

Toxidromes: An approach to the poisoned patient



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Disclosures

- Research grants from NIH, Hans and Mavis Psychosocial Foundation, e-ink corporation, Defense Advanced Research Projects Agency and Bill and Melinda Gates Foundation
- Dr. Chai has equity stake in Biobot Analytics, a wastewater based epidemiology company

Toxidrome?

- We don't know what they took, or when they took it.
- What findings point to a potential ingestion?
- What are the symptoms that best correlate with a poisoning?



Goals

Recognize a constellation of symptoms that correspond with a specific toxidrome(s) or poisoning



History

When was the ingestion?

What did they take?

Co-ingestants?

Medications they have access to?

How did they get to the hospital?

History of prior attempts?



Exam



Mental Status

Pupils

Mucous Membranes

Bowel Sounds

Bladder

Clonus, reflexes



Diagnostics

- CBC
- Chemistry
- Liver function
- Salicylates
- Acetaminophen
- Ethanol
- Ucg



- Fingerstick
- EKG (rate, intervals)



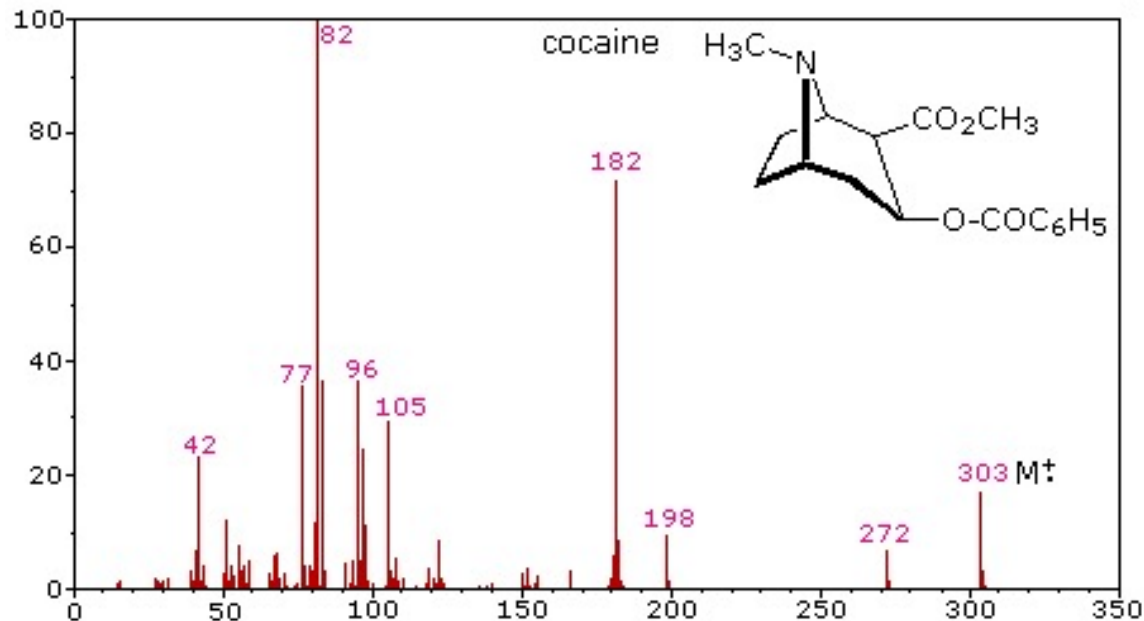
... A word about drugs of abuse screening

- **Know the matrix** you are testing (urine? Hair? Blood? Stool? Nails?) and its associated limitations.
- Understand your testing technique
- **DO NOT** get drug testing for medicolegal purposes



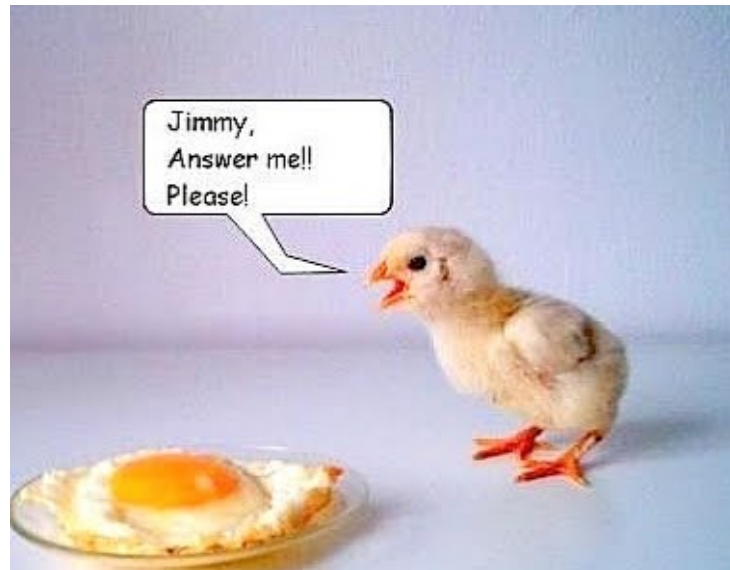
How about specific drug testing?

Initial Test Analyte	Federal Cutoff Concentrations (ng/mL)
Marijuana metabolites	50
Cocaine metabolites	150
Opiate metabolites (codeine/morphine ¹)	2,000
6-Acetylmorphine (6-AM)	10
Amphetamines ² (Amphetamine /methamphetamine)	500
Phencyclidine (PCP)	25
Methylenedioxyamphetamine (MDMA)	500



Case 1

- 20yo male brought to ER by friends
- Unresponsive
- VS: 98.6, 80, 110/75, 10, 93% 4L NC
- Pinpoint pupils, skin cool.



