absorption
- Airway
- Stomach wash
- Atropin: anti muscarinic
- Oximes: reactivators
 - Pralidoxime
 - Pralidoxime chloride 2PAM
 - Pralidoxime iodide 2PAMI
 - Methylene sulphate
 - Diacetylmorphine oximes DAM
 - Hagedorn oximes [nerve gases]
 - Sugar oxime [BBB]
- Anticonvulsant





Anionic site Esteratic site

acetylcholinesterase

Intermediate syndrome

- Muscle weakness
- Paralysis
- Acute respiratory paresis

Proximal limbs involved

OPIDP

OP INDUCED DELAYED POLYNEUROPATHY

- Ataxia
- Weakness
- Toe drop
- Flaccid paresis
- Areflexia

distal limbs involved

Carbamate

- Except PALM