

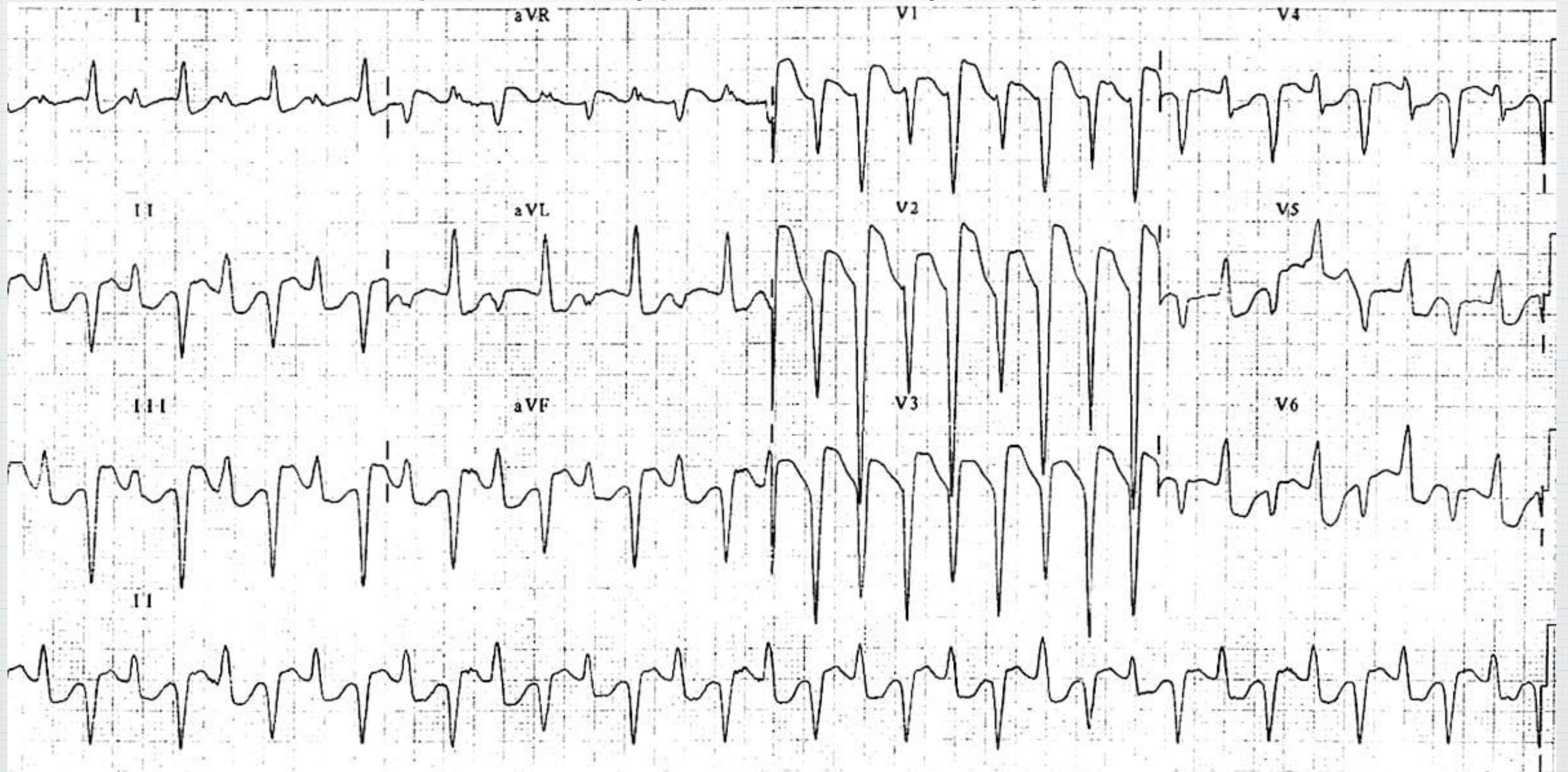
Cardiovascular Drug intoxication

Saravi Mehrdad M.D.