Opioid Intoxication

Coma, Respiratory depression, PINPOINT PUPILS, apnea



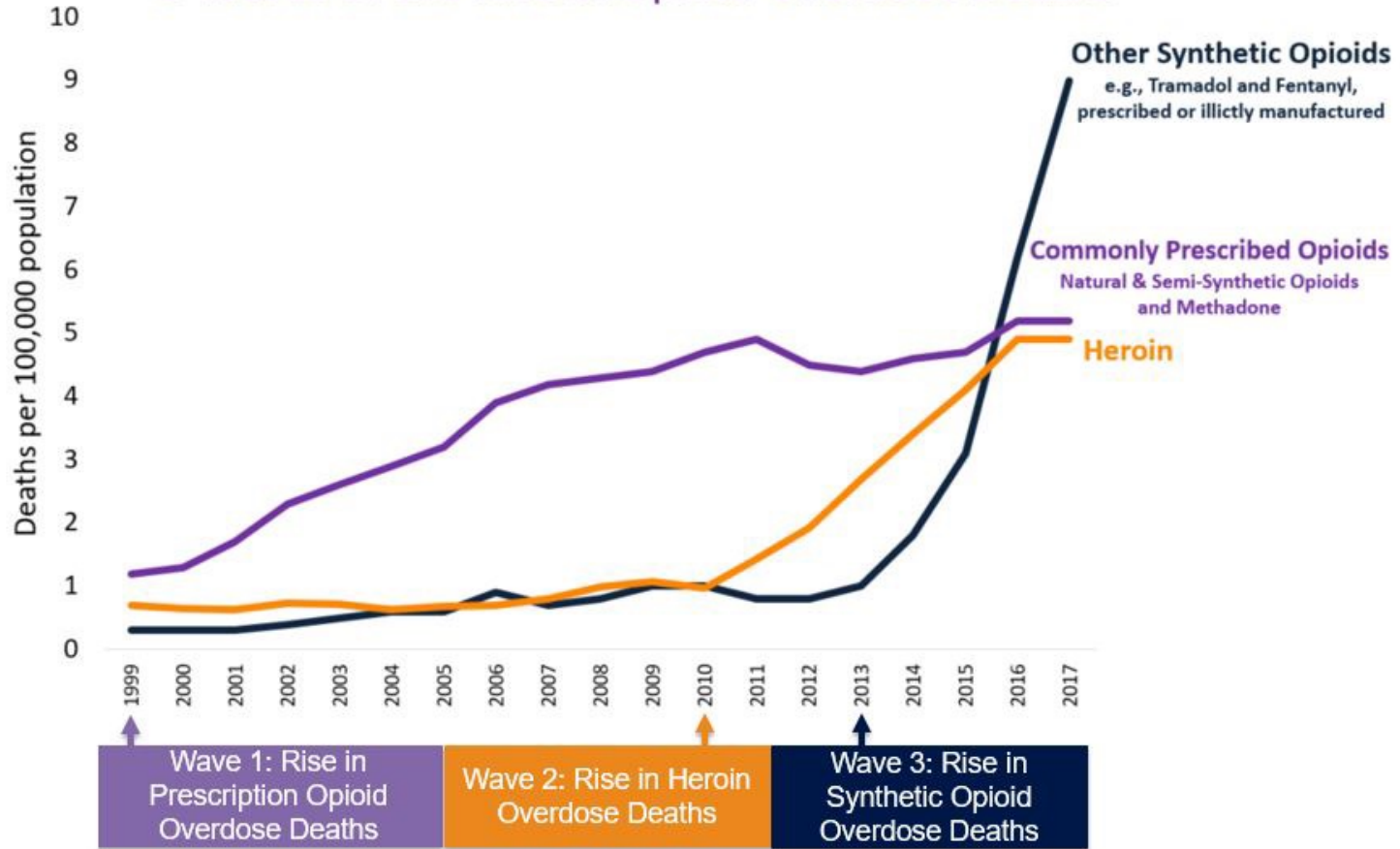
Percocet
Vicodin
Morphine
Heroin
Dilaudid
Oxycodone
Zohydro

