Neuroscience 3200

Stuart and Redman, J Physiol, 1992

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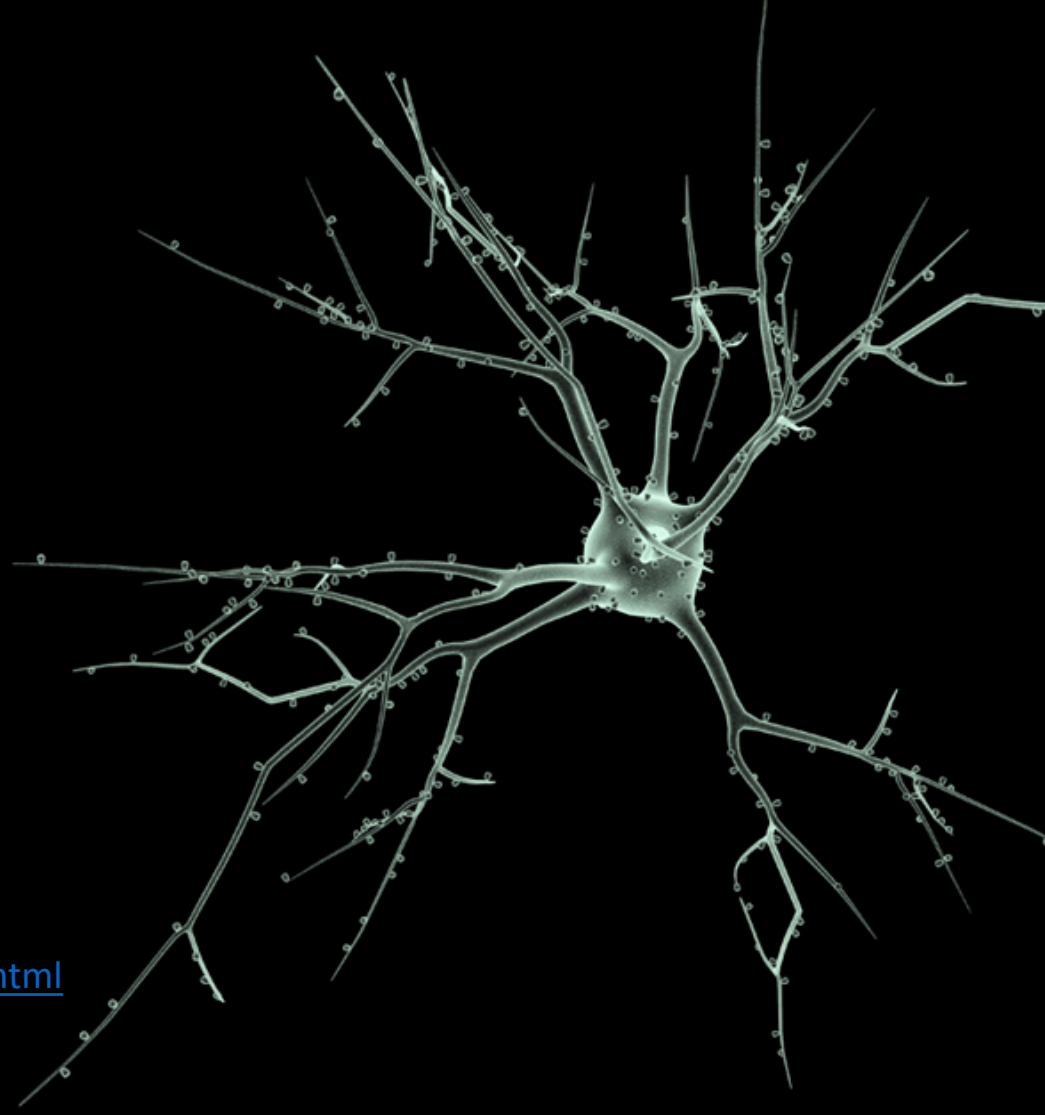

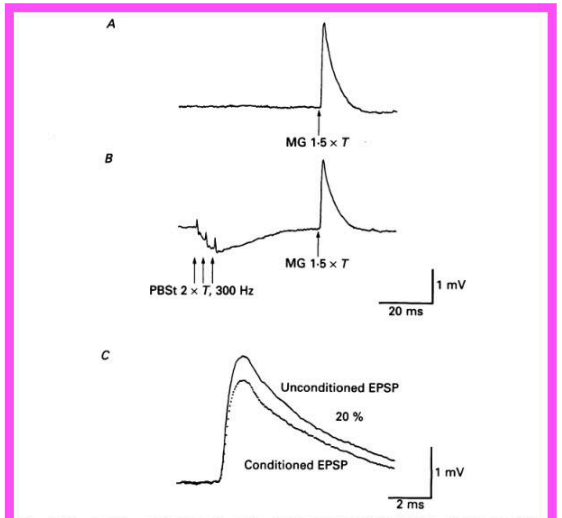

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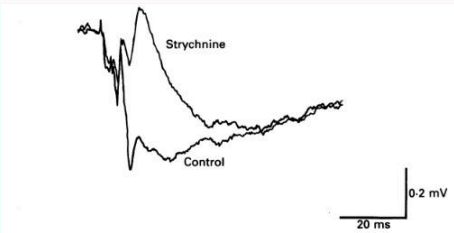

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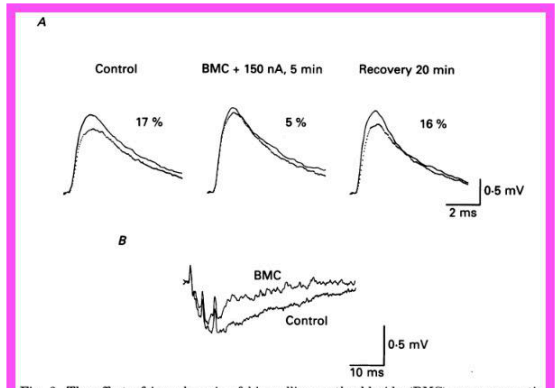

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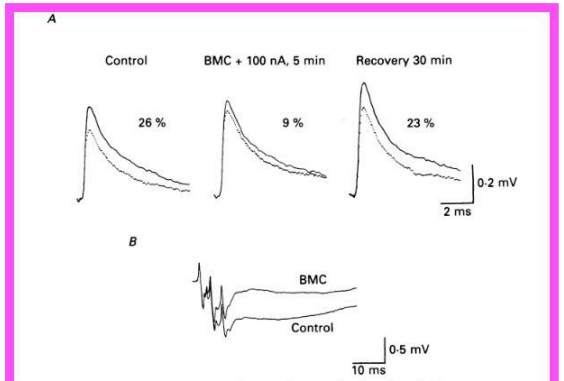

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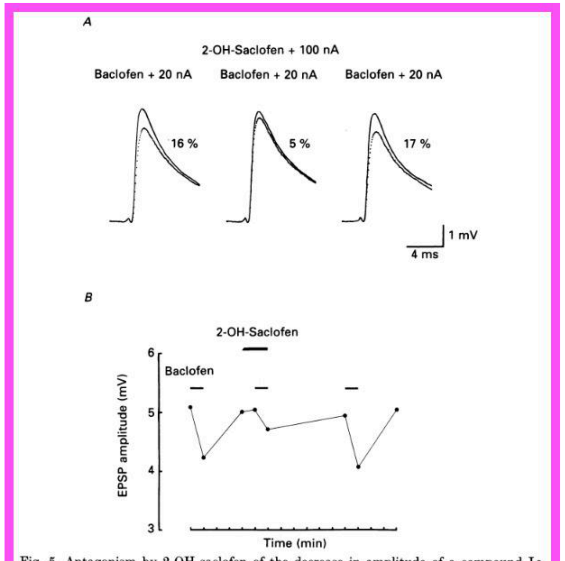

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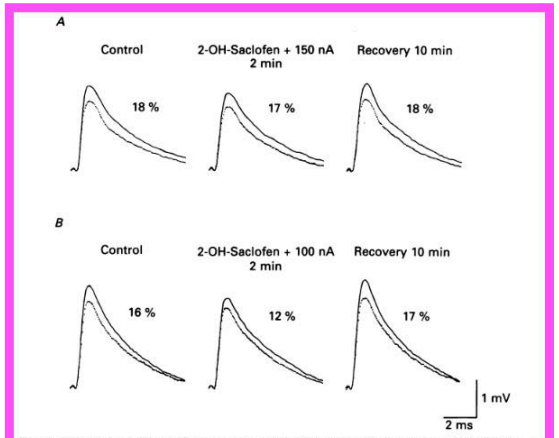

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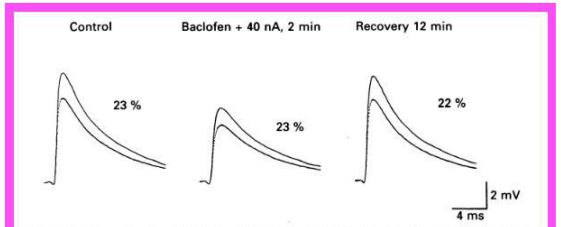

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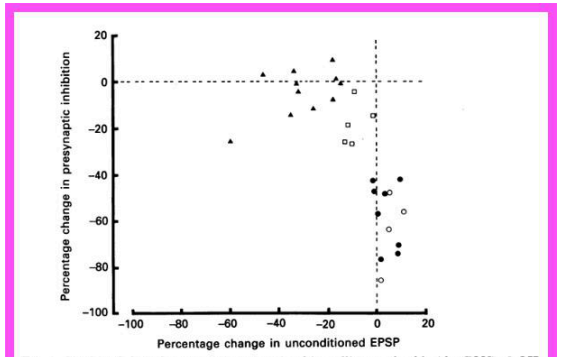

