



Poisonous Plants

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**OREGON
POISON
CENTER**

I have no financial conflicts of interest to disclose



OHSU

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Objectives

- Review common plants that
 - Grow in this area (Pacific NW)
 - Relatively poisonous
 - Accidental



Oregon Poison Center

- Consultative call center for
 - The public
 - Healthcare providers
- All topics poisoning, toxicity, exposure
- **1-800-222-1222**
- Open 24/7/365



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1-800-222-1222

- 50,000 cases per year
 - 137 cases per day
- > 500 plant cases/year

Plants - foraging

- Pacific NW
- Variety of toxin content in plants
 - Season, rain, soil, temperature
 - Toxin concentration varies in root, leaf, flower, berry/fruit
- **The dose determines the poison**
 - Generally, small bite is not dangerous
 - The poison center can help



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Plants - identification

- Identification of plants is not easy
- The PC relies on botanists and master gardeners to identify plants
 - I will mention some plant features, but this is not a plant ID / botany course



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Conium maculatum (poison hemlock)



Conium maculatum

- Poison hemlock
- Mistaken:
 - leaves for cow parsley

root for carrot/parsnip



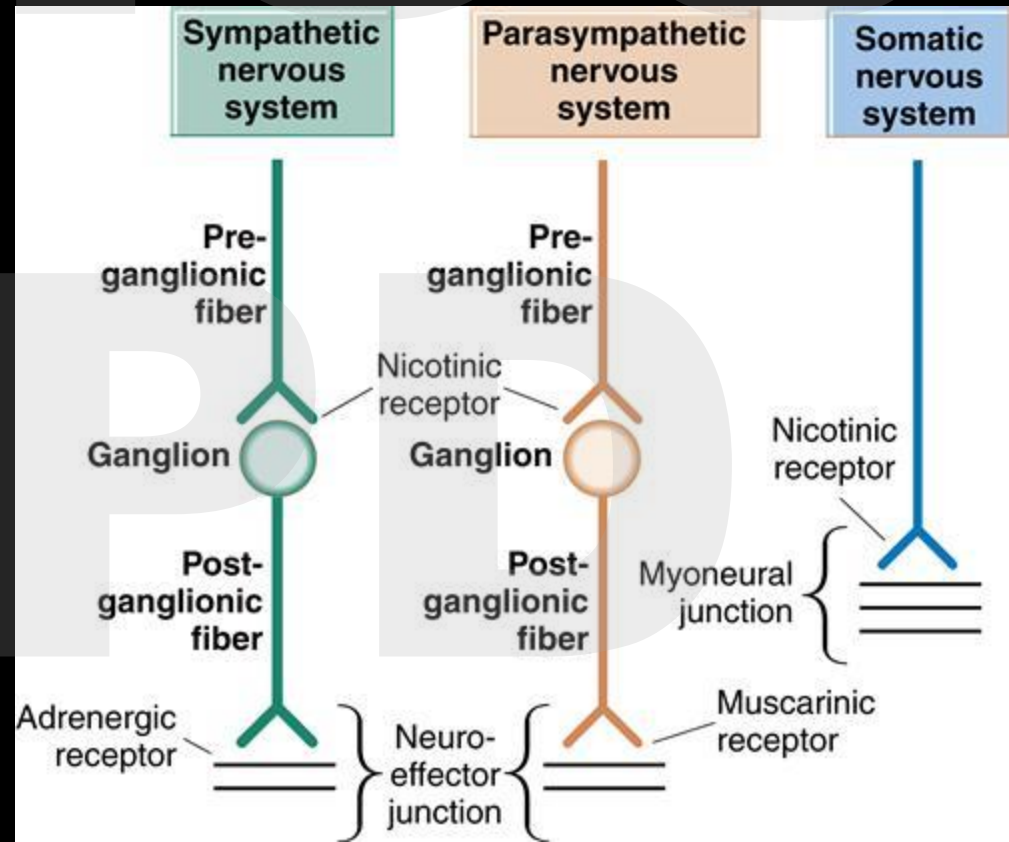
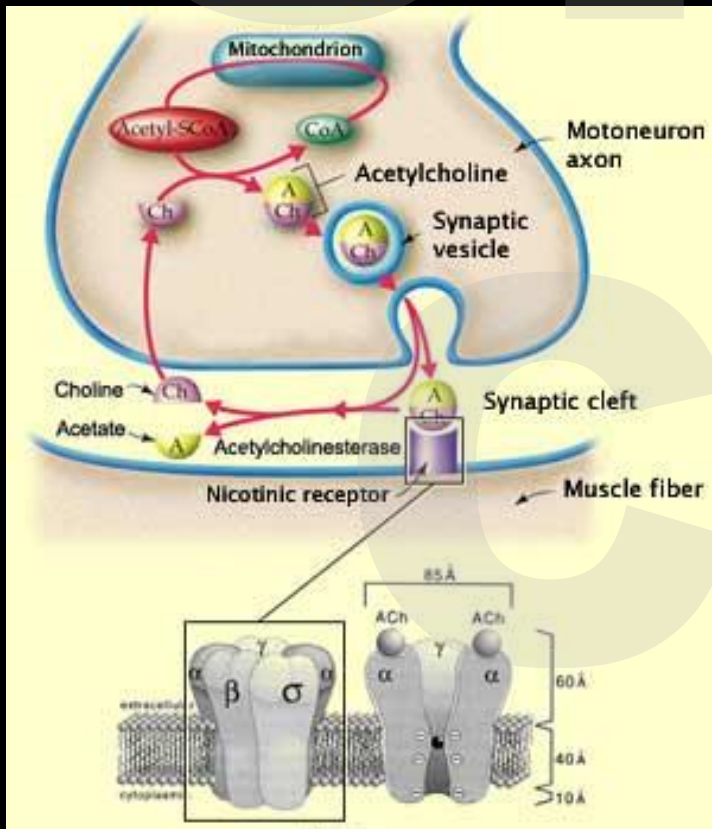
Conium maculatum

- Poison hemlock
- ID: fern-like leaves, **purple spots on stem**, leaf ribs end on leaf crypts.