Tramadol
Bupenorphine
Fentanyl
Methadone
Codeine

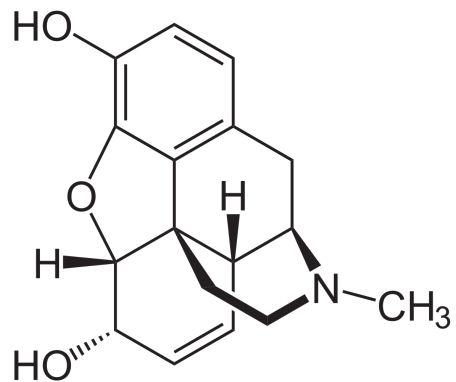
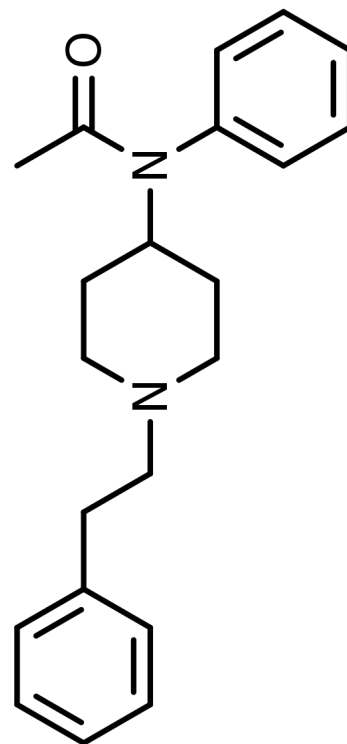
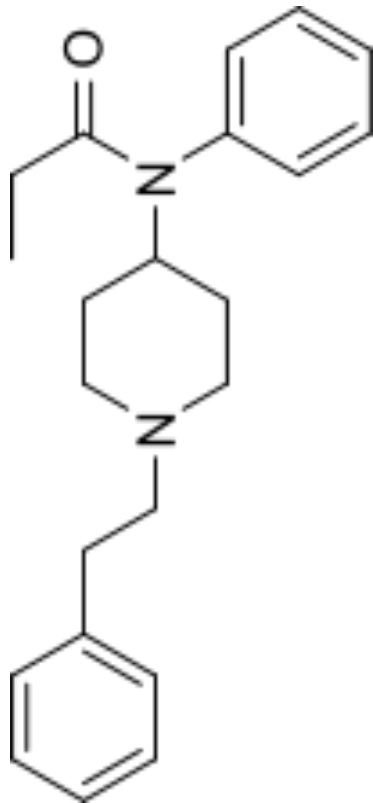
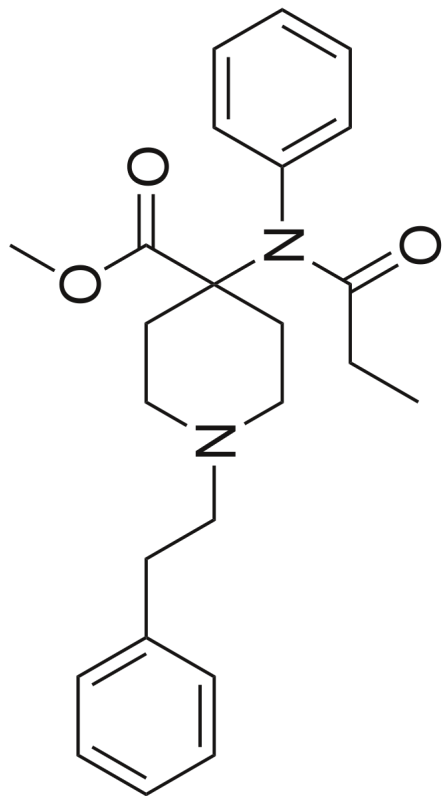


Fentanyl

3 Waves of the Rise in Opioid Overdose Deaths

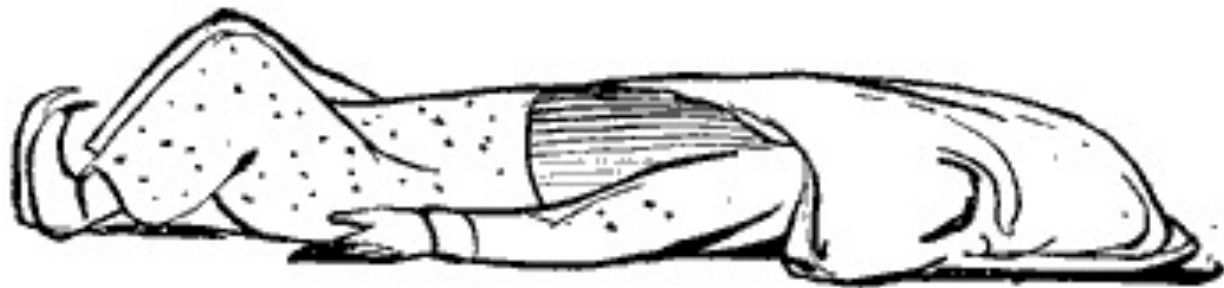


SOURCE: National Vital Statistics System Mortality File.



Case 2

- 20yo male brought to ER by friends
- Sommolent, minimally arousable to noxious stimuli
- VS: 98.6, 80, 110/75, 10, 93% 4L NC
- Pupils 4mm reactive, skin cool.