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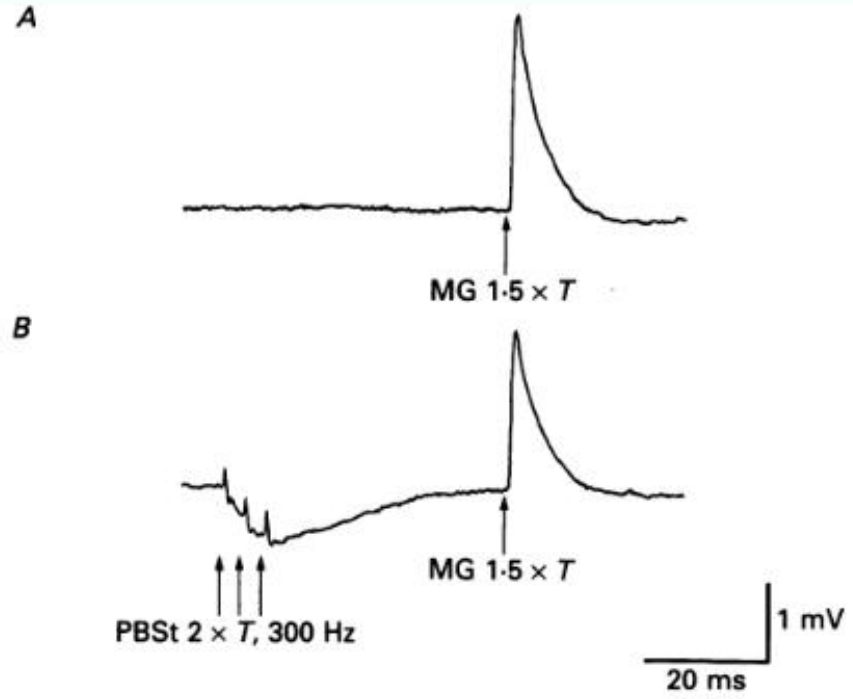

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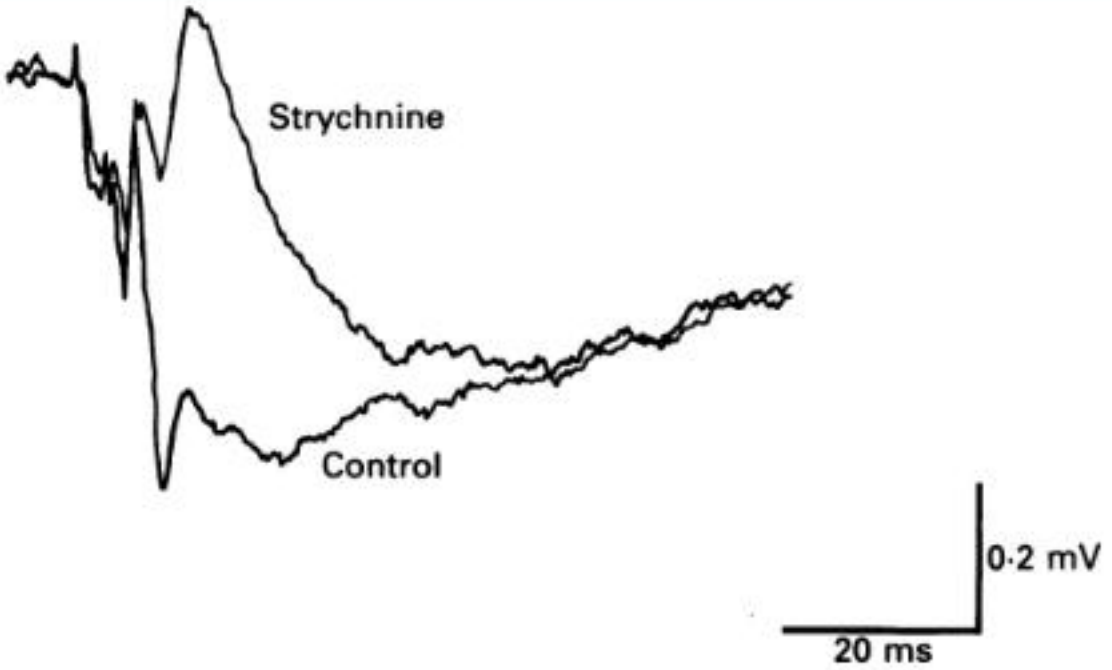

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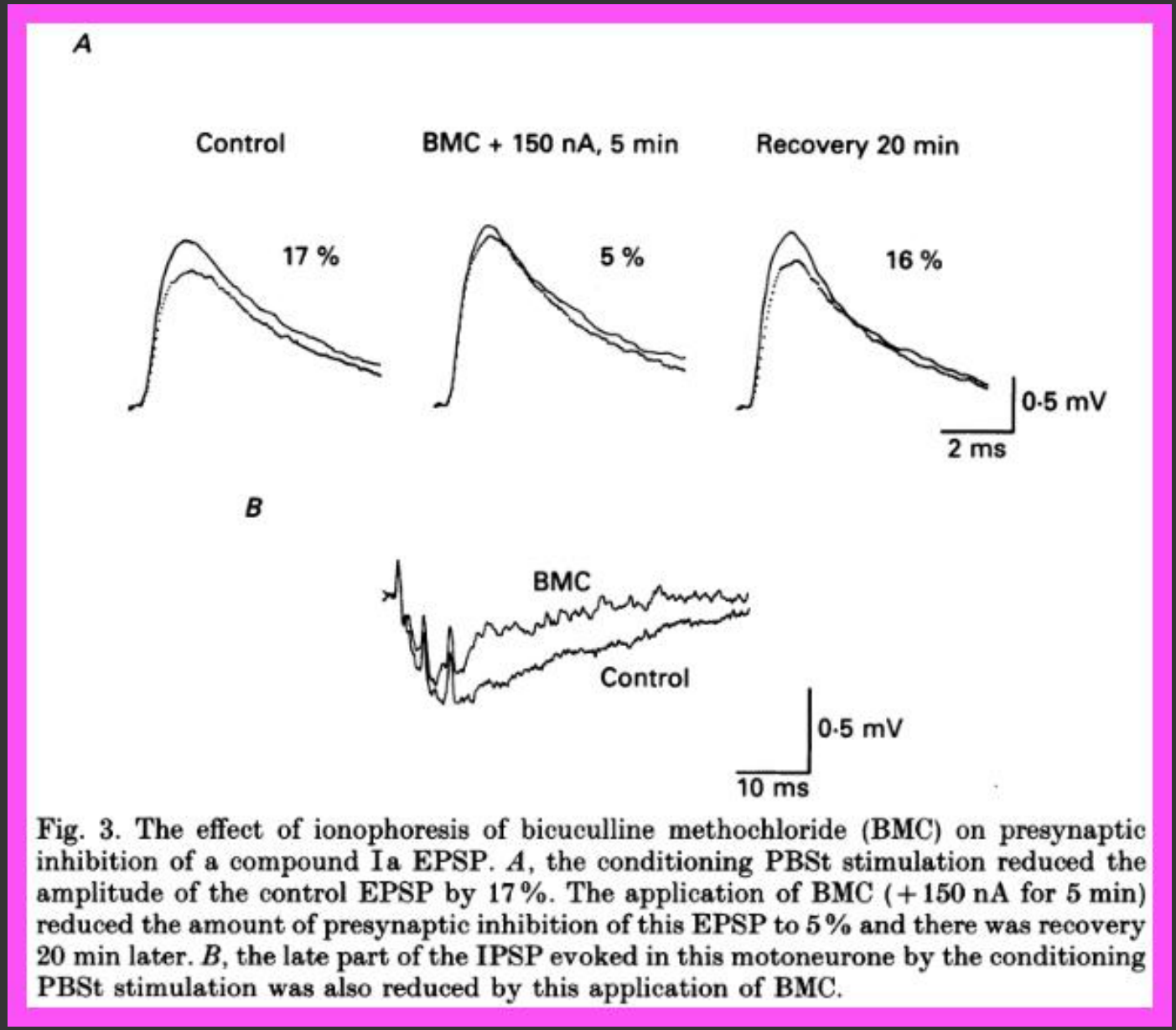

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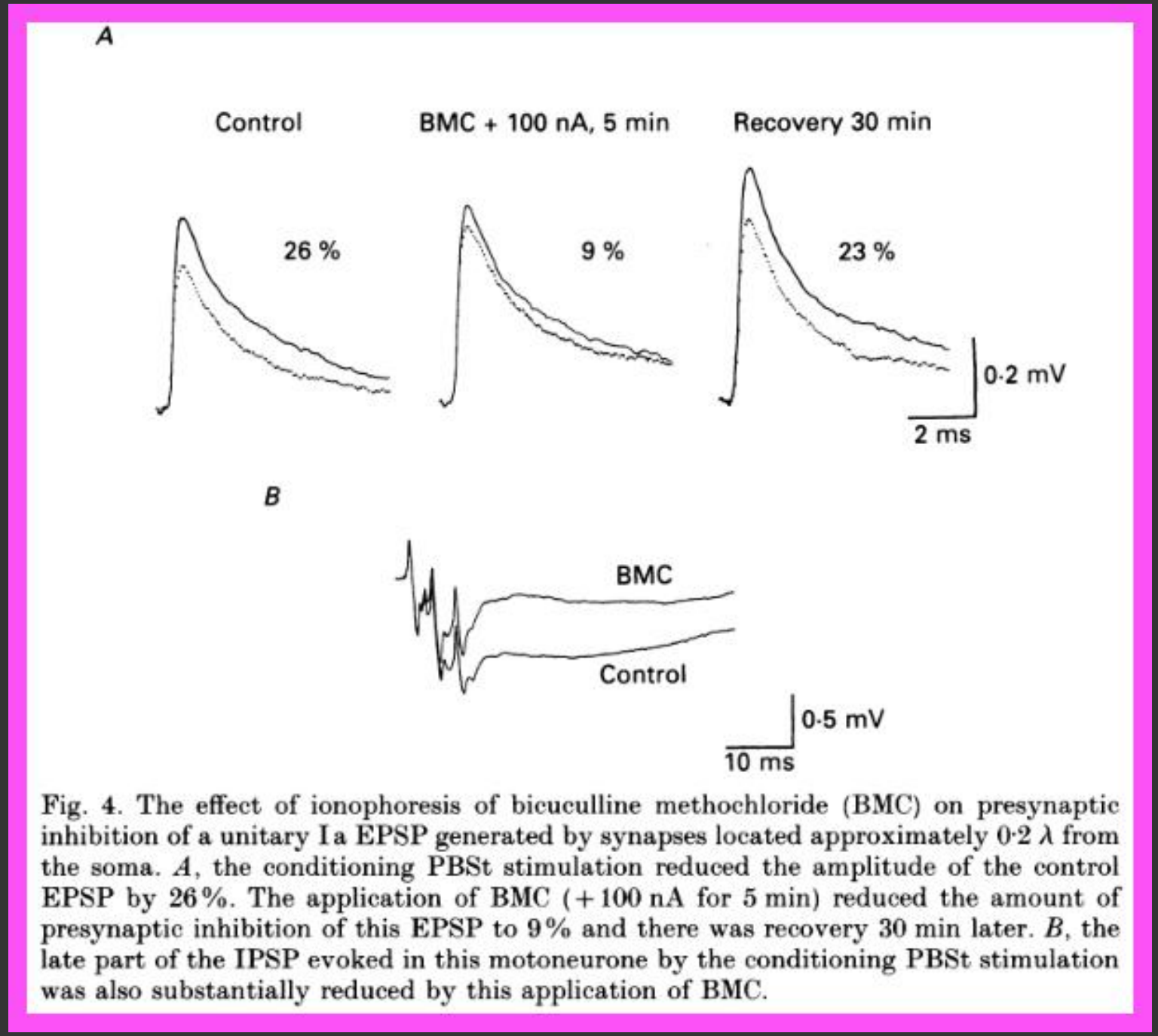