Conium maculatum

- **Coniine** = similar to **nicotine**
 - Present in all parts of the plant
 - Nicotinic acetylcholine receptor agonist



Conium maculatum

- **Coniine** = similar to nicotine
 - Tachycardia and sweating, then bradycardia
 - Tremor, fasciculations, muscular weakness

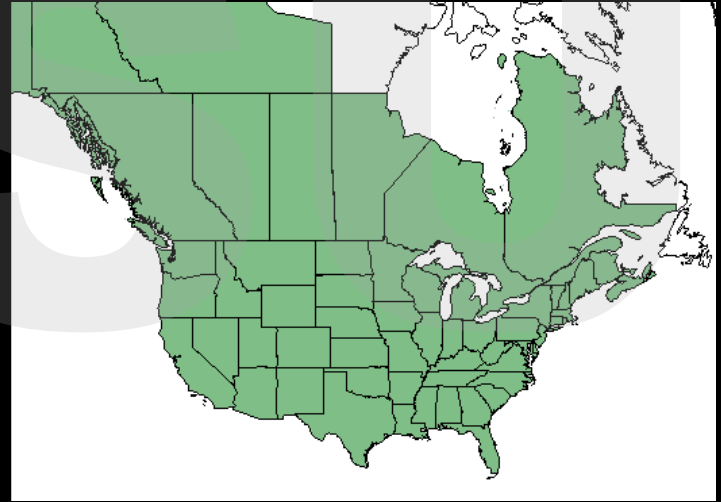


Cicuta maculata (water hemlock)

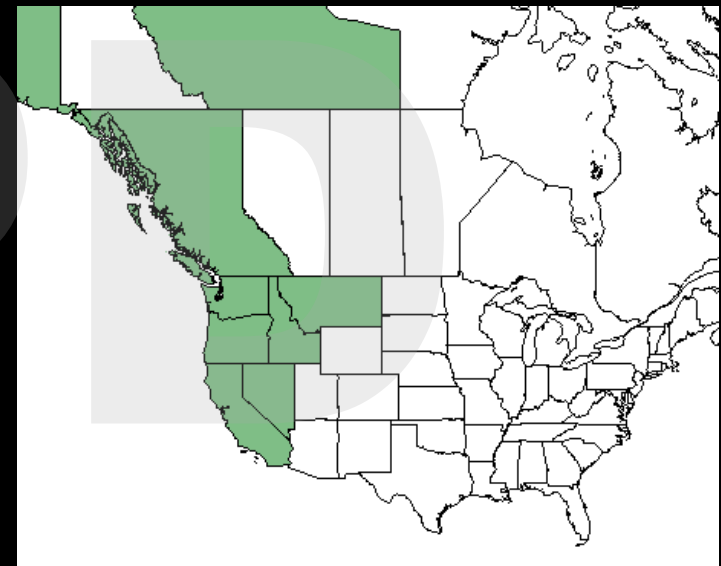


Water hemlock

- *Cicuta maculata*
 - Water hemlock



- *Cicuta douglasii*
 - Western water hemlock



Water hemlock

- “Water Hemlock” AKA: cowbane, snakeweed, poison parsnip, false parsley.
 - Mistaken for wild parsnip
 - Water hemlock

wild parsnip



Water hemlock

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wild parsnip

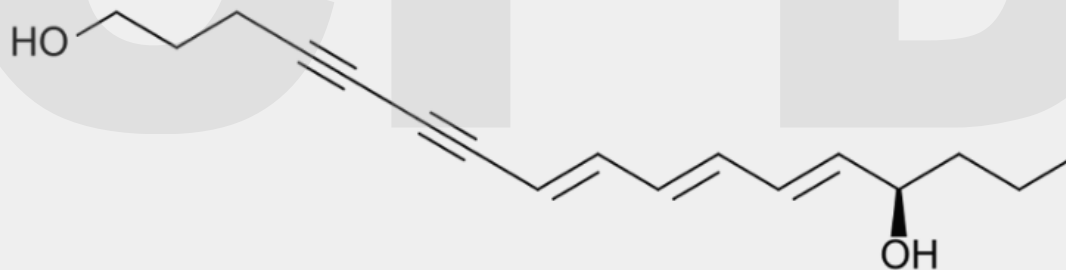
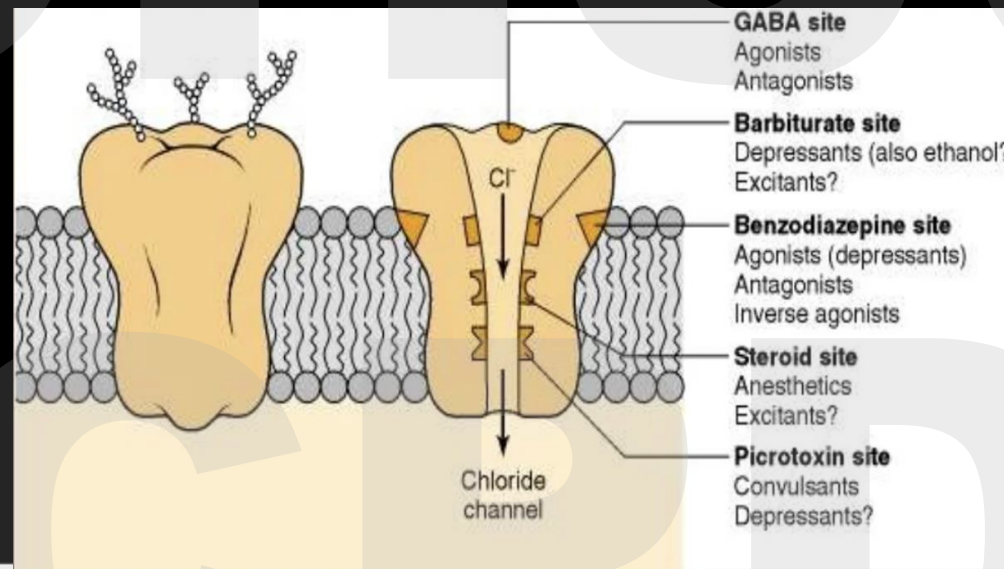


Water hemlock

- “Water Hemlock”
 - AKA: cowbane, snakeweed, poison parsnip, false parsley.
 - **Cicutoxin**
- Most lethal plant in the US
 - 2nd only to amanita mushrooms for most US deaths from natural products
- Root contains most poison
 - All parts of the plant have some toxin

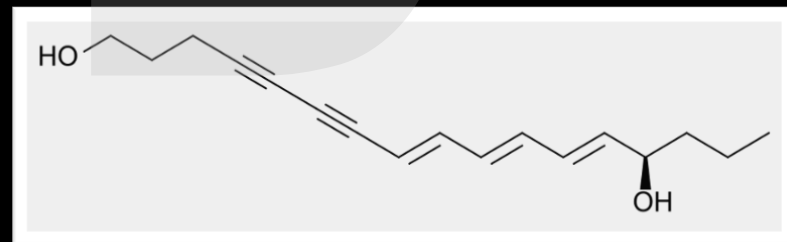
Water hemlock

- **Cicutoxin**
 - non-competitive GABA antagonist at the picrotoxin binding site.



