PAIN MANAGEMENT

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Lecture headlines:

- Gate control theory.
- Codeine
- Tramadol
We have 2 types of nerve fibers: 1) **thin** (pain, Aδ & C fibers) and 2) **large** diameter (non-nociceptive, Aβ fibers) nerve fibers carry information from the site of injury to two destinations in the dorsal horn of the spinal cord:

- **transmission cells** that carry the pain signal up to the brain, and
- **inhibitory interneurons** that impede transmission cell activity.
Activity in both thin and large diameter fibers *excites* transmission cells.

Thin fiber activity *impedes* the inhibitory cells (tending to indirectly allow the transmission cell to fire) and large diameter fiber activity *excites* the inhibitory cells (tending to inhibit transmission cell activity). So, the more large fiber (touch, pressure, vibration) activity relative to thin fiber activity at the inhibitory cell, the less pain is felt.
So by definition Gate control theory states that: activation of nerves which do not transmit pain signals, called non-nociceptive fibers, can interfere with signals from pain fibers, thereby inhibiting pain. Therefore, stimulation by non-noxious input is able to suppress pain.

Thus, depending on the relative rates of firing of C and Aβ fibers, the firing of the nonnociceptive fiber may inhibit the firing of the projection neuron and the transmission of pain stimuli.
Gate control theory thus explains how stimulus that activates only nonnociceptive nerves can inhibit pain. The pain seems to be lessened when the area is rubbed because activation of nonnociceptive fibers inhibits the firing of nociceptive ones in the laminae.

In *transcutaneous electrical nerve stimulation (TENS)*, nonnociceptive fibers are selectively stimulated with electrodes in order to produce this effect and thereby lessen pain.
CODEINE

- A naturally occurring opioid.
- Weak analgesic compared to morphine.
- Used only for mild–moderate pain.
- It exerts its effect by acting on the \( \mu \) opioid receptors on the membranes of certain cells in the CNS.
- Used to decrease pain \textit{by increasing the threshold for pain} without impairing consciousness or altering other sensory functions.
- Actions include: Analgesia, euphoria, reduction of intestinal motility and depression of cough reflex.
- Commonly used in combination with \textit{acetaminophen} for management of pain.
Routes of administration: oral, rectal, Sc & IM injections.

Side effects: include vomiting, constipation, itchiness, lightheadedness, and drowsiness dysphoria (anxiety, depression). Serious side effects may include breathing difficulties and addiction.

It is unclear if its use in pregnancy is safe. Care should be used during breastfeeding as it may result in opiate toxicity in the baby.

Not recommended for use in the presence of renal failure.
A centrally acting synthetic opioid that binds to the μ receptor.

It’s used to manage moderate to moderately severe pain.

less potential for abuse and respiratory depression than morphine.

the onset of pain relief usually begins within an hour.

It is also a serotonin–norepinephrine reuptake inhibitor.
Cont.,

- **Routes of administration**: mouth, IV, IM, rectal.

- **Side effects**:
  - constipation, itchiness, and nausea.
  - Serious side effects may include **seizures**, increased risk of **serotonin syndrome**, decreased alertness, and **drug addiction**.

  - A **change in dosage** may be recommended in those with kidney or liver problems.

  - It **is not recommended** in those who are at risk of suicide or in those who are pregnant.

  - While **not recommended** in women who are breastfeeding, those who take a single dose should not generally stop breastfeeding.
Overdose can be observed as a coma, constricted pupils, seizures, respiratory depression, bradycardia, hypotension, cardiac arrest, and death.

- Naloxone (opioid antagonist) can only partially reverse the analgesia produced by tramadol.
- Anaphylactoid reactions have been reported
THANK YOU