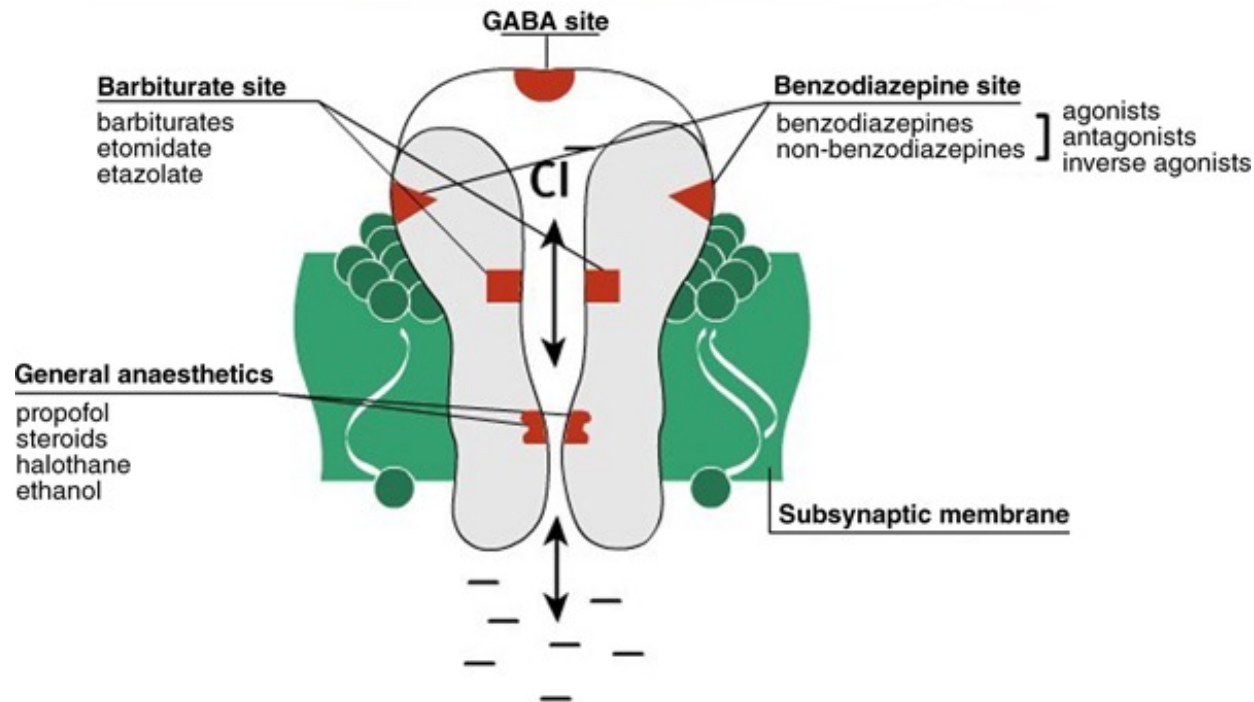


Sedative/hypnotics

Coma, Respiratory depression, NORMAL PUPILS, apnea

NO RESPONSE TO NARCAN

Benzodiazepines
Neurontin
Melatonin
Barbiturates
Gammahydroxybutyrate
Zolpidem
Ethanol



Case 3

- 20yo male brought to ER by police
- Diaphoretic, screaming, in handcuffs, biting
- VS: 101, 160, 180/95, 25, 97% on RA
- Pupils 7mm, no tremor or clonus



Sympathomimetic

Surge of sympathetic system: hyperthermia, hypertension,
tachycardia

AGITATED DELIRIUM, DIAPHORESIS, NO TREMOR

Cocaine
Ecstasy (MDMA)
Amphetamines
Cathinones (bath salts)
Ephedra
Adderall
Concerta



Case 4

- 20yo male found by police wandering the streets
- Confused, mumbling
- VS: 100.9, 140, 110/75, 18, 98% 2L NC
- Pupils 5mm, dry skin, dry mm, no clonus, distended bladder



Anticholinergic

Muttering delirium, dry skin, mydriasis, dry mucous membranes,
dec bowel sounds



Quetiapine
Diphenhydramine
Atropine
Benztropine
Antipsychotics
Tricyclic Antidepressants

Case 5

- 20yo male brought in by EMS
- h/o Depression, left suicide note, found with empty pill bottle
- VS: 100.9, 140, 110/75, 18, 98% 2L NC
- Mumbling, clonus, hyper-reflexia, flushed skin



Serotonin Syndrome

Tremor, flushed skin, rigidity, febrile, diaphoretic

INDUCIBLE OR SPONTANEOUS CLONUS, WITH AGITATION



SSRIs, SnRIs

Atypical antipsychotics

Trazodone, buspirone

MAOI

Linezolid, Isoniazid, ritonavir

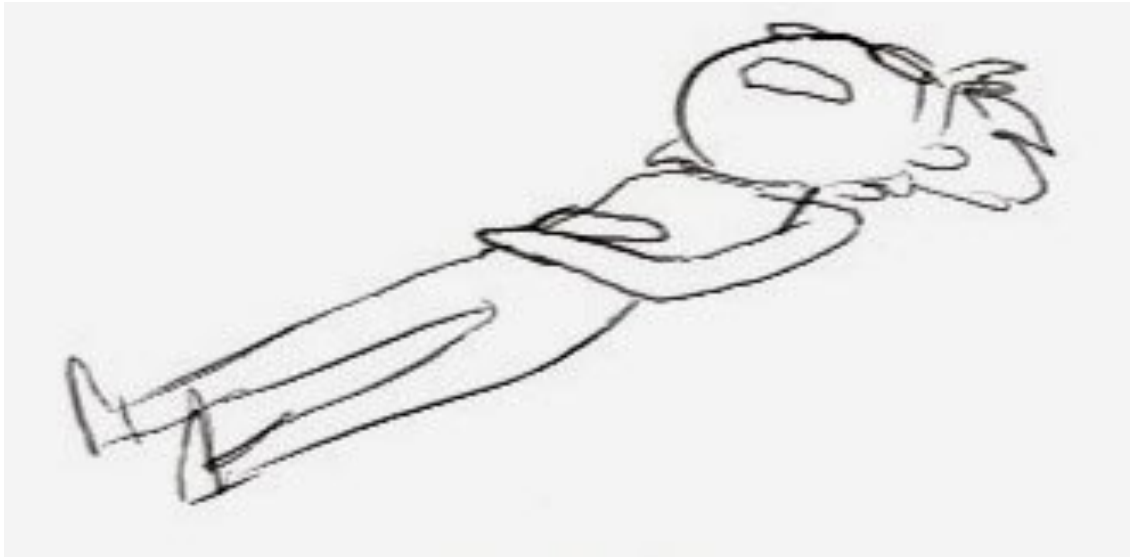
Meperedine, fentanyl, tramadol

Triptans

Dextromethrophan

Case 6

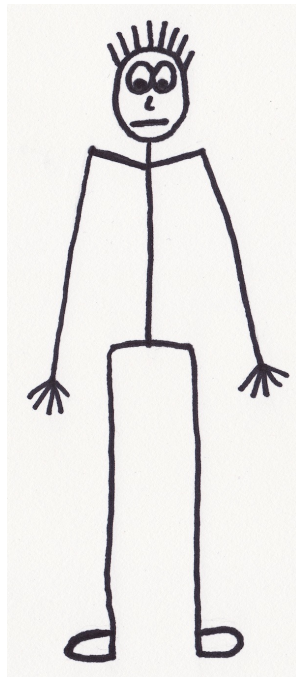
- 20yo male brought in by EMS found in bed
- Schizophrenic, increased meds recently
- VS: 102, 120, 180/90, 20, 90% 4LNC
- Rigid, tremors, hyperthermic