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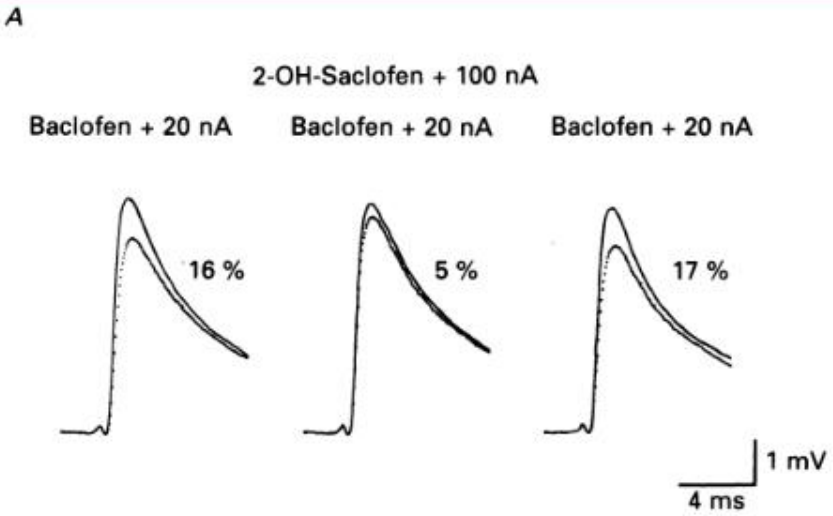

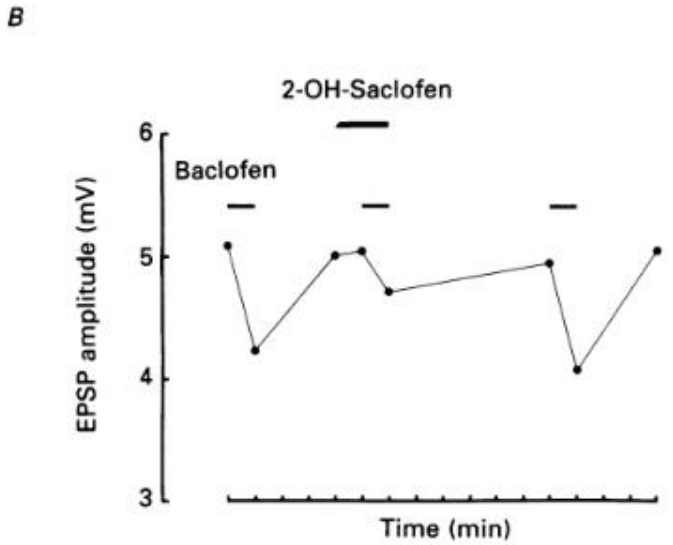

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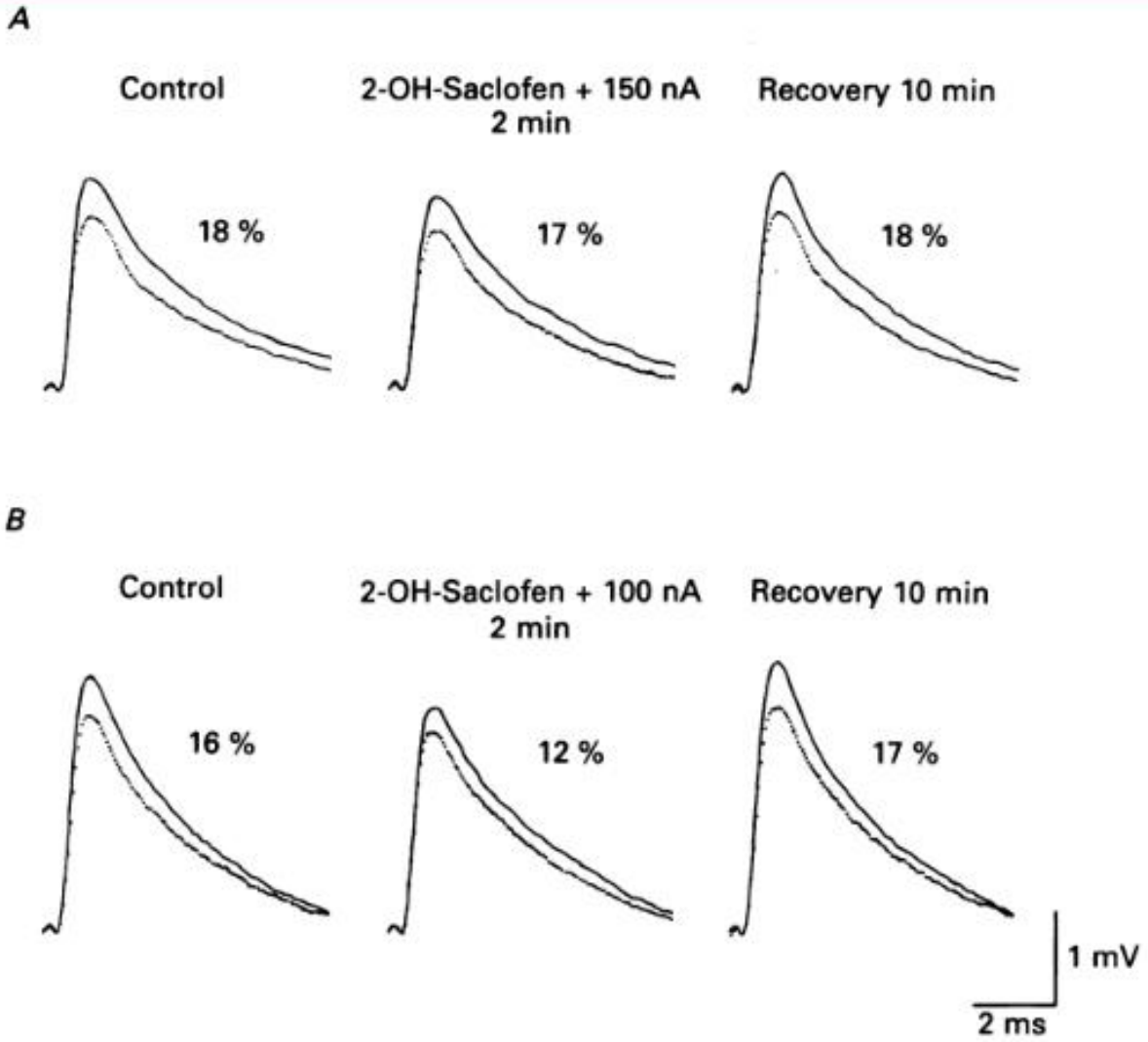

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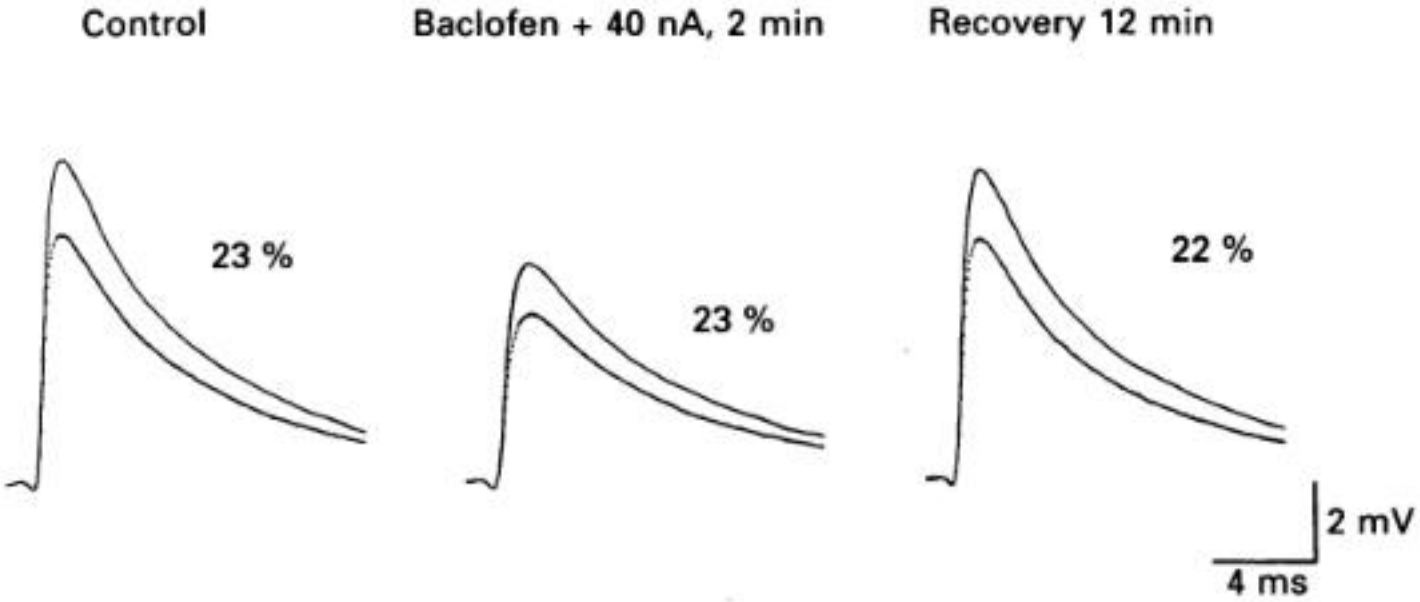