Water hemlock

- **Cicutoxin**
 - Nausea, vomiting
 - Followed by
 - Seizures
 - Rhabdomyolysis
 - Renal failure
- Treatment:
 - Activated charcoal
 - Seizures – benzodiazepines, barbiturates, propofol



Digitalis purpurea



Digitalis sp.



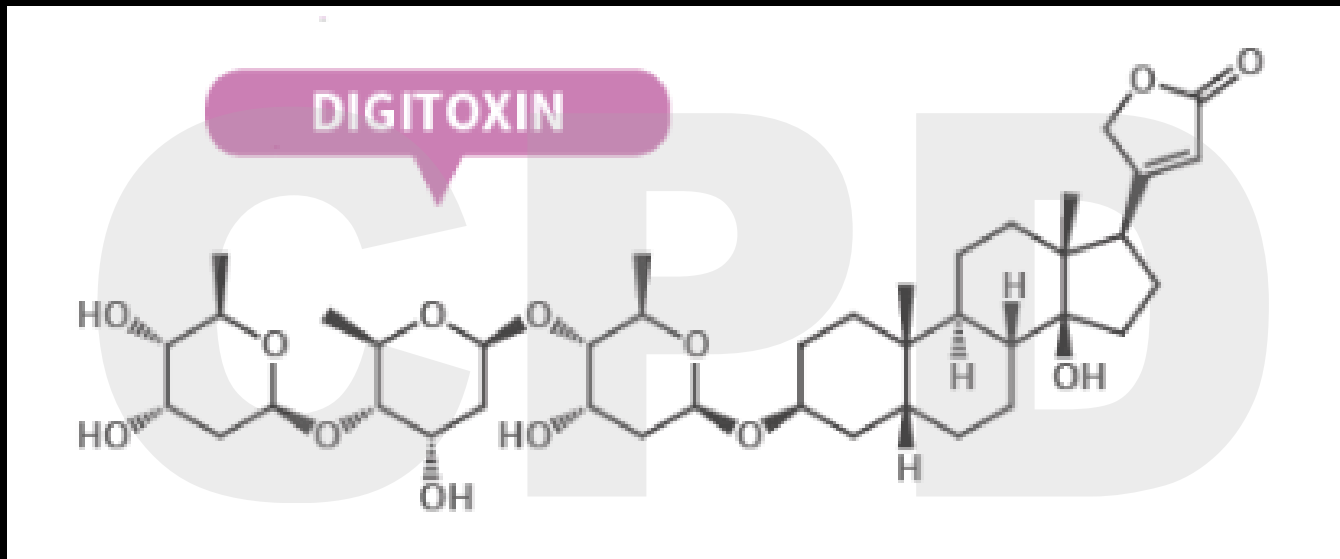
Digitalis lanata



Digitalis purpurea

Digitalis sp.

- Foxglove, fairy finger, witch's bells
- Contains many **cardiac glycosides**:
 - **digoxin, digitoxin**



Digitalis purpurea

- Mistaken for **comfrey**



foxglove



comfrey

Digitalis purpurea

- Mistaken for comfrey



foxglove



comfrey

Digitalis purpurea

- Mistaken for **borage**



foxglove



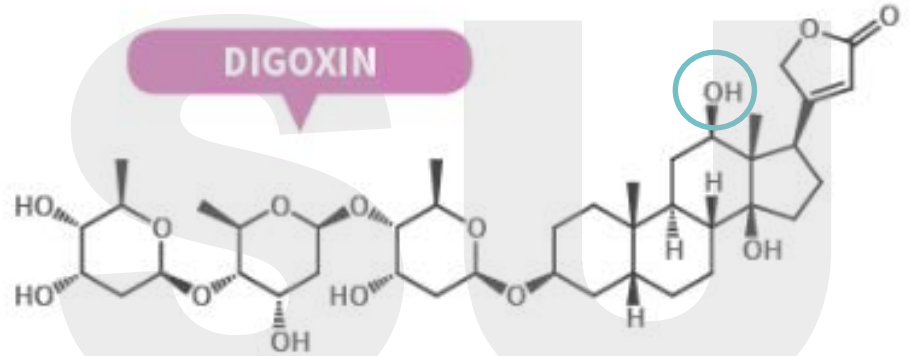
borage

Digitalis purpurea

- **Digitoxin**
 - Cardiac glycoside
 - Metabolized in liver
 - Longer $t_{1/2}$ than digoxin