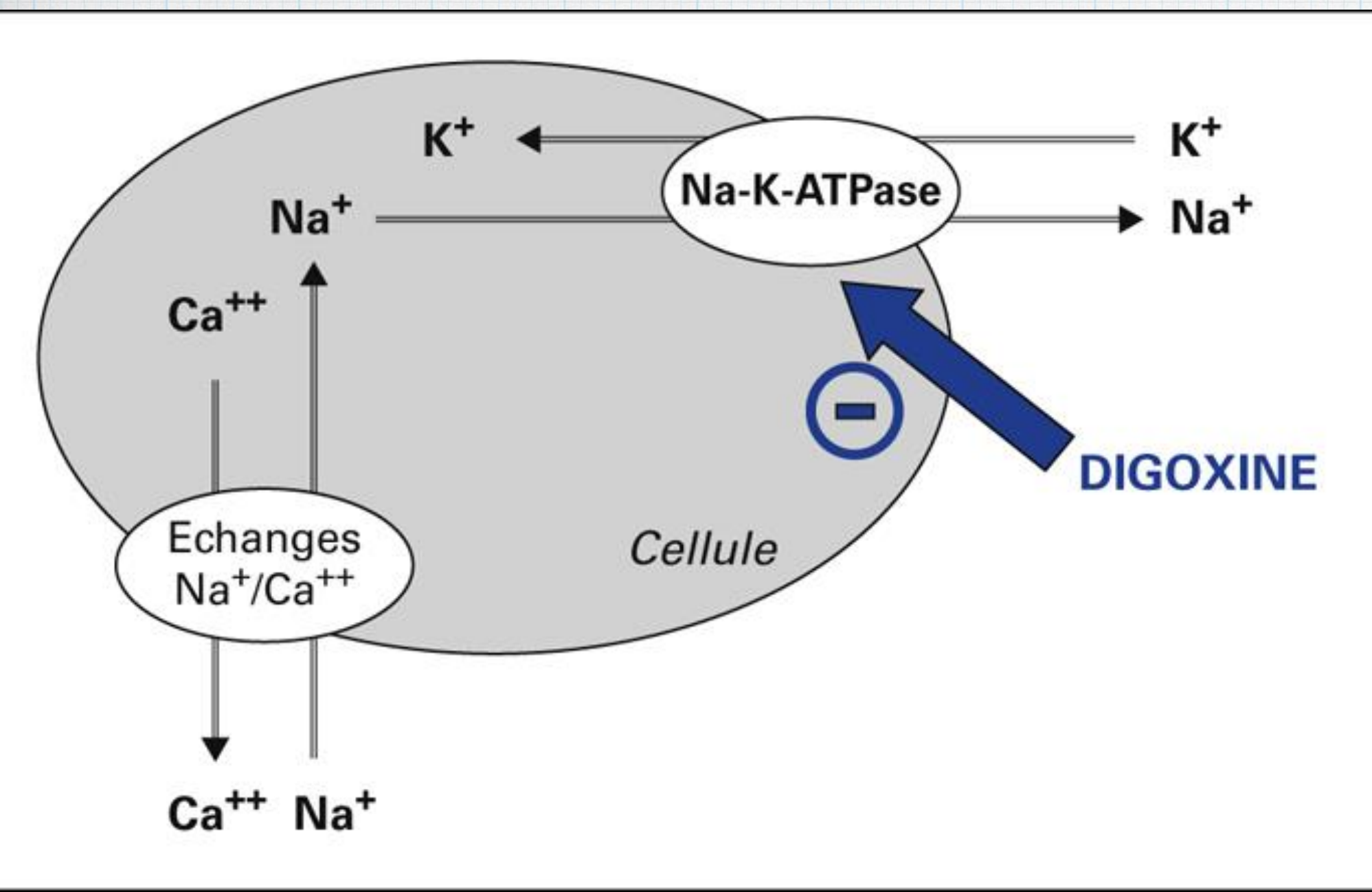
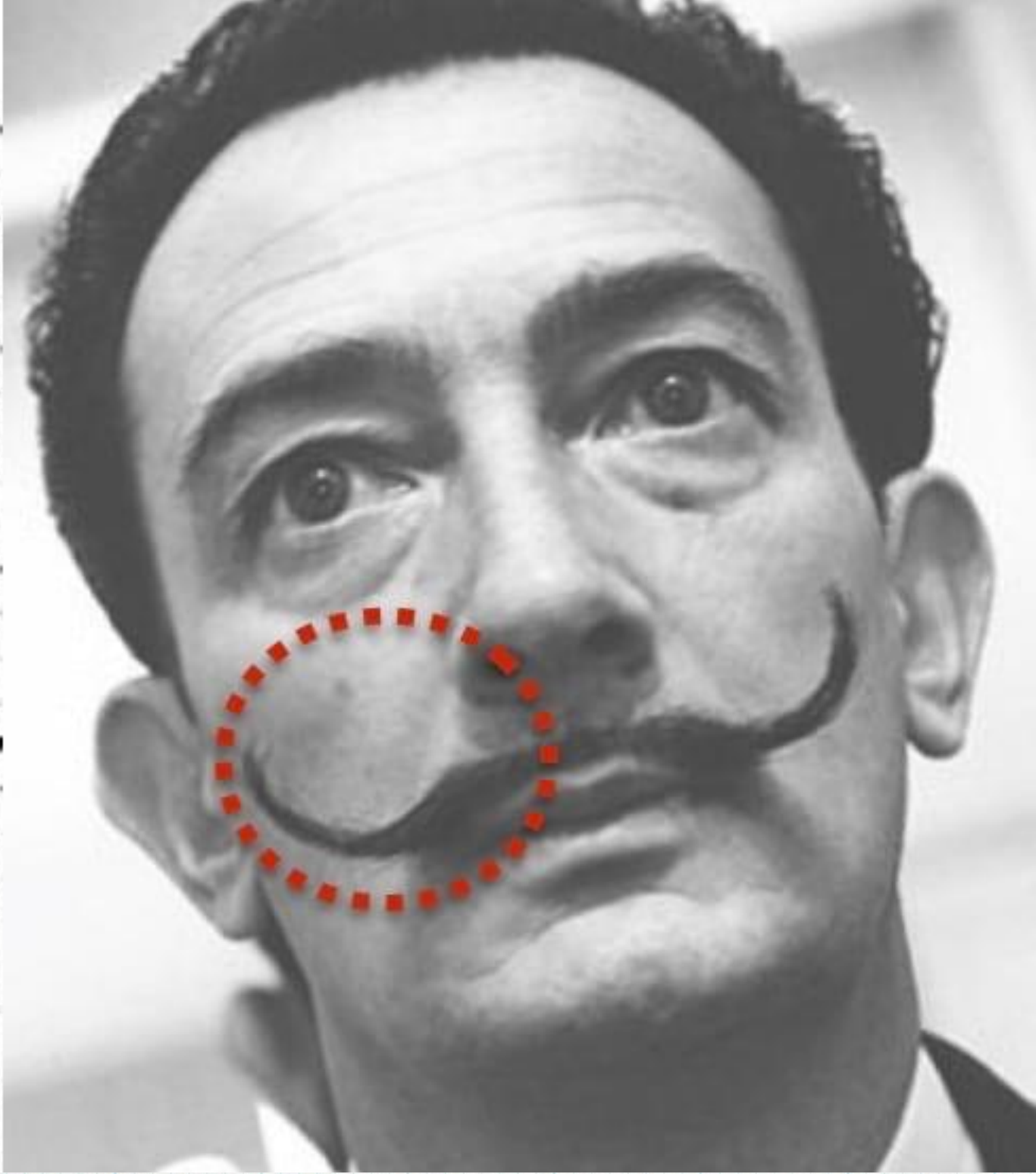
Associated Professor of Cardiology