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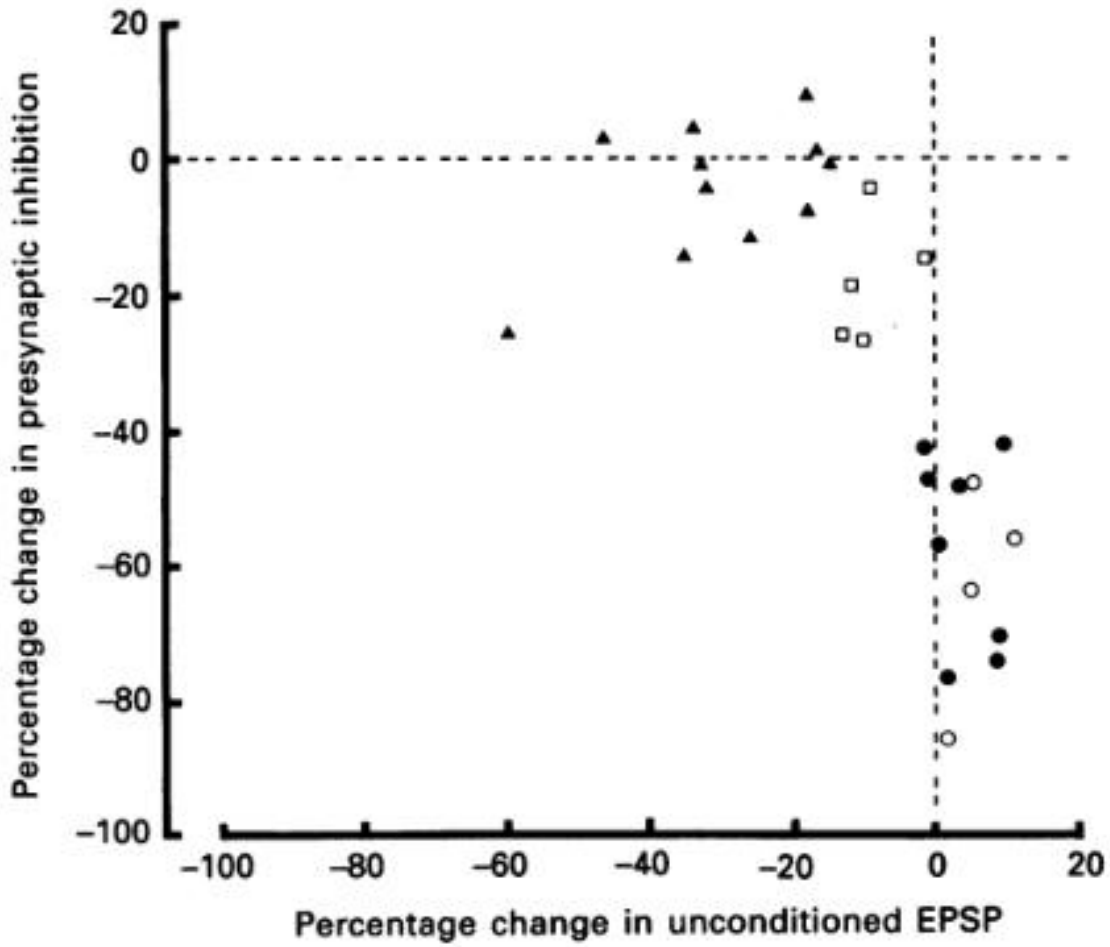

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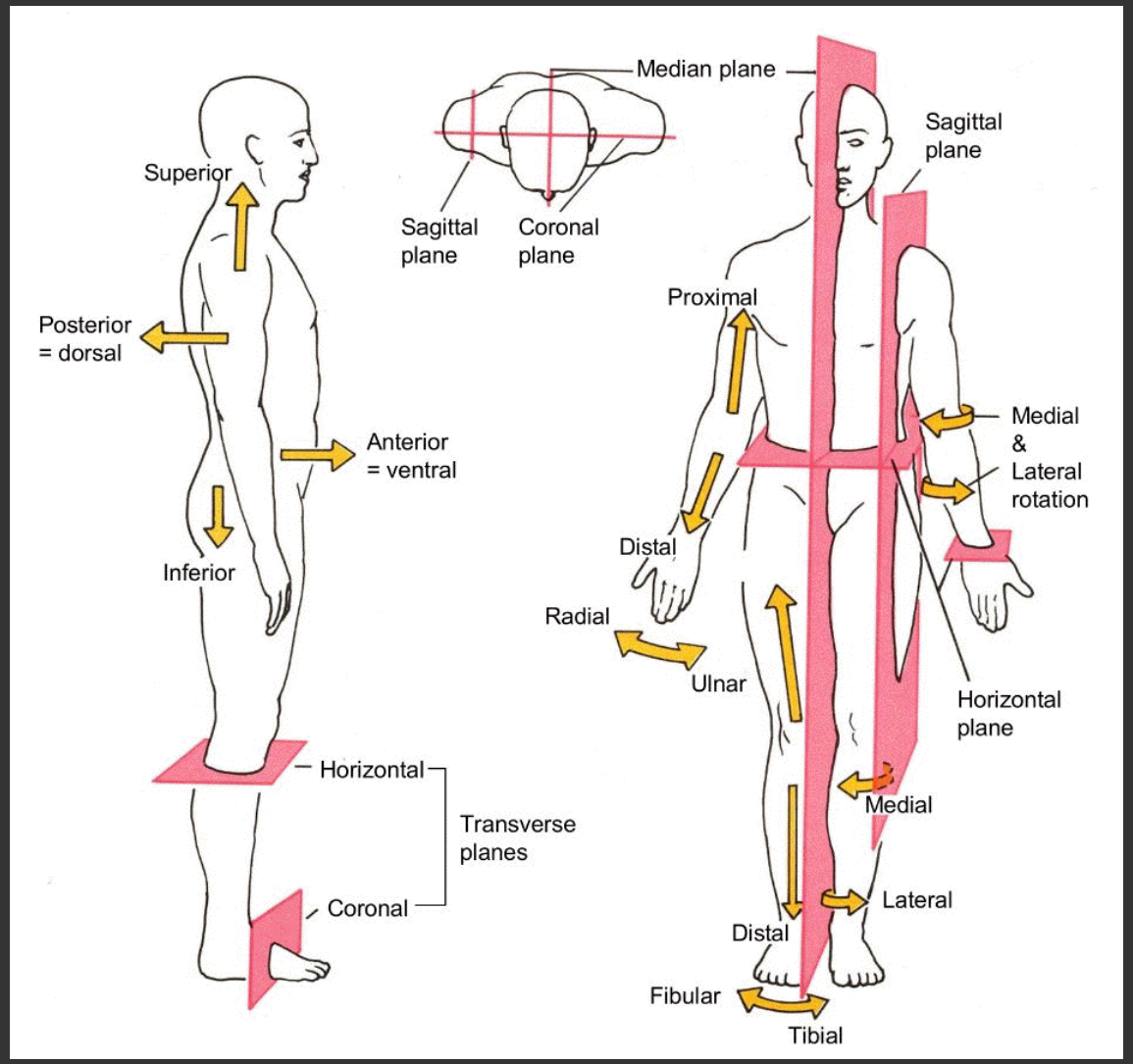
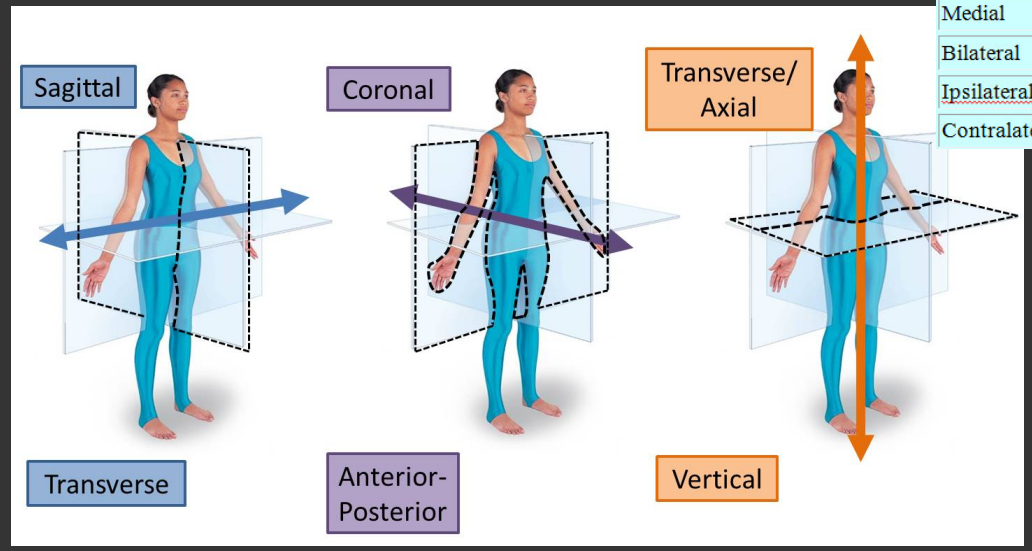
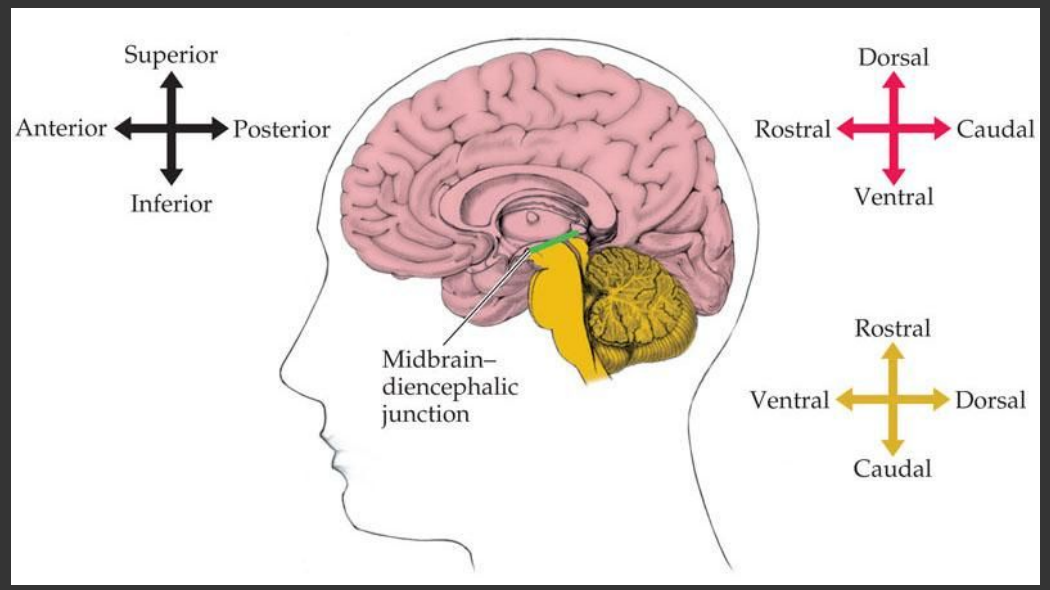
Definition – Direction Terminology