Neuroleptic Malignant Syndrome

Hyperthermia, rigidity, tachycardia, dopamine receptor blockade

LEAD PIPE RIGIDITY, ESCALATING DOSE OF ANTIPSYCHOTIC OR
WITHDRAWAL OF DOPAMINERGIC AGENT



Atypical antipsychotics
Haldol
Quetiapine
Parkinson's medications
Reserpine

Case 7

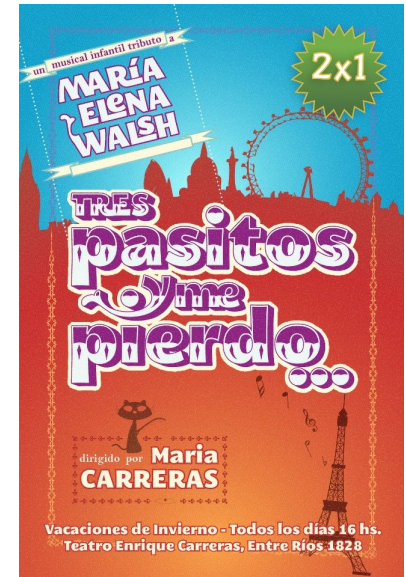
- 20yo male found wandering near CHL covered in feces
- h/o schizophrenia
- VS: 98.6, 40, 110/75, 18, 85% 2L NC
- Diaphoretic, SOB, foaming at mouth, diarrhea



Cholinergic

The killer B's: bronchorrhea, broncospasm, bradycardia
Sludge drainage from every orifice

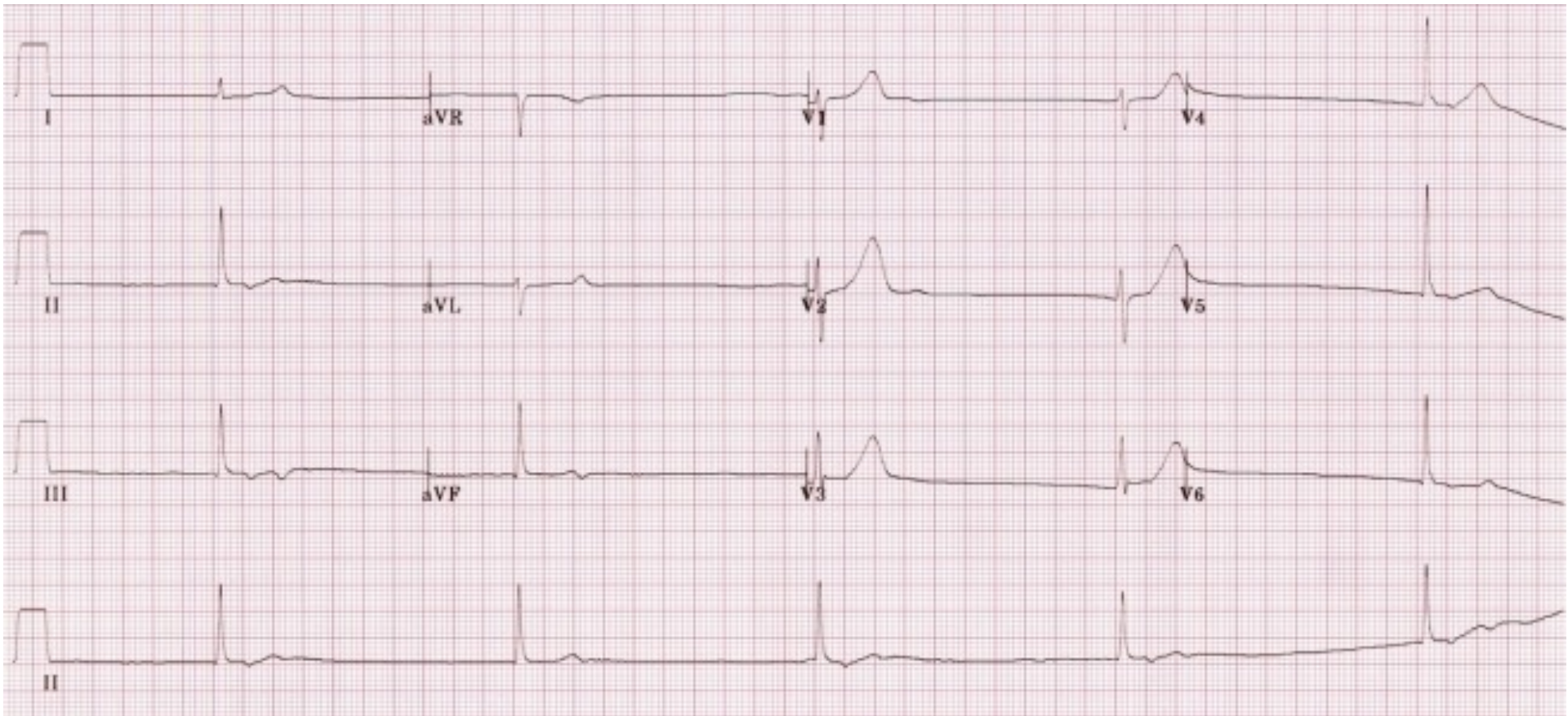
Organophosphates
Carbamates
Sarin gas
V agents