Fellowship of Interventional Electrophysiology

Palpitation, Hypotension, Syncope



Bidirectional ventricular tachycardia



Digoxin level 3.6 ng/ml

Digoxin level

Starts to plateau at 6 hours

Serum level do not always correlate with toxicity

Digoxin toxicity

Diagnosis is difficult and usually made clinically

Symptoms of Digoxin toxicity

Gastro-intestinal

Nausea, vomiting , anorexia , diarrhea

Visual

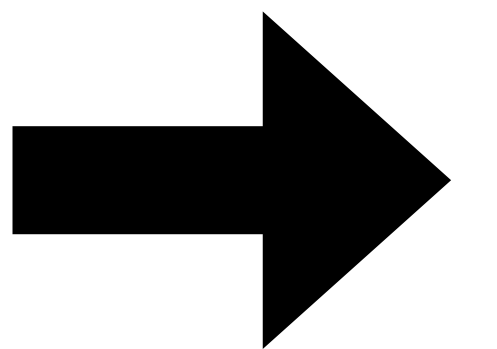
Blurred vision, Yellow-green discoloration

Cardiovascular

Palpitation, dyspnea , syncope

Neurologic

Confusion, dizziness, delirium , fatigue



Digoxin level increased

Decreased clearance

Verapamil, diltiazem, itraconazole, Amiodarone, sprinolactone, quinidine, Propafenone, warfarin, cyclosporine

Decreased gut flora metabolism

Erythromycin , clarithromycin, tetracycline

False positive digoxin level

Hepatic failure

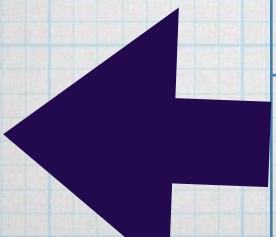
Renal failure

Subarachnoid hemorrhage

Acromegaly

Diabetes

Pregnancy



Management of Digoxin Toxicity

[Digoxin Specific antibody](#)

Multi-dose activated charcoal (within 2 hours)

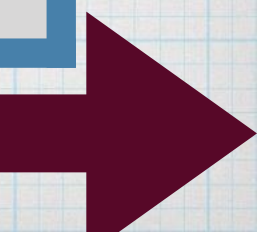
Atropine

Antiarrhythmias : lidocaine, phenytoin

Cardioversion- Defibrillation

Pacing

Dialysis (acute renal failure, refractory hyperkalemia)



PRESCRIPTION ONLY MEDICINE
KEEP OUT OF REACH OF CHILDREN

DIGIFab.