Direction	Description
Ventral	Toward the belly (front)
Dorsal	Toward the back
Rostral	Toward the nose
Caudal	Toward the tail
Superior	Toward the top of the head/body
Lateral	Away from the middle
Medial	Toward the middle
Bilateral	On both sides
Ipsilateral	On the same side
Contralateral	On the opposite side

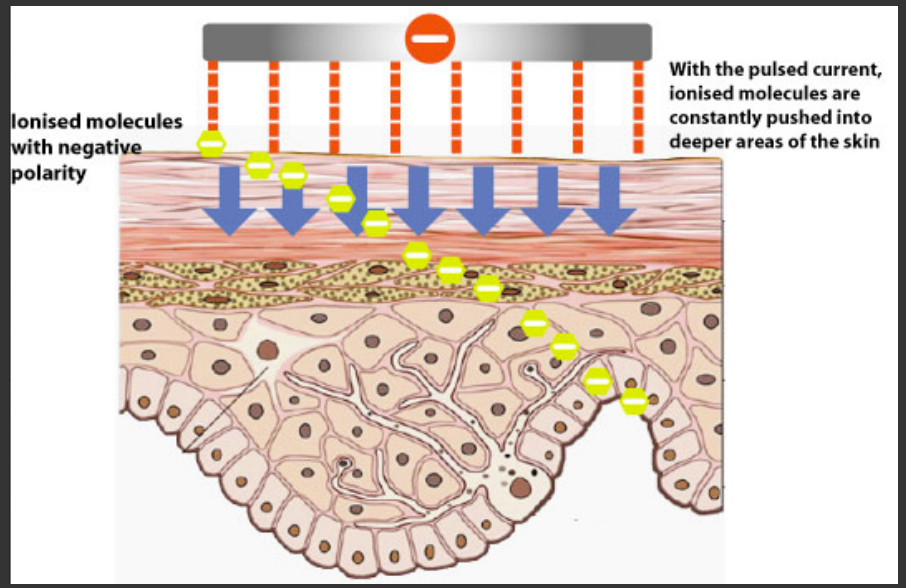


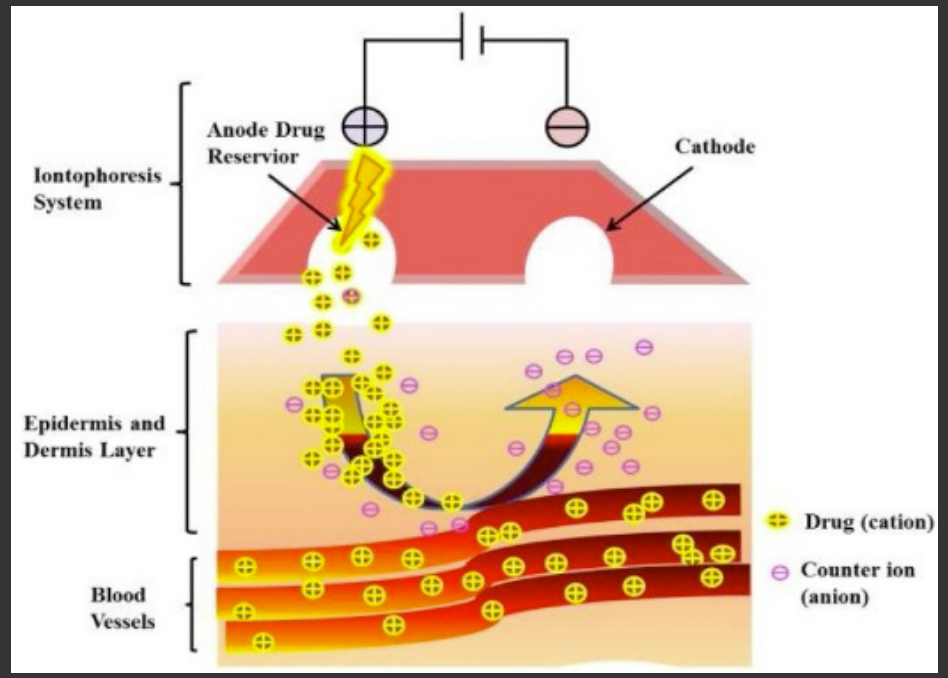


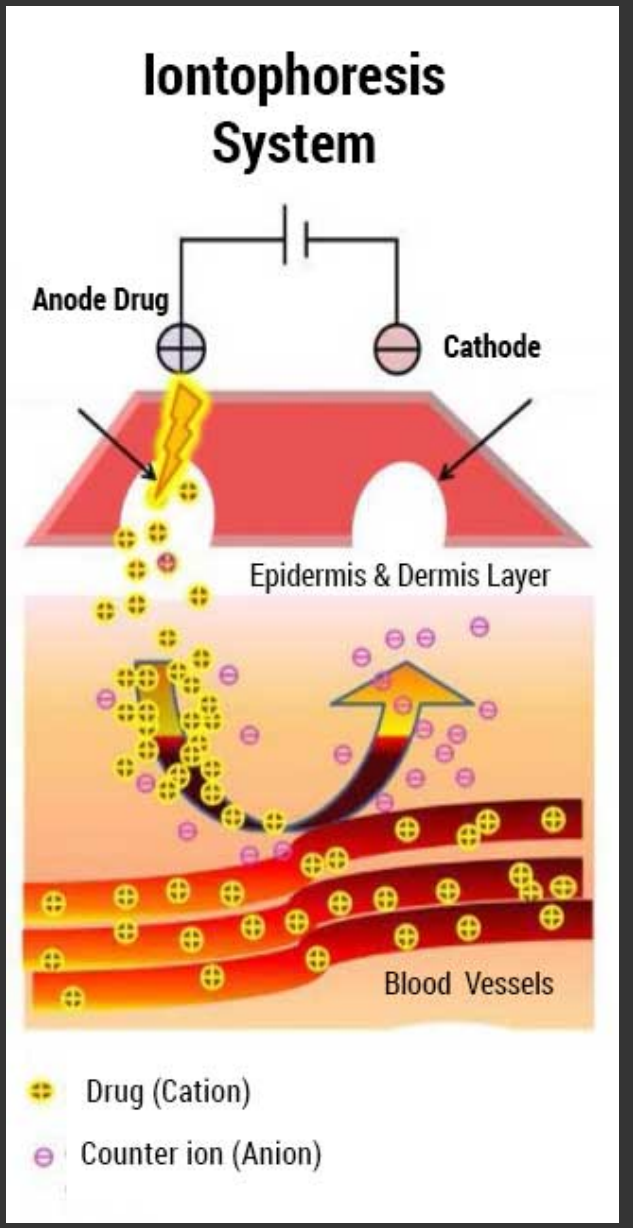


Definition – Iontophoresis / Ionophoresis

- Process of transdermal drug delivery by use of a voltage gradient on the skin.
- Molecules are transported across the stratum corneum by electrophoresis and electroosmosis.