Case 8

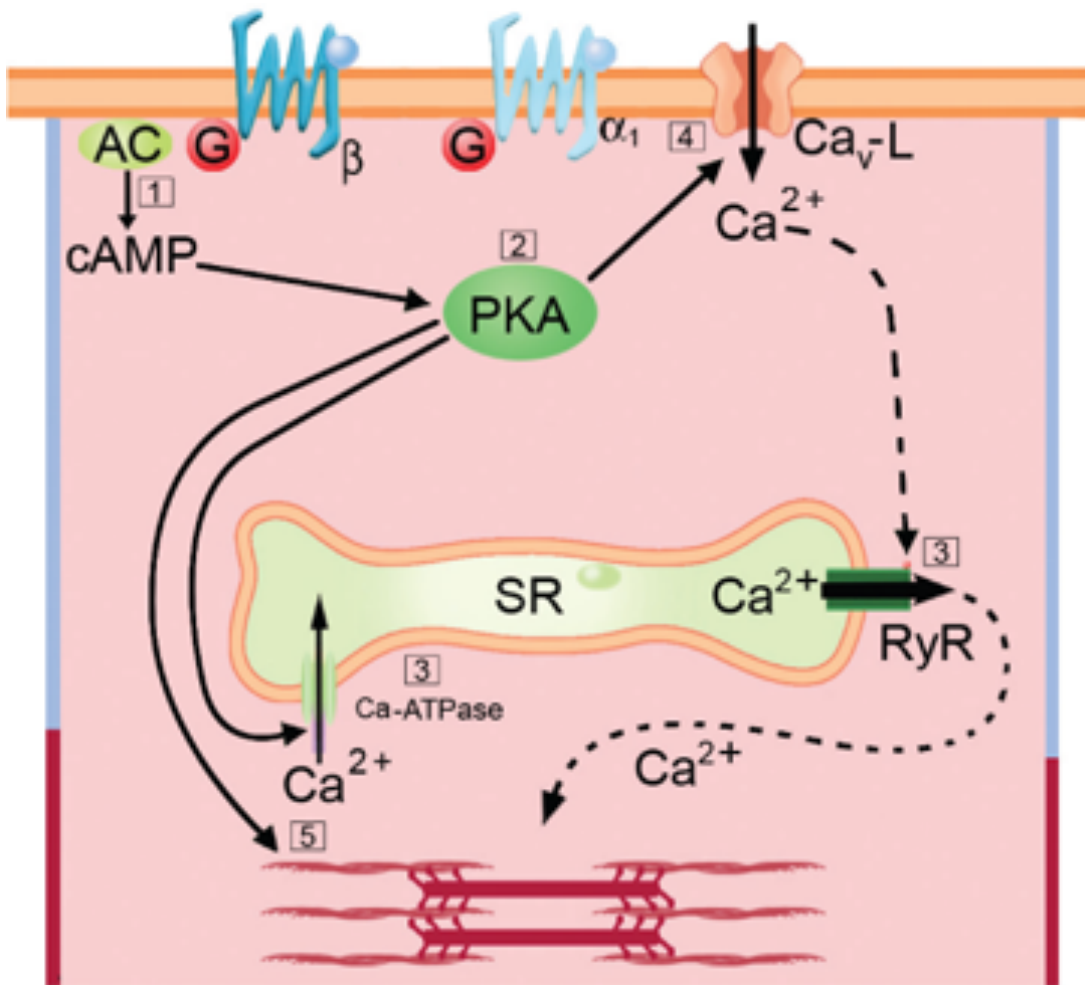
- 25yo male presents after suicide attempt
- Took mother's medication she is on for a fib.
- VS: 98.6, 30, 60/40, 20, 100% RA
- Awake, oriented, strong peripheral pulses, no complaints

Case 8

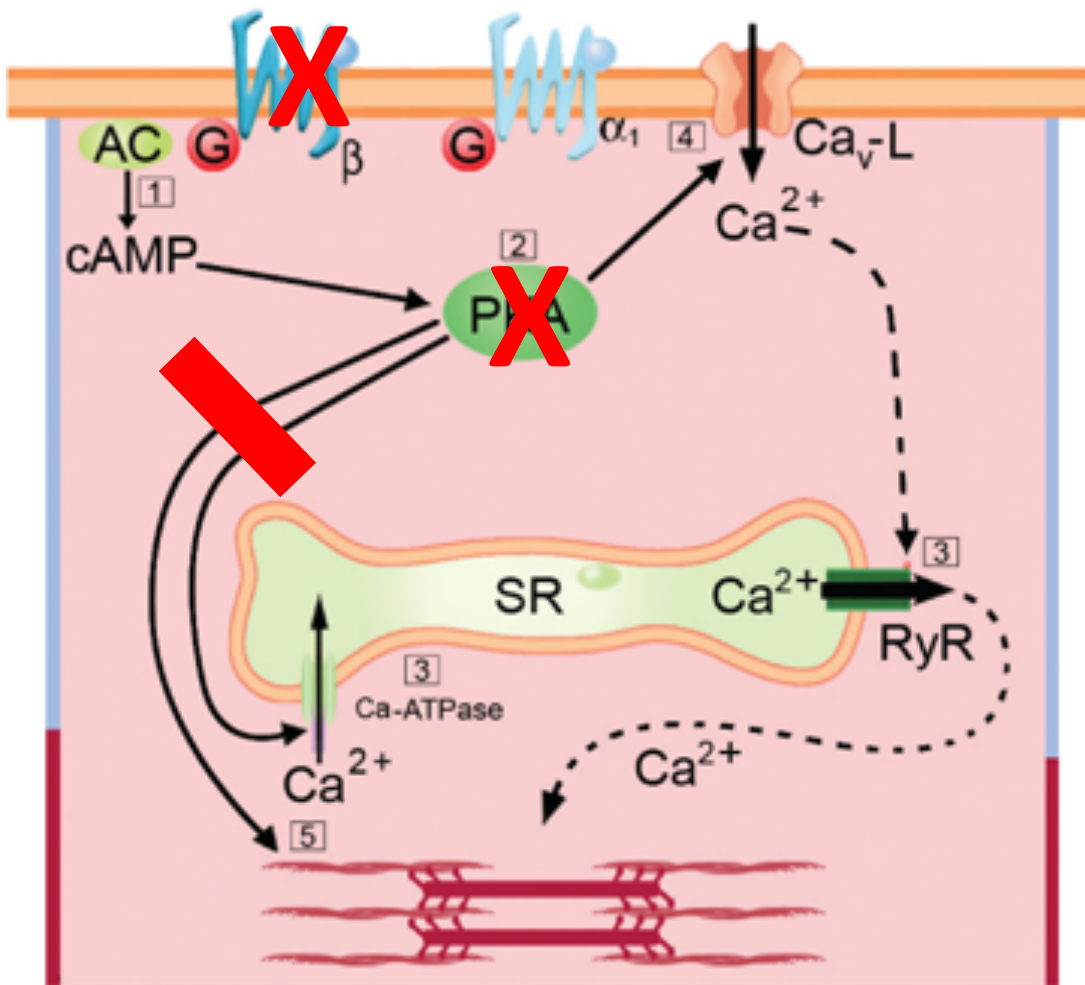


Calcium Channel Blocker Toxicity

- Bradycardia, hypotension and hyperglycemia + physical exam findings create a “CV poison toxidrome”
- Differentiate between CCB vs BB on exam
- Key “unique presentations” that aren’t textbook