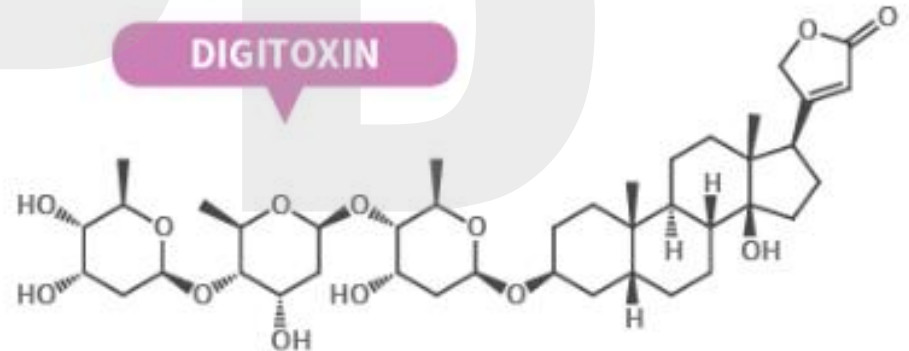
POISONOUS FOXGLOVES

DIGOXIN



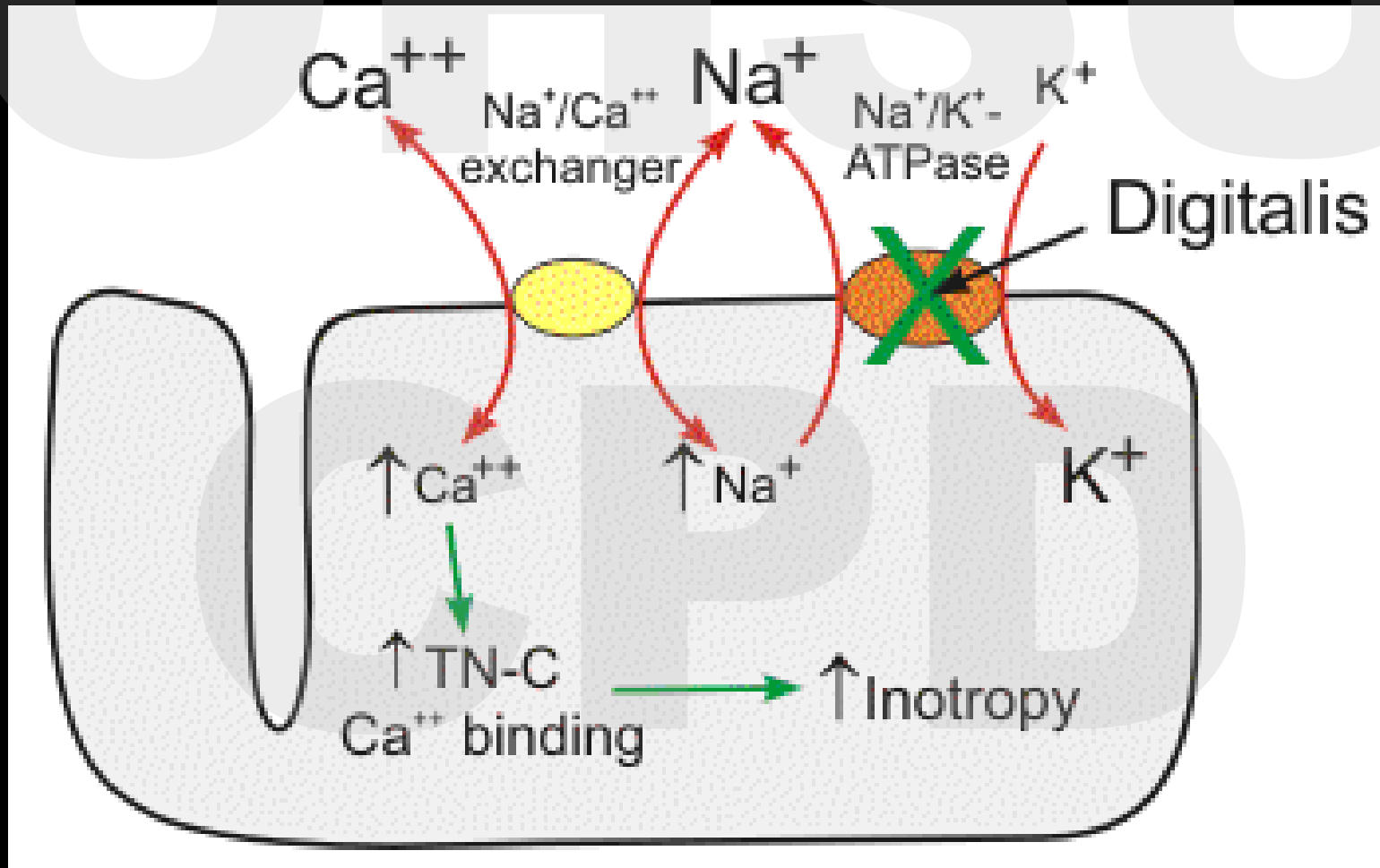
All parts of the foxglove contain compounds called cardiac glycosides, including the structurally similar digoxin and digitoxin. Ingestion of these compounds can cause nausea, vomiting, diarrhoea, and an irregular heart beat. They disable cell sodium-potassium ion pumps, leading to increased cell sodium and calcium ion concentration. This slows the heart rate, which can lead to a heart attack and death.

DIGITOXIN



Digitalis purpurea

- Digitoxin



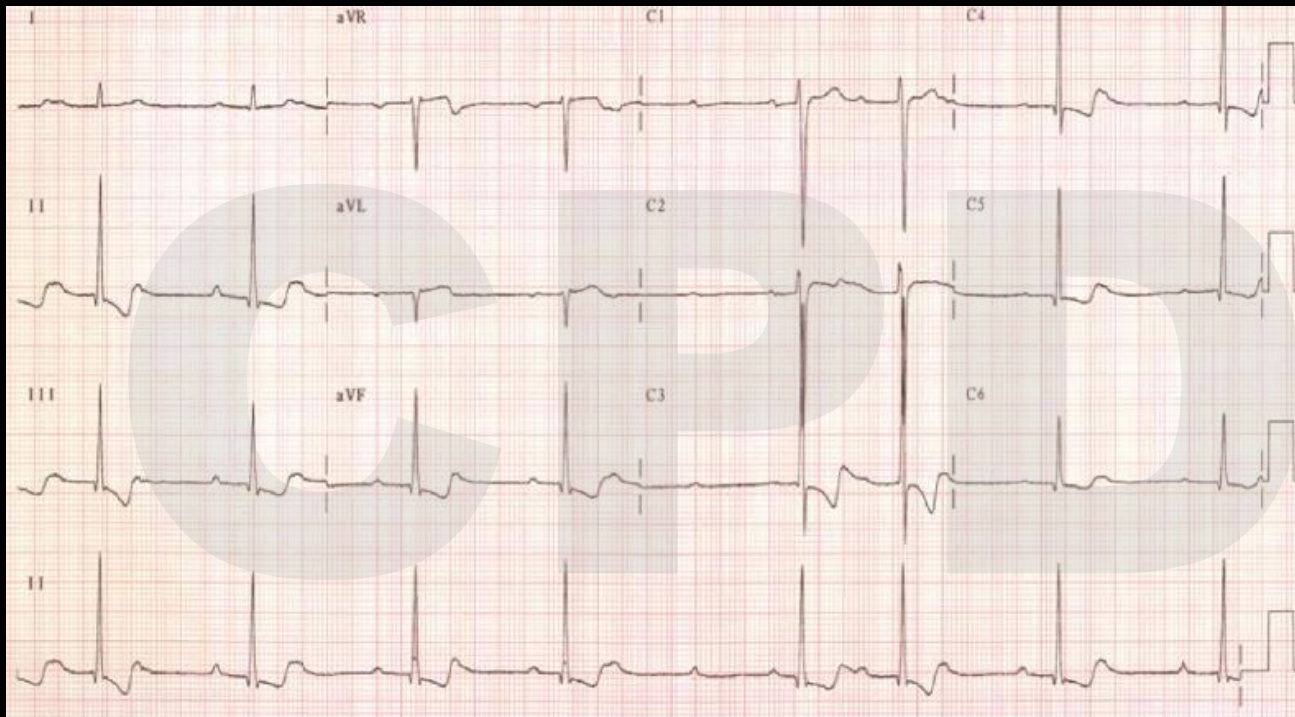
Digitalis purpurea

- Increased intracellular calcium leads to:
 - Increased contraction
 - Increased automaticity
 - PVCs
 - Ventricular tachycardia