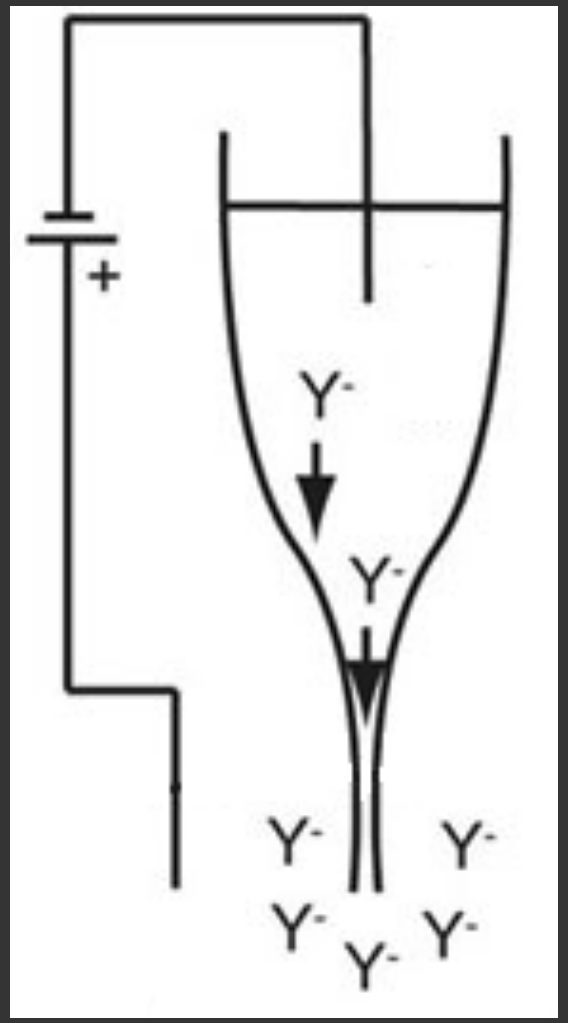






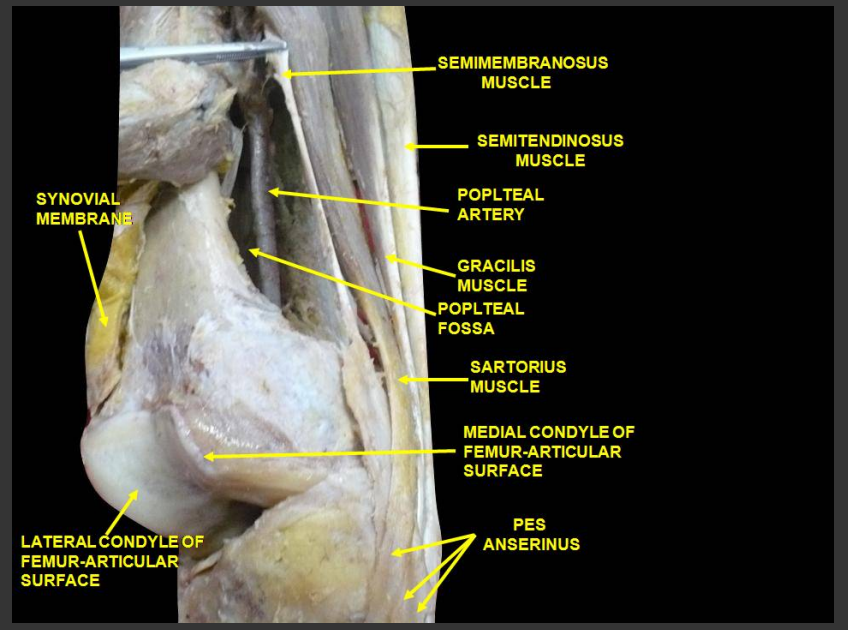
Definition – Iontophoretic Barrels

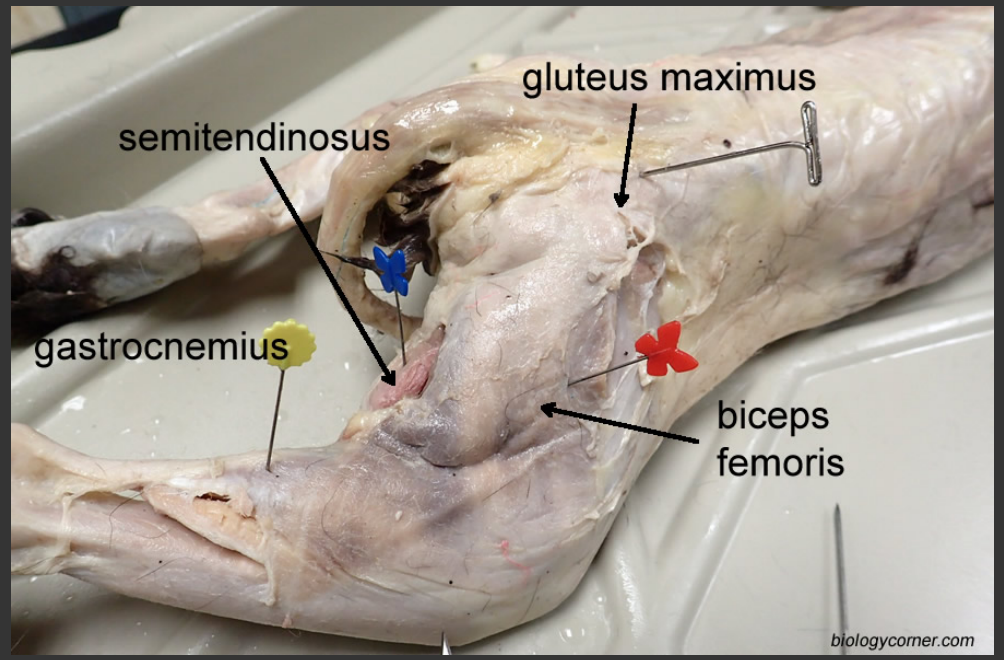
- Basically, a syringe used to administer positive or negative ions.

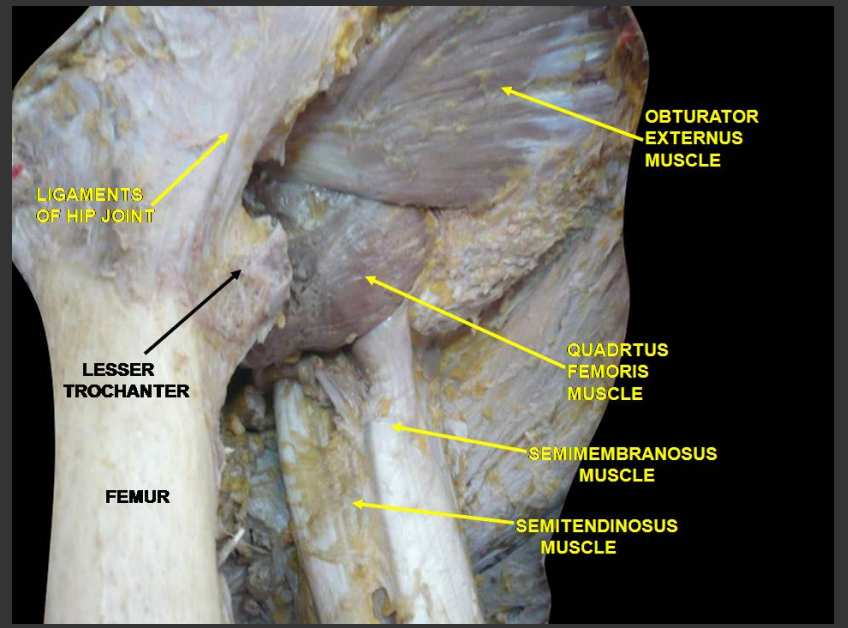


Definition – Posterior Biceps and Semitendinosus (PBSt)

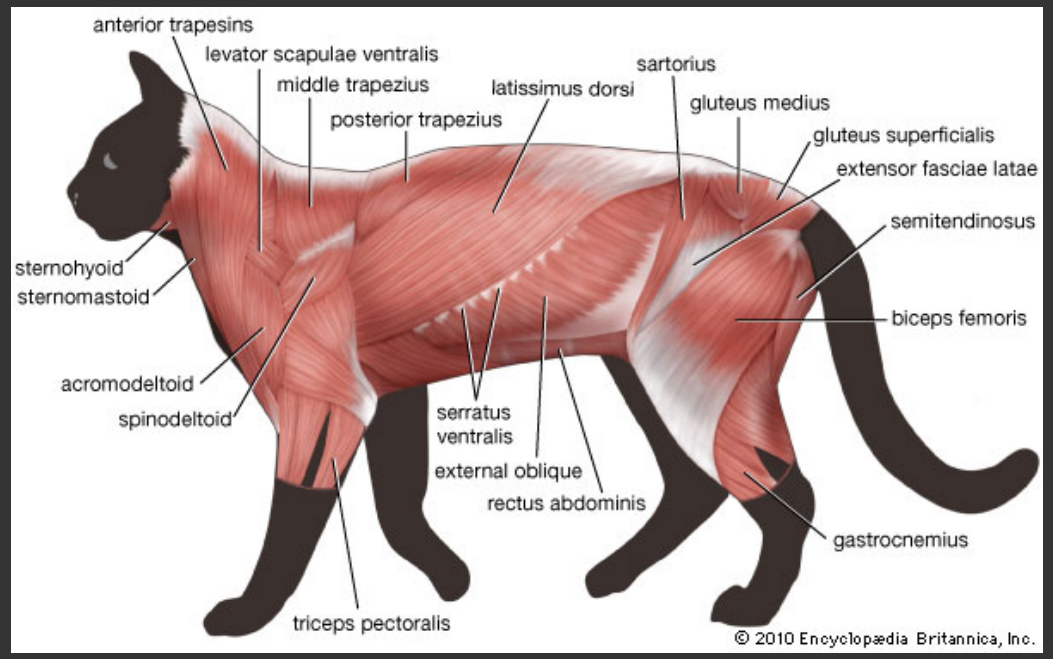
- A lower motor neuron exits to the scral plexus exiting through the spinal levels L5-S2.
- From the sacral plexus, the lower motor neuron travels down the sciatic nerve.