Digoxin-specific
antibody fragment
f(Ab) (Ovine) powder
for injection 40mg

Store at 2°C to 8°C.
Refrigerate. Do not
freeze.



Global Leader. Local Partner.



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Empiric doses of DSFab

20 vials	acute overdose
6-8 vials	chronic overdose
1-2 vials	chronic overdose on children

DSFab dosage

$(0.8 \text{ times the ingested dose})/0.5$	numbers of vials for acute overdose
Digoxin level (steady state) times weight (kg)/100	numbers of vials for acute or chronic overdose

DSFab dosage

Infusion : over 30 minutes
Onset of effect 20 minutes
Complete effect 90 minutes

Digoxin specific antibody

Ventricular arrhythmia

Hypotension

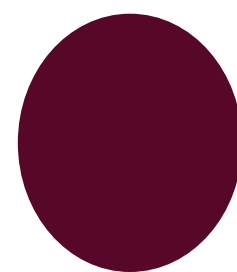
Symptoms bradycardia

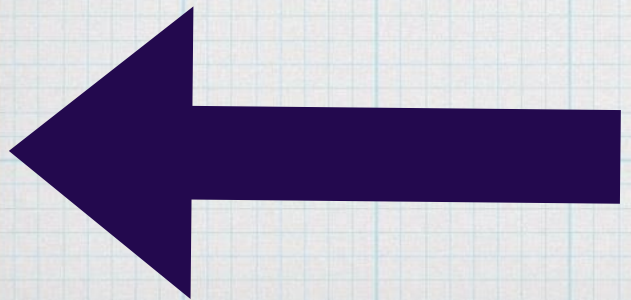
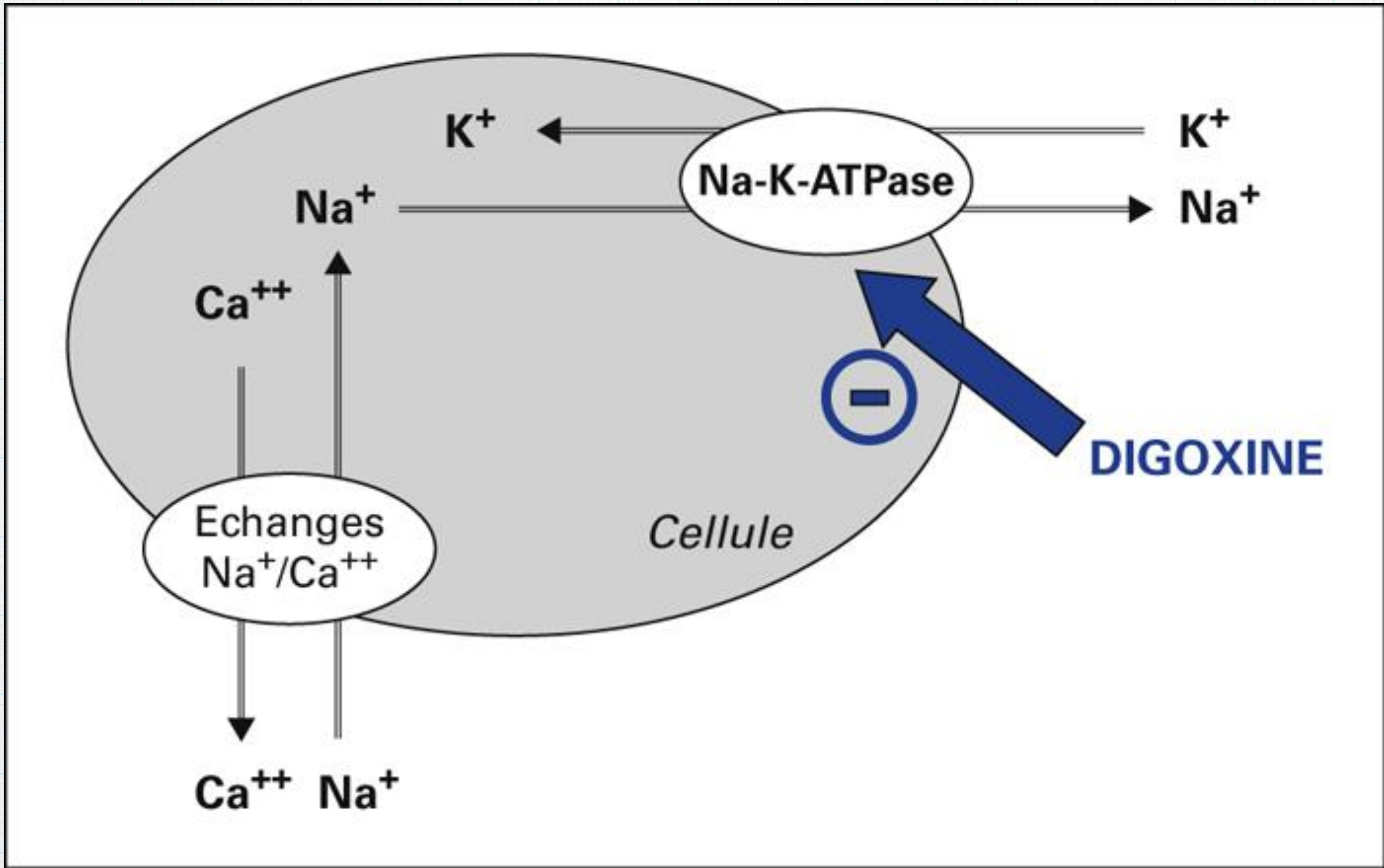
Potassium greater than five meq/L in acute overdose