- Blunt ionotropy
- Decrease contractility
- Slow SA node discharge
- Blocks free fatty acid mobilization from fat cells



BRADYcardia



HYPOtension

Reliant on sympathetic tone to maintain above



HYPOglycemia

Is it CCB or BB?

- Use your exam!!!

Calcium salts (2-4g IV)

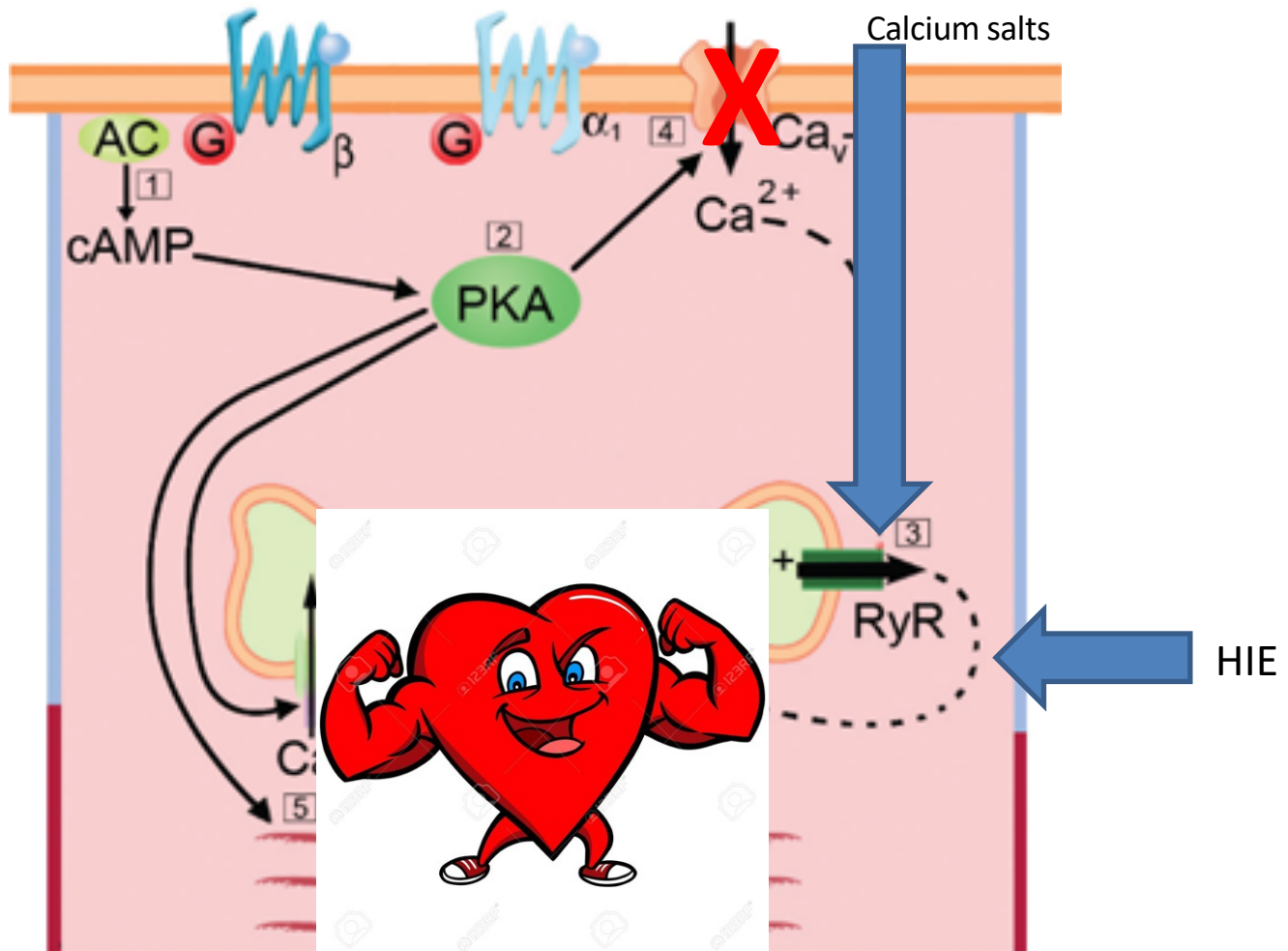
- Goal Serum Ca 10-11

Calcium Channel Blocker

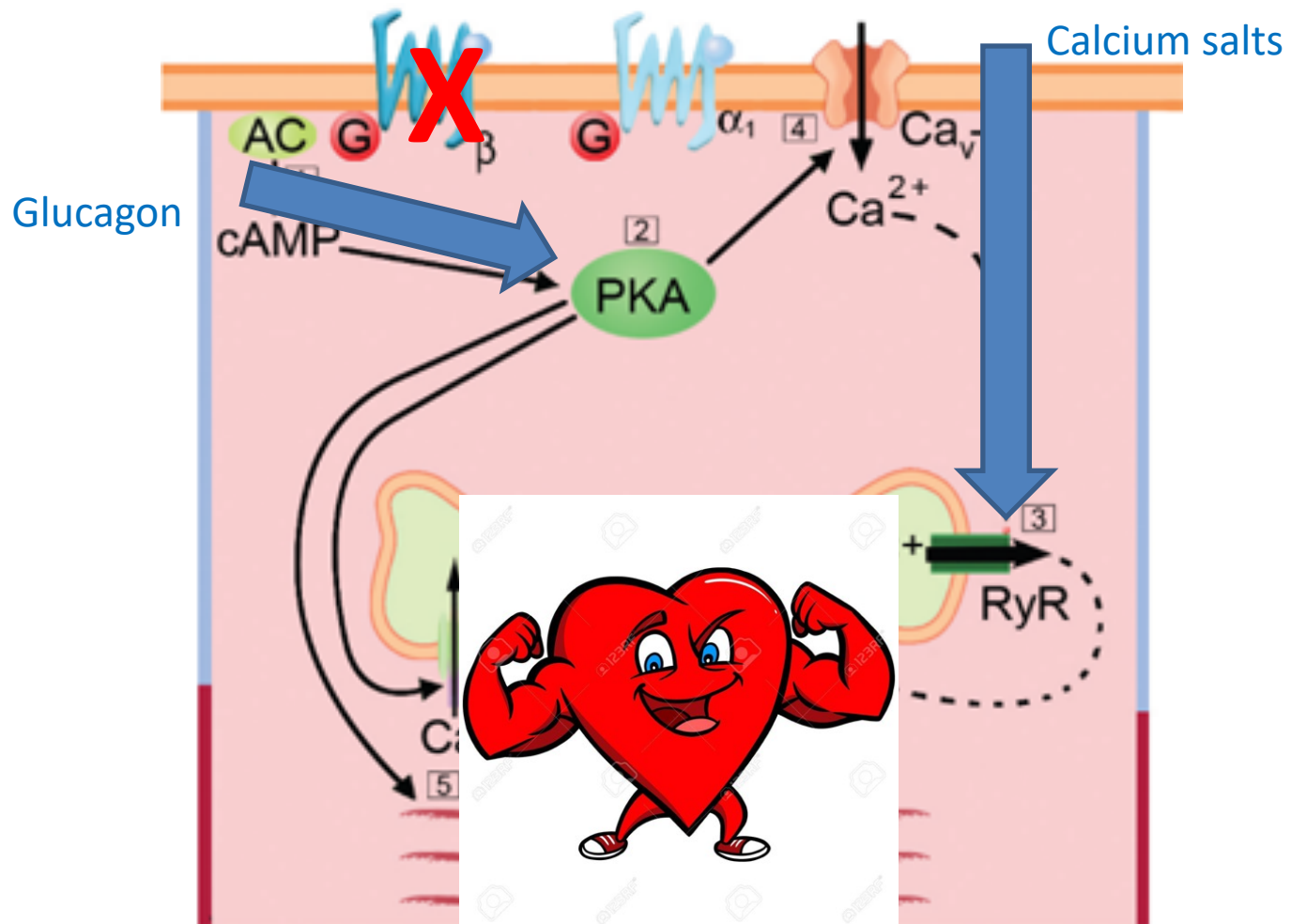
- HIE
- Pressor support
- ECMO

Beta Blocker

- HIE
- Glucagon
- Pressor support
- ECMO



Goldfranks Toxicologic Emergencies 10th ed. Beta Adrenergic Antagonists.



	Heart Rate	Blood Pressure	Mental Status	Blood Glucose
Calcium Channel	Decreased	Decreased	Normal	Hyperglycemia
Beta Blocker	Decreased	Decreased	Depressed, altered	Hypoglycemia

	Heart Rate	Blood Pressure	Mental Status	Blood Glucose
Calcium Channel	Decreased	Decreased	Normal	Hyperglycemia
Beta Blocker	Decreased	Decreased	Depressed, altered	Hypoglycemia

Toxidromes Review

	Heart rate	Resp rate	Blood pressure	Mental status	Skin	Reflexes
Opioid	Nml	Low	Nml	Dec	Nml	Nml
Sedative/hypnotic	Nml	Low	Low/nml	Dec	Nml	Nml
Sympathomimetic	High	High	High	Agitated	Diaphoresis	+
Anticholinergic	High	Nml	Nml	Altered	Dry	+
Serotonin Syndrome	High	Nml	Nml	Altered	Diaphoresis	+ (clonus)