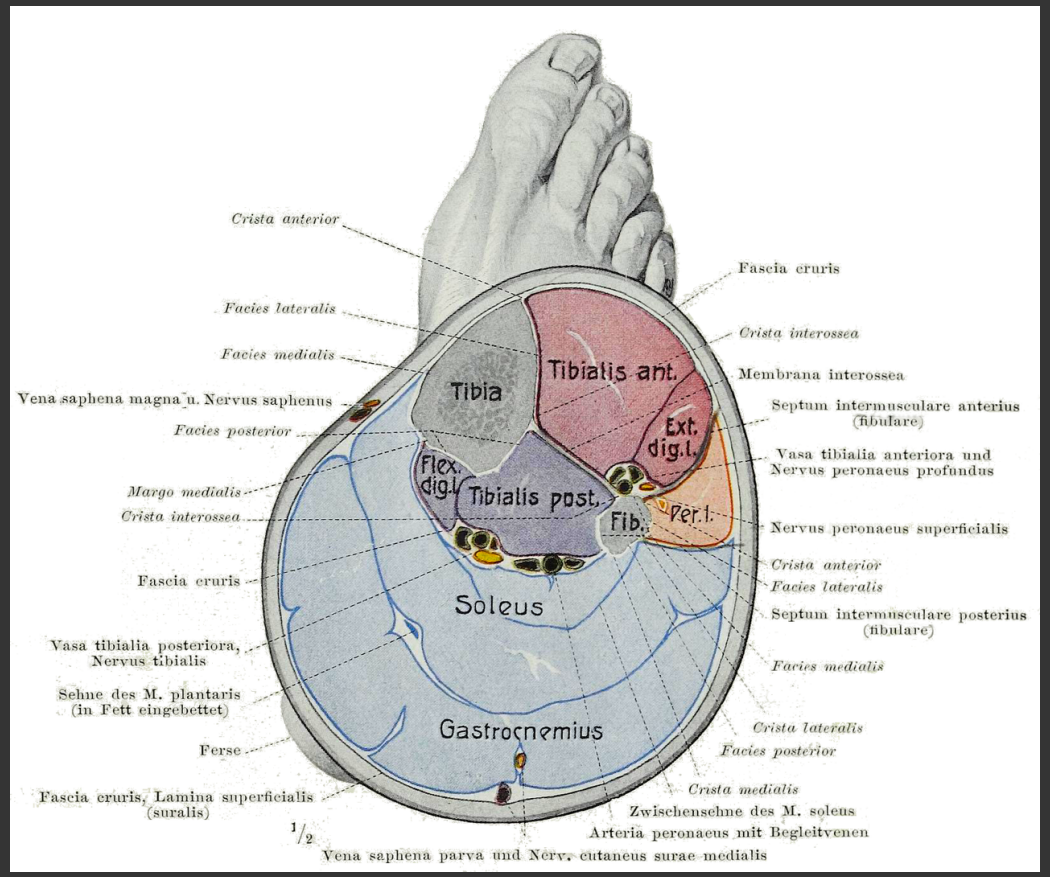


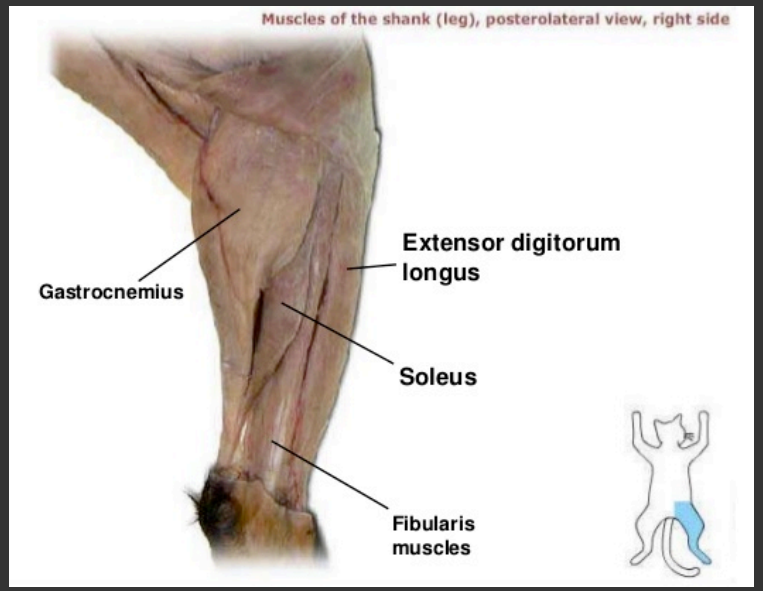




Definition – Medial Gastrocnemius (MG)

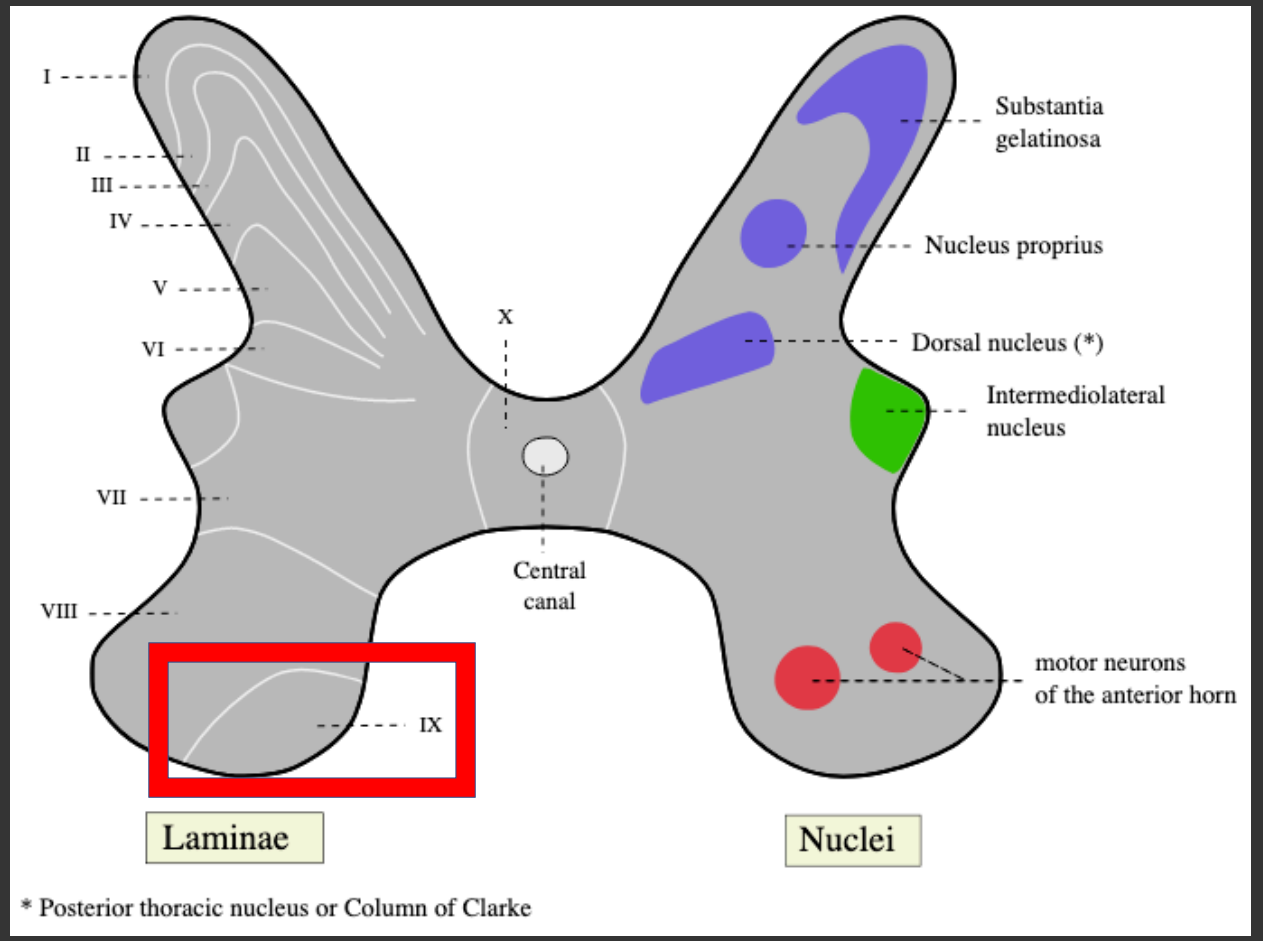




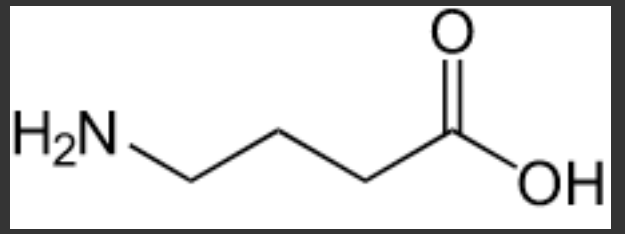


Definition – Alpha Motor Neuron (α-MN)

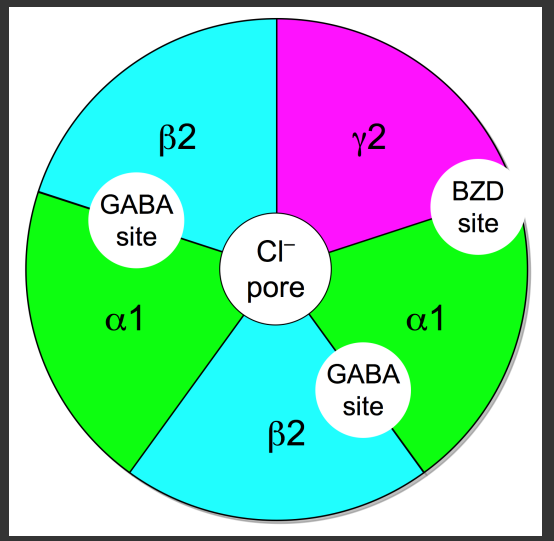
- Located in Lamina 1X
- Gastrocnemius Muscle is innervated by α-MNs in segments S1 and S2 in the caudal spinal cord.



Definition - γ-Aminobutyric Acid (GABA)

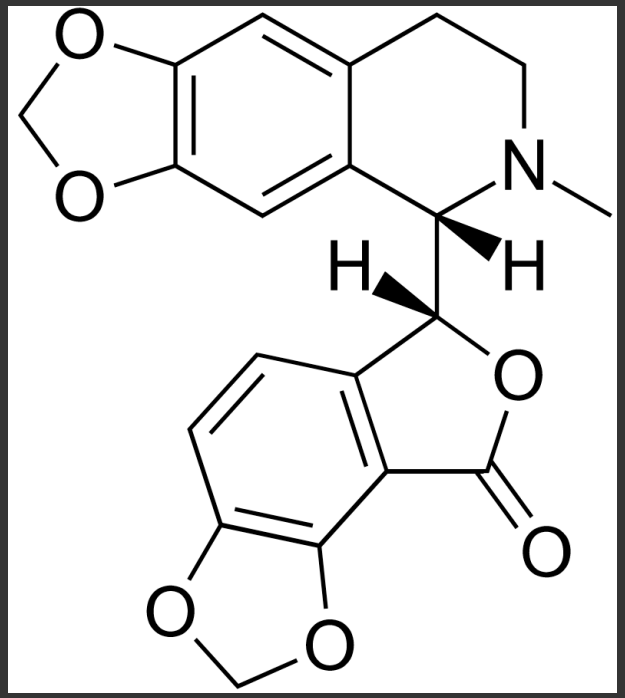


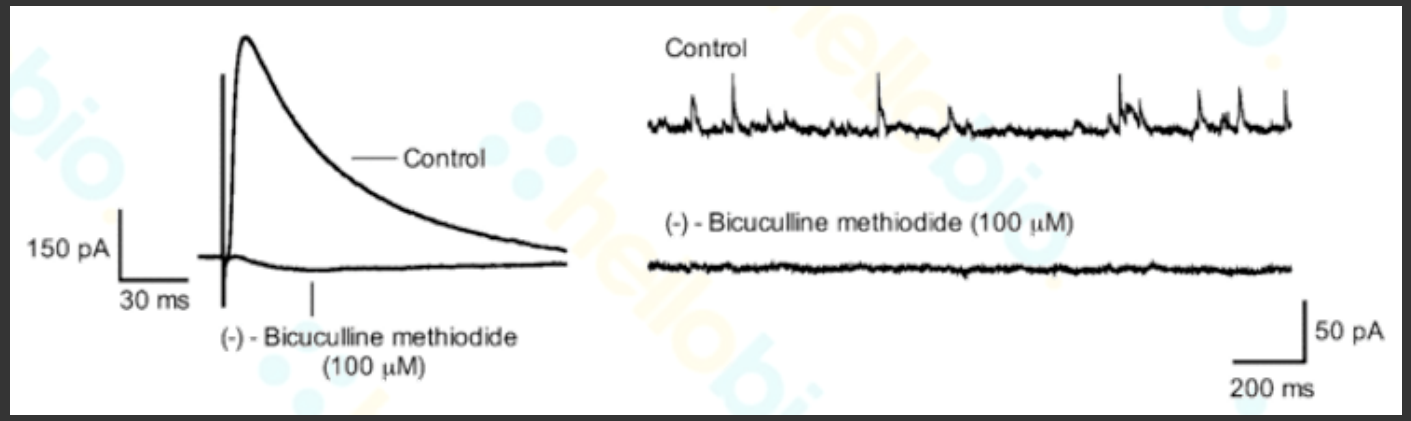
- Inhibitory neurotransmitter
- Functions to reduce neuronal excitability
- $GABA_A$ Receptor is ionotropic and ligand-gated ion channel.
  - Selectively permeable to chloride ions
  - If membrane potential is higher than equilibrium potential for chloride, then chloride will flow inside the cell causing hyperpolarization.
  - The receptor's allosteric control sites are affected by benzodiazepines, barbiturates, and alcohols