Acute ingestions greater than 10 mg in an adult or greater than 4 mg in a child

Digoxin concentration > 15 ng/ml measured at any time

Digoxin concentration > 10 ng/ml measured at 6 hours post ingestion



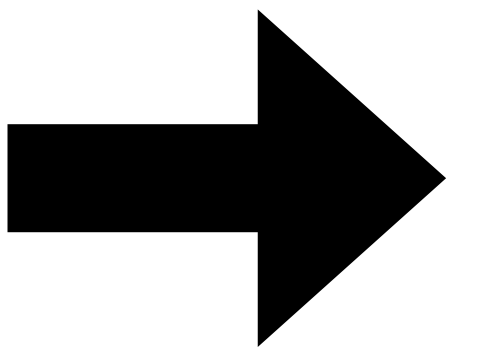


Electrolytes with higher risk of Digoxin toxicity

Hypokalemia

Hypomagnesemia

Hypercalcemia



Received digoxin-specific antibody fragments (Fab)

Weight 108 kg

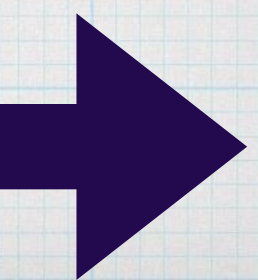
Digoxin level: 2.9 ng/mL

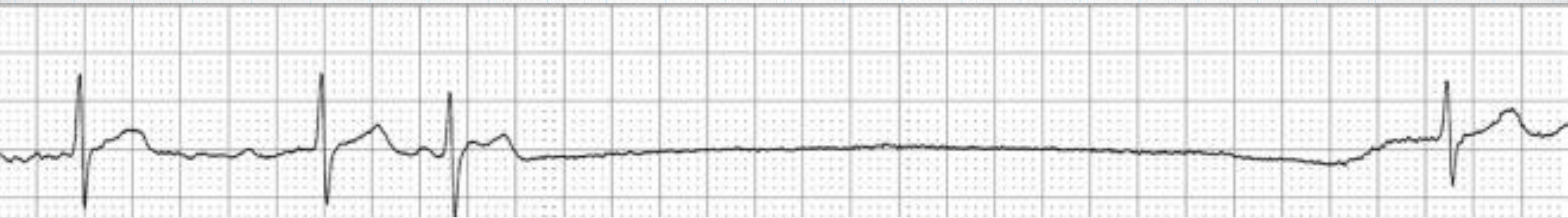
Fab Dose In Vials =

(Serum Digoxin ng/mL) x (Weight in kg)