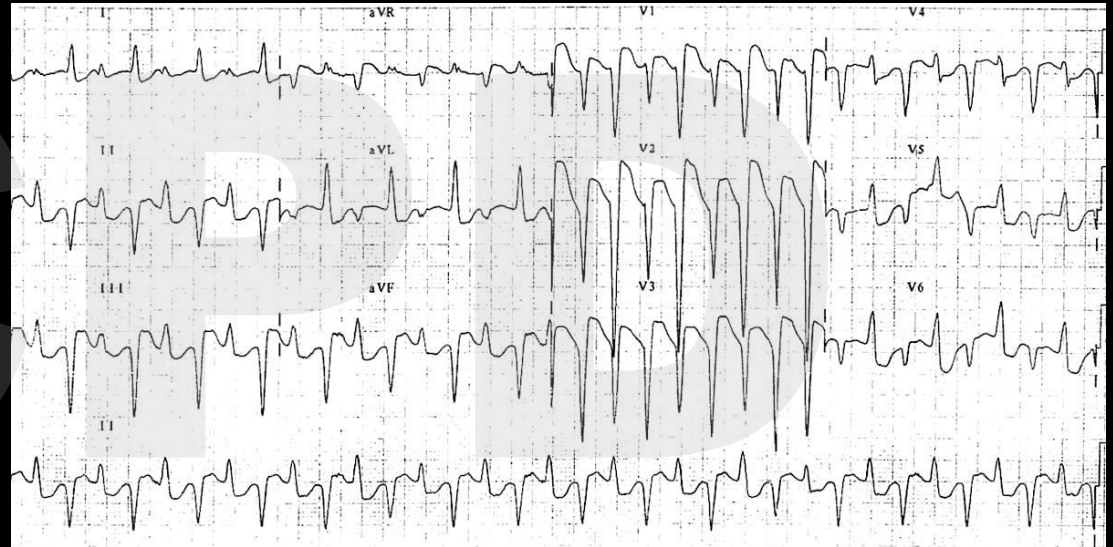
Digitalis purpurea

- Increased vagal tone leads to:
 - Slowed SA/AV conduction
 - Sinus bradycardia
 - AV block
 - (stimulation of carotid baroreceptor -> incr vagal tone)



Digitalis purpurea

- Acute ingestion – symptoms
 - Nausea/vomiting
 - Ectopy with ventricular tachycardia
 - Bradycardia, AV block
 - Hyperkalemia



Digitalis purpurea

- Management
 - Digoxin assay may detect digitoxin, but may not quantify correctly
 - If it is positive, it is evidence that there is digitoxin present (or digoxin)
 - If negative, no conclusion
 - If severe symptoms,
 - Digoxin-specific Fab fragments
 - Incompletely bind to all cardiac glycosides
 - Start with 2 vials

Lily of the Valley



Lilly of the Valley

- Two elliptical green leaves with small white delicate flowers
- Toxin= convallotoxin, convallarin, convallamarin, all **cardiac glycosides**



Look alike

Lily of the valley

Wild onion or Ramps
(*Allium tricoccum*)



Purple stems; smell like garlic

Common foraging mistake in Appalachia

Look alike

Lily of the valley



**False lily of the valley
(Maianthemum dilatatum)**



Look alikes

Lily of the valley



Allium ursinum (wild garlic)

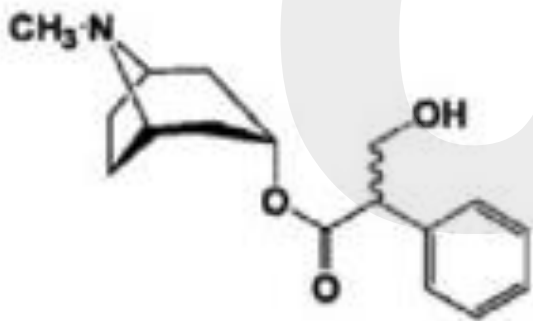


Atropa belladonna (deadly nightshade)

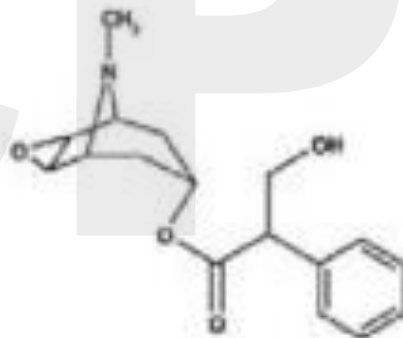


Atropa belladonna

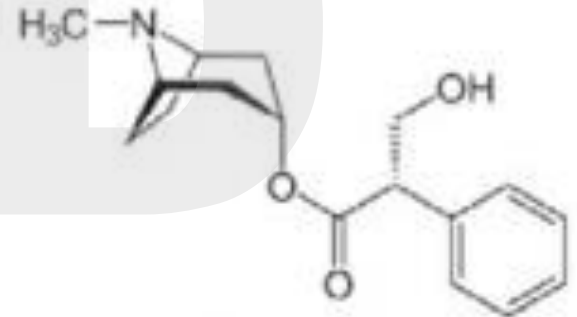
- Contains:
 - **Atropine** (throughout plant)
 - **Scopolamine** (roots)
 - **Hyoscyamine** (flowers, fruits, seeds)
- All antagonize muscarinic acetylcholine receptors