Definition – Bicuculline Methochloride (BMC)

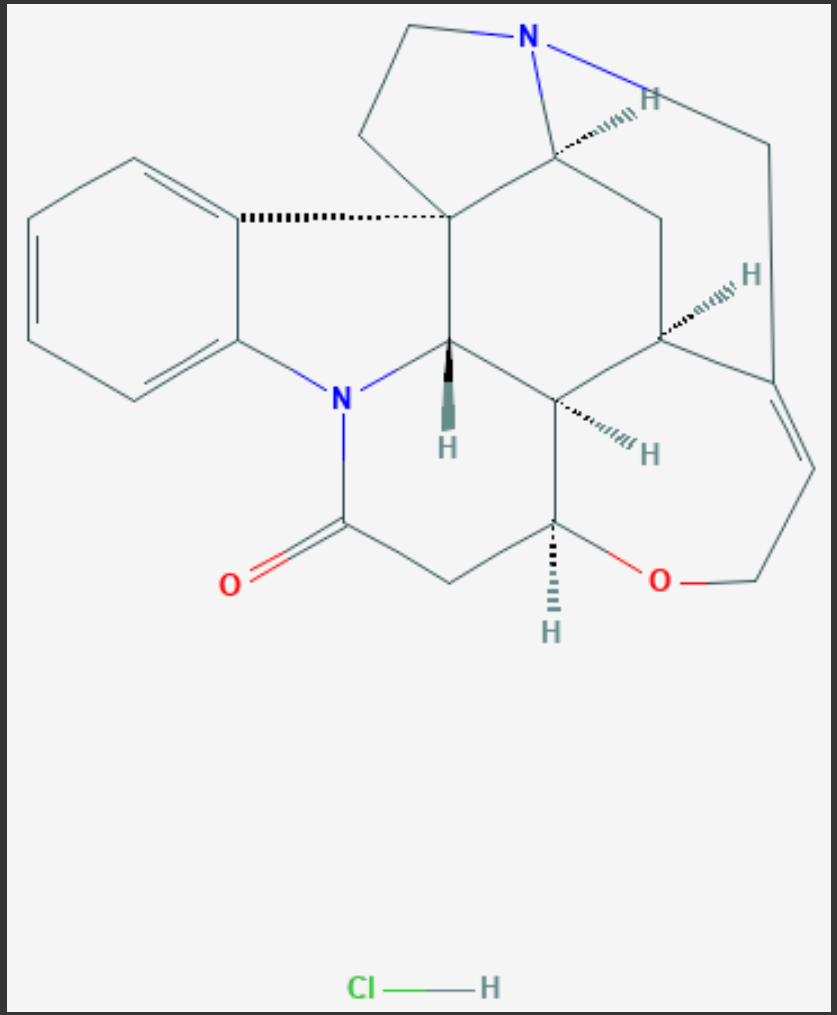
- Competitive antagonist of GABAA receptors
- When administered, it mimics epilepsy and causes convulsions because its blocks GABA receptors.
- Reduces both spontaneous inhibitory post synaptic currents and evoked IPSCs





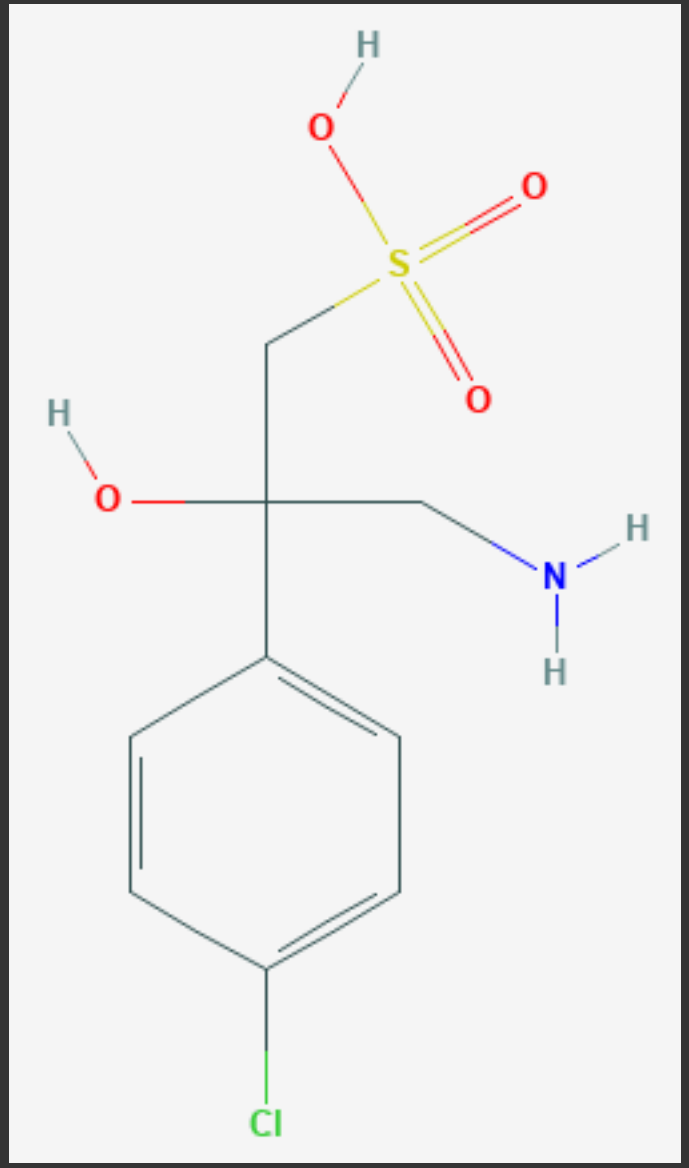
Definition – Strychnine Hydrochloride

- Highly toxic, colorless, bitter, crystalline alkaloid used as a pesticide.
- Causes poisoning which results in muscular convulsions
- Feline IV LD_{50} = 0.33 mg/kg
- Feline Oral LD_{50} = 0.5 mg/kg



Definition – 2-OH - saclofen

- Competitive antagonist for GABAB receptor
- Analogue for the GABAB agonist baclofen.
- Saclofen is paradoxically observed to have an antiepileptic effect.
  - This is probably because GABAB effects is coupled to excitation in the thalmo-cortical circuits
  - Thalmo-cortical circuit overfiring is seen in types of epilepsy involving absence seizures.
  - The Unexpected antiepileptic effects of saclofen may thus be explained.
    - Unexpected as the GABA receptors are inhibitory and antagonizing them should lead to hyperactivity of the affected neurons.
- Possible therapeutic uses of saclofen are currently being researched.
- The (R)-stereoisomer is the one that binds to the $GABA_B$ receptor.

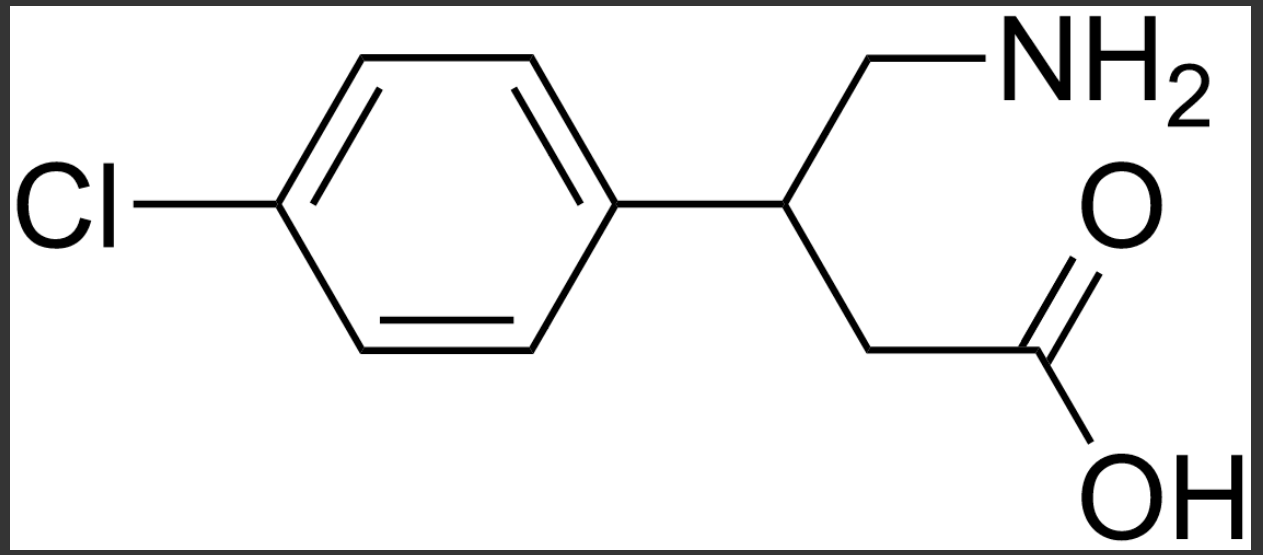


https://pubchem.ncbi.nlm.nih.gov/compound/2-Hydroxysaclofen#section=Structures

https://en.wikipedia.org/wiki/Saclofen

Definition – (–) -baclofen

- Medication used to treat muscle spasticity.
- May be used for hiccups and muscle spasms
- Believed to work by decreasing neurotransmitters
- Effects are likely not by activation of $GABA_B$ receptor, but rather by activation of the GHB receptor.
- Believed to work by activating (or agonizing) GABA receptors, specifically the $GABA_B$ receptor.



https://en.wikipedia.org/wiki/Baclofen