100

3 vials administered





Decreased level of consciousness , Hypotension



Beta blocker overdose

No validated serum marker

Gastric decontamination

Activated Charcoal

Gastric lavage

Heart rate

Blood pressure

Pretreatment with calcium



Catecholamines

Inotropes

Vasopressors

Survival benefit , Improved hemodynamics



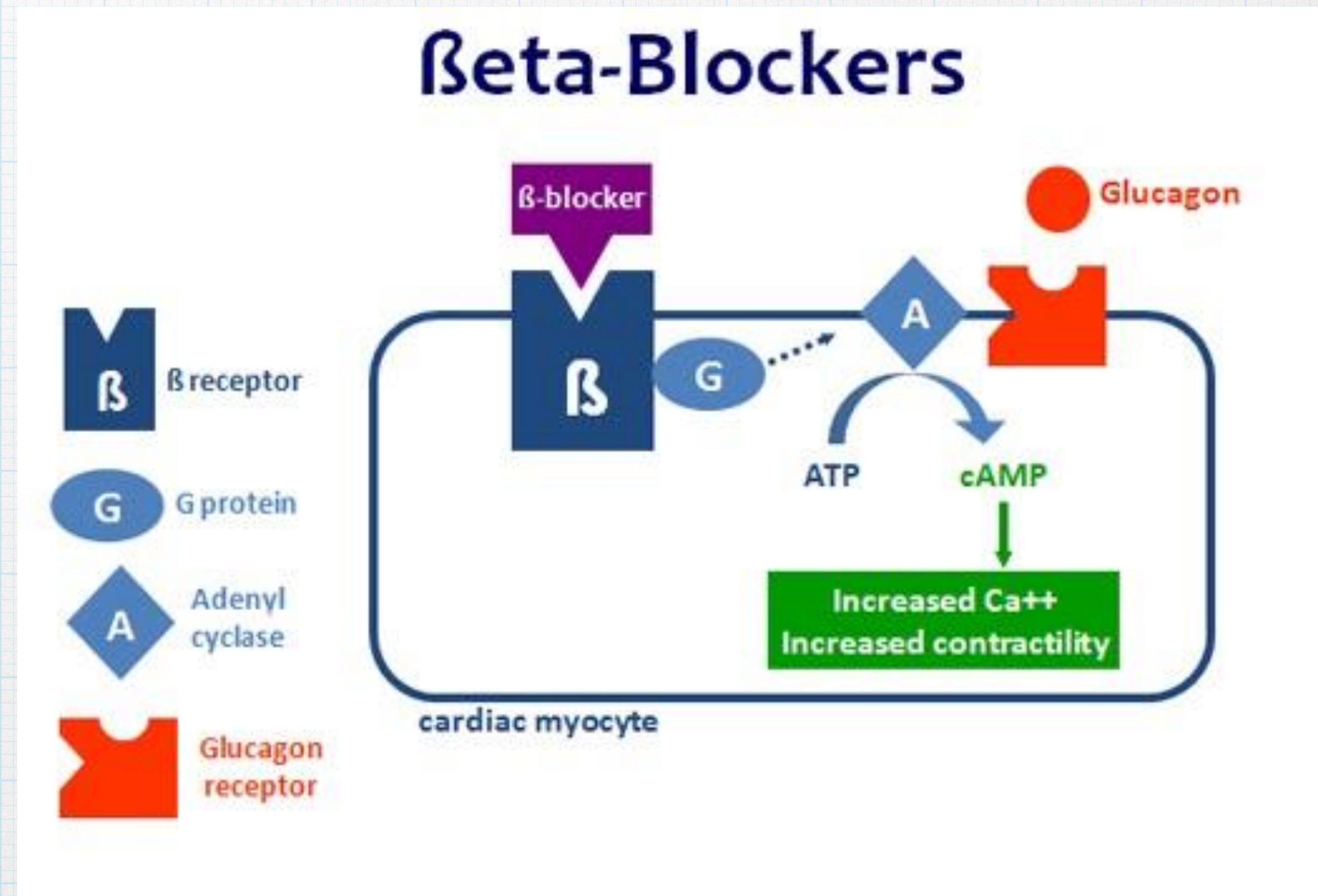
- * Calcium chloride has 3 times more elemental calcium than calcium gluconate
- * Avoid extravasation (necrosis)
- * Use central vein



Glucagon in beta blocker overdose

Minor improvement in hemodynamics

- Increases glucose (stimulates hepatic glycogenolysis)
- Has potent emetic effect: securing airway before administration



Insulin in Beta Blocker Overdose

- * **Metabolism shifts from fatty acids to glucose consumption**
- * **Insulin increases glucose uptake**
- * **Hyperinsulinemia euglycemia : improved coronary blood flow, cardiac metabolism, mechanical function**



Insulin euglycemic therapy

High dose

1-10 units/kg/h

Adverse effect

Hypoglycemia

Hypokalemia

Mortality benefit

Hemodynamic
improvement

Lipid emission therapy in Beta Blocker Overdose

- By drawing away lipophilic substances from their respective tissue receptors
- More Free fatty acid availability for myocardial tissue