Atropine

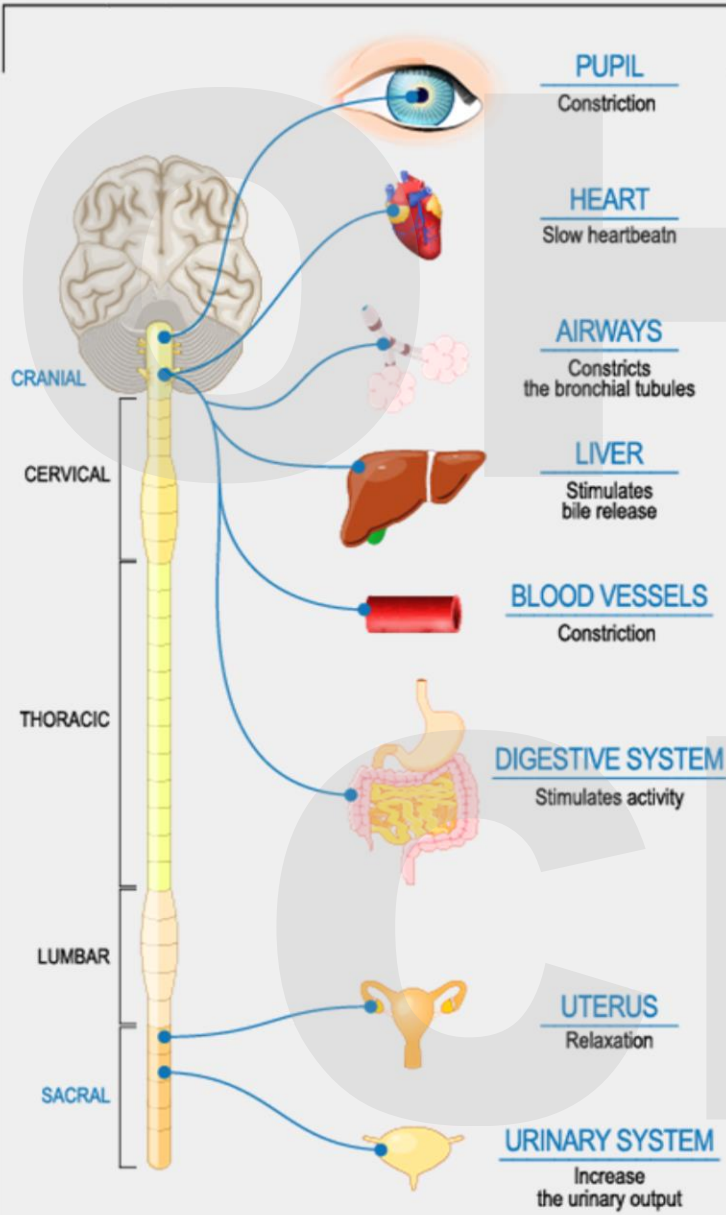


Scopolamine

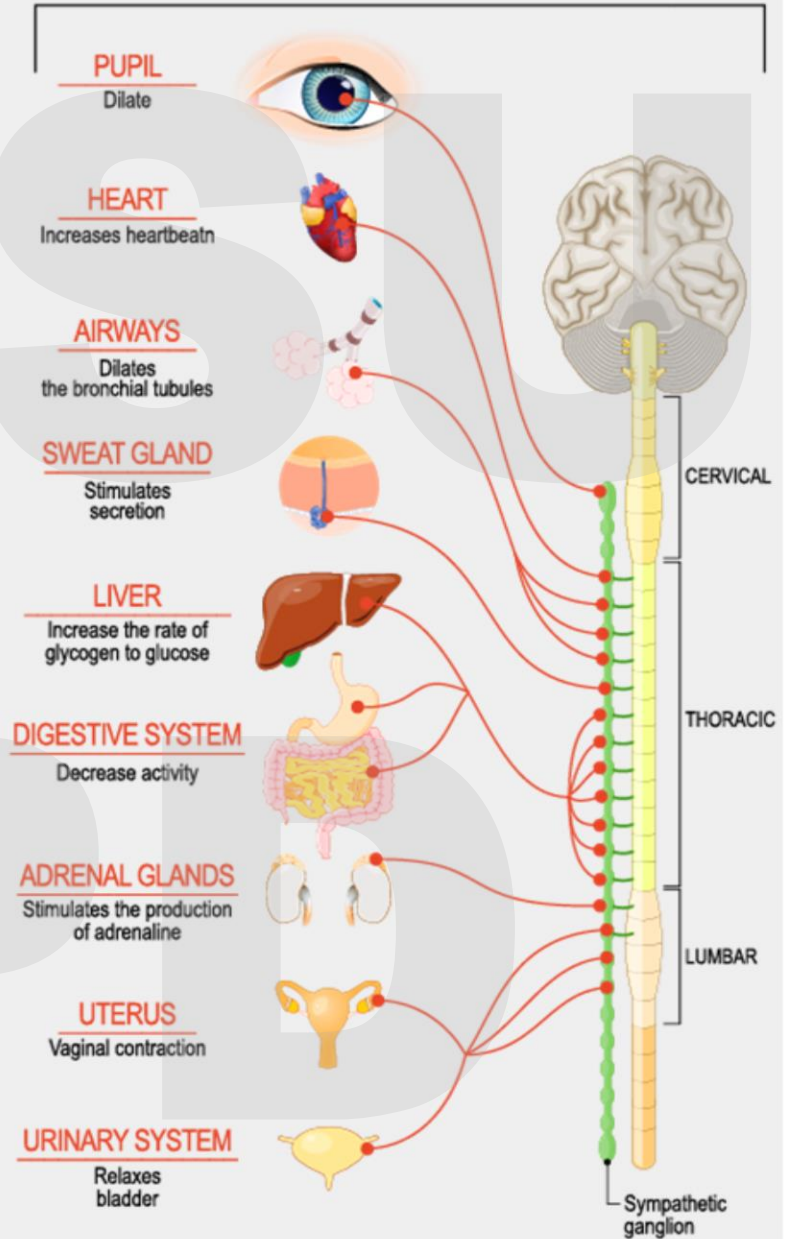


Hyoscyamine

Parasympathetic



Sympathetic



- Symptoms:
 - Mydriasis
 - Tachycardia
 - Urinary retention
 - Ileus/decreased bowel sounds
 - Confusion
 - Hallucinations
 - Flushed dry skin
 - Hyperthermia
 - Seizures

Anticholinergic Toxidrome



Atropa belladonna

- Treatment:
 - Physostigmine, 1-2 mg IV over 5 minutes

CLINICAL TOXICOLOGY
2021, VOL. 59, NO. 8, 698–704
<https://doi.org/10.1080/15563650.2020.1854281>

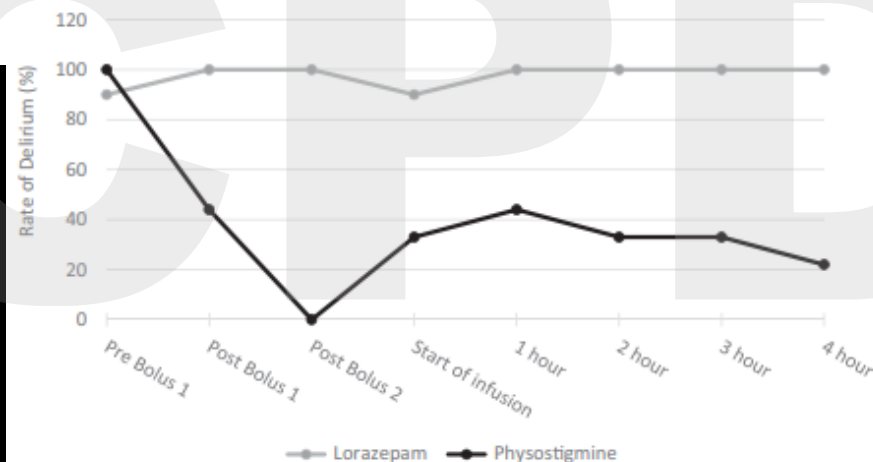


CLINICAL RESEARCH



A randomized trial comparing physostigmine vs lorazepam for treatment of antimuscarinic (anticholinergic) toxidrome