NMS	High	High	Nml	Altered	Nml	Rigidity
Cholinergic	Low	Nml	Nml	Seizures	diaphoresis	Nml
Ion Channel (BB)	Low	Nml	Low	Sedated	Nml	Nml
Ion Channel (CCB)	Low	Nml	Low	Alert	Nml	Nml

Test your knowledge!

1) A patient is admitted to the ICU on a naloxone drip after a suspected opioid overdose. He presented with hypopnea and pinpoint pupils. His urine drugs of abuse screen returns negative for opiates. Describe the most likely reason:

- a) The patient did not overdose on opioids, the presentation is more consistent with benzodiazepine overdose.
- c) Naloxone neutralizes opioids on the urine drug of abuse screen.
- b) The patient overdosed on opioids that do not react with the opiate immunoassay.
- d) Another drug is the primary cause of the overdose.

Test your knowledge!

2) A patient presents with bradycardia and hypotension after an intentional overdose. She is oriented, remorseful. On exam, she has strong radial pulses. EKG demonstrates junctional bradycardia. What is the causative agent and antidotal therapy?

- a) Digoxin, DIGIFab
- b) Beta blocker, glucagon
- c) Calcium Channel blocker, hyperinsulinemia euglycemia therapy
- d) Cocaine, benzodiazepines

Thanks!

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