Methylthioninium chloride (methylene Blue)

hemodynamic improvement (in co-ingestion of amlodipii



Hemodialysis

Hemodynamic improvement

Water soluble beta blockers

Atenolol

Nadolol

Acebutolol

Dialyzable

Atenolol, nadolol, practolol, sotalol

Moderately dialyzable

Acebutolol , bisoprolol

Slightly dialyzable

Metoprolol

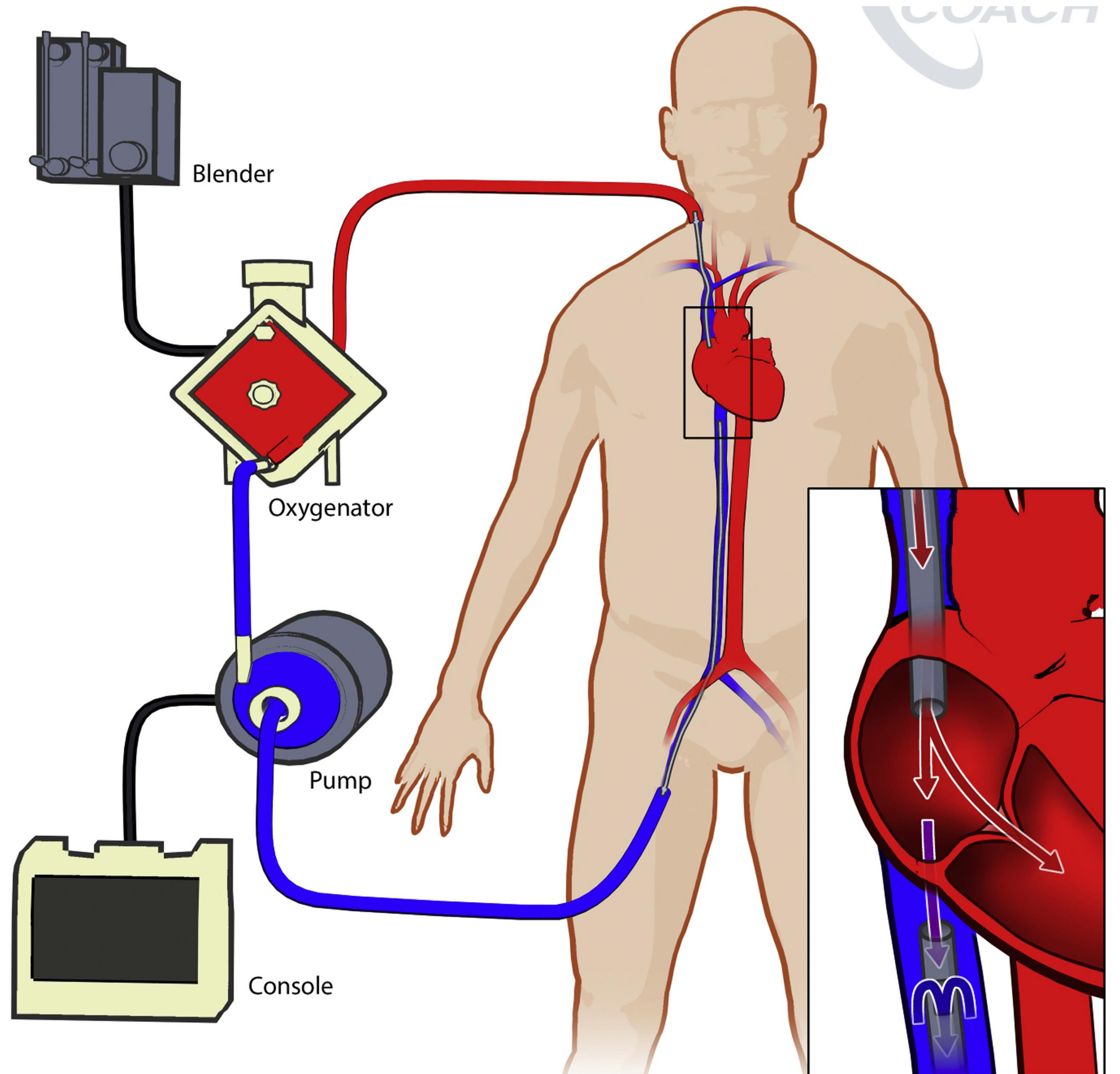
Non-dialyzable

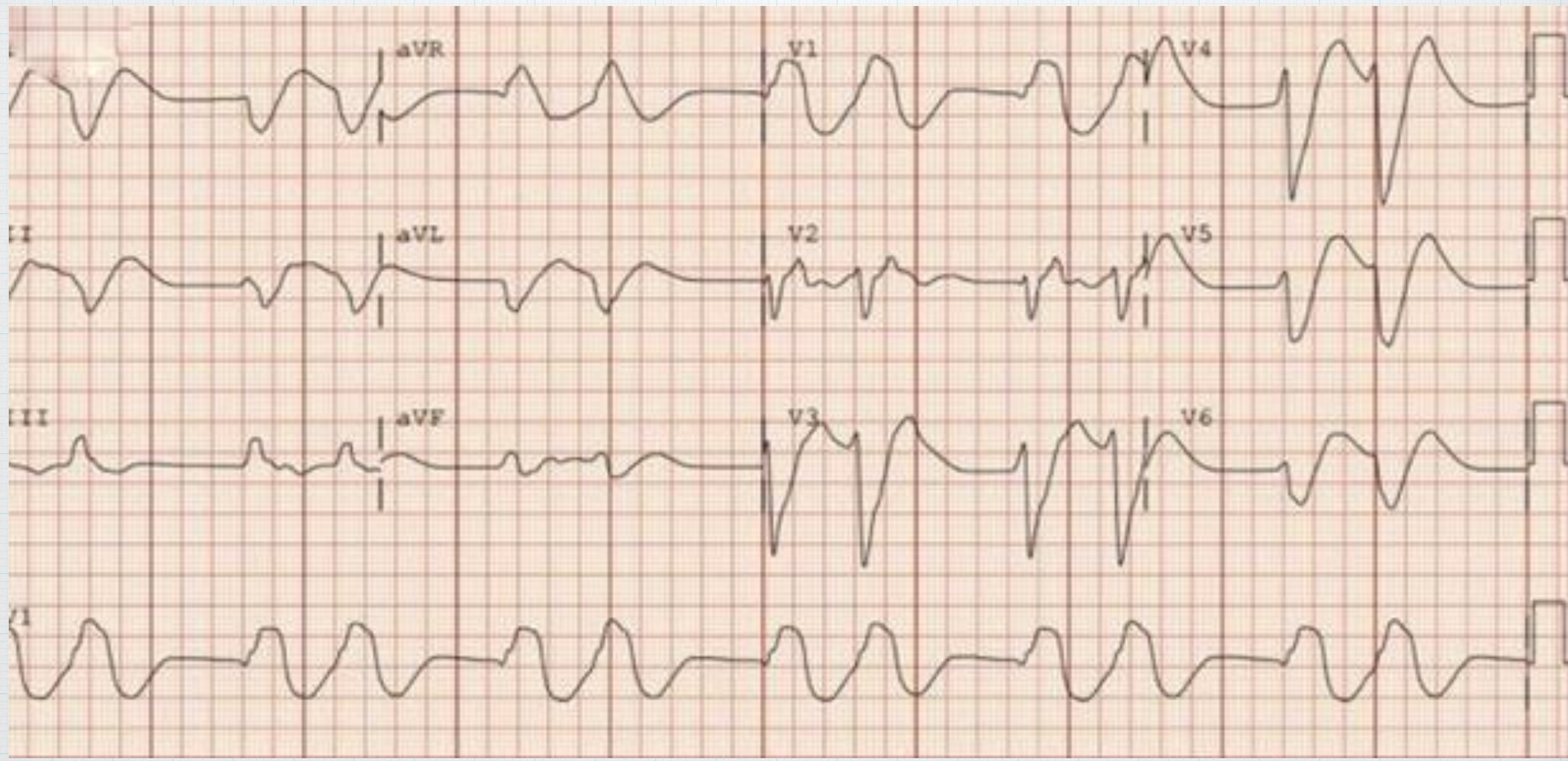
Propranolol, betaxolol, carvedilol, labetalol,

Temporary pacing



Extra Corporeal Membrane Oxygenation





- **48 years old male , emotional state 1 month ago**
- **Dyspnea , Paroxysmal Atrial Fibrillation**
- **Drowsy, slurred speech , ice cold, but sweaty**
- **Flecainide , Digoxin**
- **Serum potassium 6.1 mEq/Lit, Normal serum calcium**
- **Elevated serum troponin I level**

- Normal coronary angiography
- Hyper dynamic basal segment and near akinesia of the mid-distal segments extending to the apex
- Normal TSH, Normal hemoglobin
- Negative drug screen for ethanol, methanol, ethylene glycol
- Flecainide serum level 5.3 microgram/ml (therapeutic range 0.2-1 microgram/ml)

Lipid emulsion therapy

As a lipid sink: isolating lipophilic substances from receptors

Positive inotropic effect (more efficient metabolism)

Opens voltage gated calcium channels



Sodium bicarbonate in Flecainide overdose

First line management

Reverses sodium channel blockade

Narrows QRS



Extra Corporeal Membrane Oxygenation