George Sam Wang^a, Keith Baker^b, Patrick Ng^c, Gregory C. Janis^d, Jan Leonard^a, Rakesh D. Mistry^a and Kennon Heard^e



Datura stramonium



Hyoscyamus niger (henbane)



Solanum americanum (American Nightshade)



Solanum dolcamara (bittersweet woody nightshade)



Solanum nigrum (common/black nightshade)



Aconitum columbianum



Aconitum columbianum

Roots may be mistaken for horseradish, but most are gathered for herbal medicine or “out of body experiences”



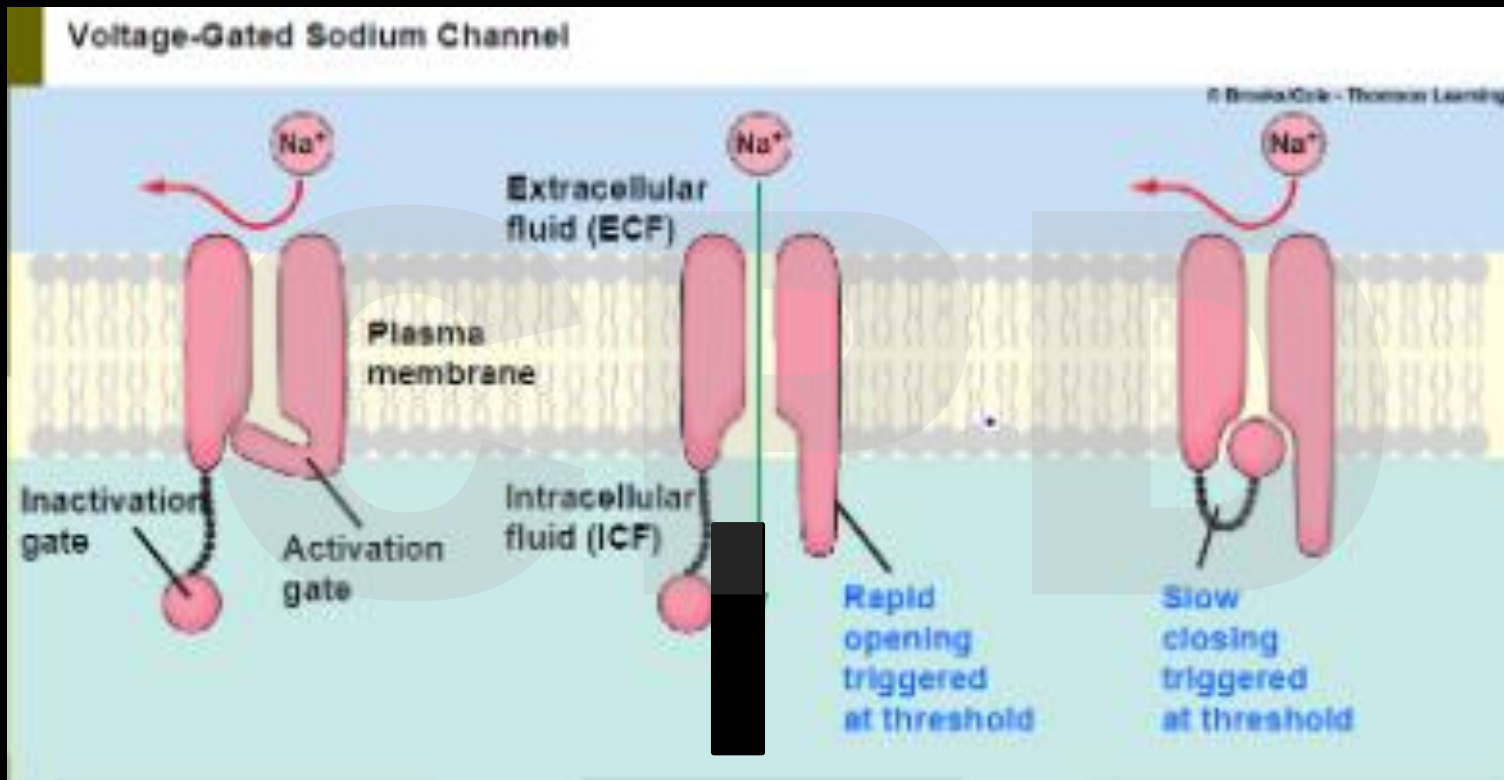
Aconitum root



Horseradish root

Aconitum napellus (monkshood)

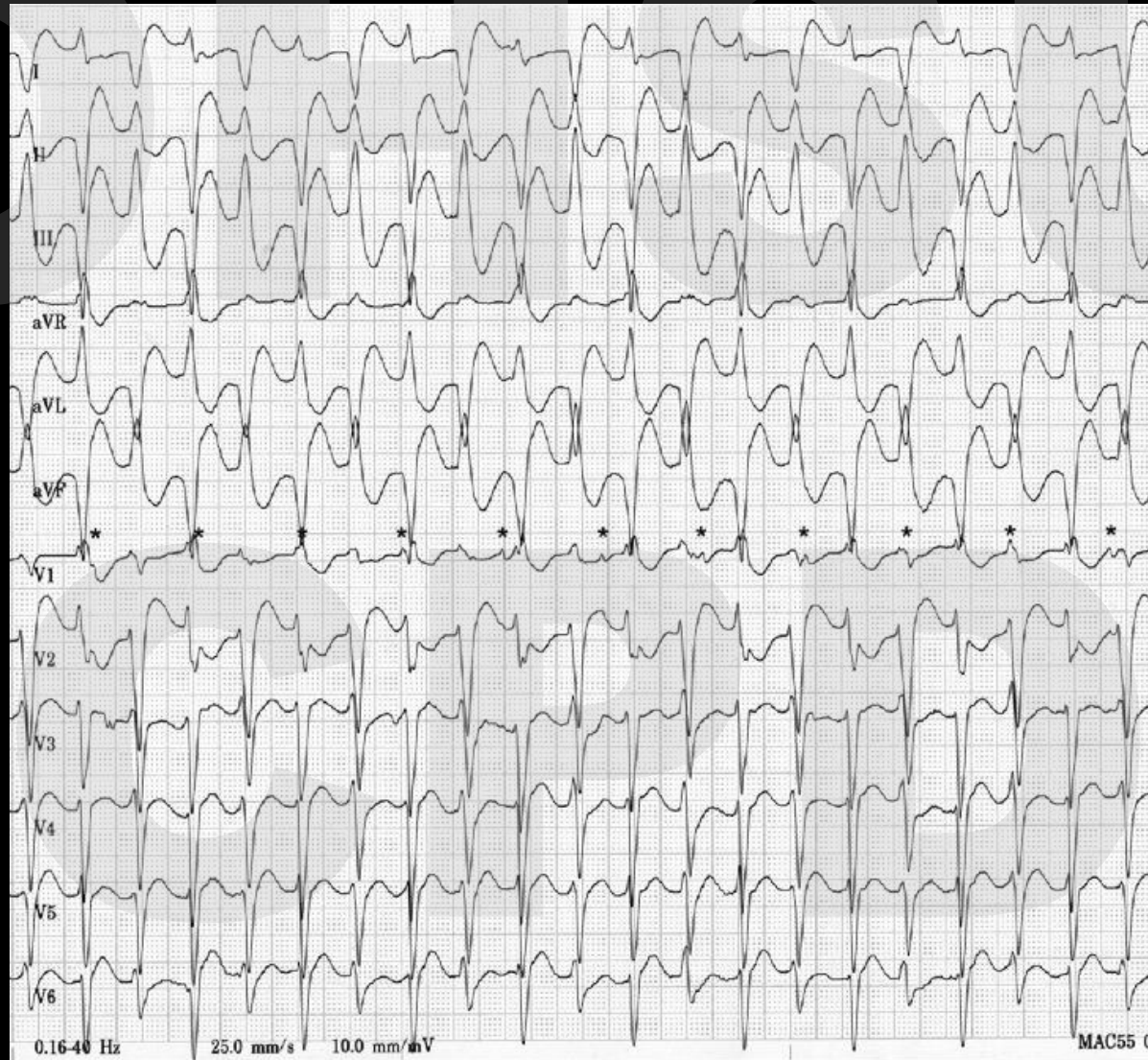
- Toxin = Aconite –
 - Na-channel opener – initial hyperexcitation, then slower repolarization
 - Ca-channel opener



Aconitum napellus (monkshood)

- Sx: 5min to 4 hrs after ingestion:
 - GI = N/V/D, hypersalivation
 - Heart = **Looks a bit like digoxin**
 - sinus bradycardia, then
 - ventricular dysrhythmia
 - Nervous system =
 - Confusion
 - Paresthesias (paresthesias may help differentiate from cardiac glycosides)
 - Respiratory muscle weakness -> paralysis
 - Seizure
- Treatment: supportive
 - Bradycardia – atropine, epinephrine
 - Ventricular dysrhythmias - Amiodarone, magnesium, flecainide, or beta blockers, Ann Emerg Med 2004; 43:574

Bidirectional ventricular tachycardia



Veratrum viride (& spp.)

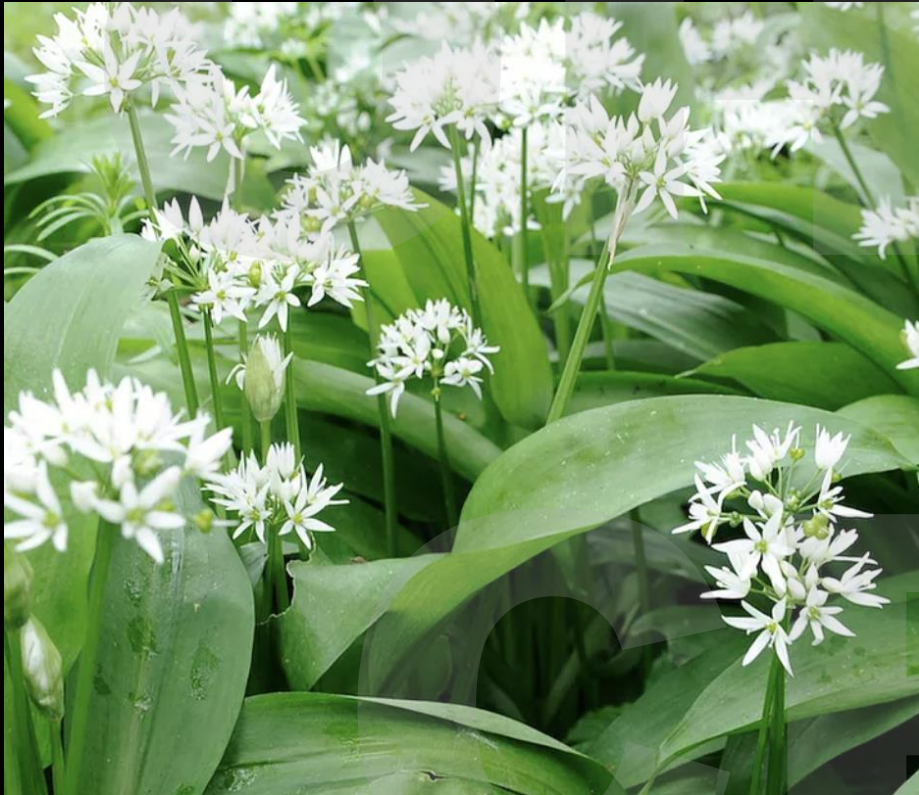


“False Hellebore”

Veratrum spp

- *Veratrum viride, californicum, caudatum, album*
- Veratridine = a **veratrotoxin**
 - Na & Ca channel opener (similar to aconitine, but milder)
- Sx: <1 hour – N/V/D/HA, then bradycardia, hypotension, and cholinergic sxs
- May be mistaken for:
 - Roots = *Allium porrum* (leek),
 - Leaves = *Gentiana lutea* (Europe; used for tea/wine)

Wild garlic (*Allium ursinum*)



Veratrum viride (false hellebore)



Toxicosordion venenosum (death camas) (formerly zigadenus venenosum)



Toxicosordion venenosus (death camas)



Allium cernuum (wild onion)



Toxicosordion venenosus (death camas)

Camassia quamash (Common camas)



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Camassia quamash (common camas)

Toxicosordion venenosus
(death camas)



What do I do?

- Poison Center is here to help
 - References
 - Botanists & identifiers
 - Ability to monitor patients at home
 - If sent to emergency department, we can call ahead and provide information

Questions?

