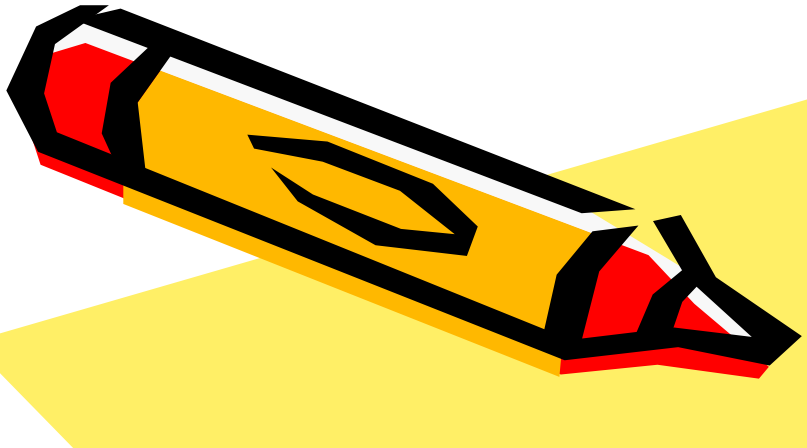

Opiate Receptors

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Opiate Receptors

- Mechanism of Opiate Receptors
- Types and Actions of Opiate Receptors
- Common Opiates
- Effects of Opiates

Mechanism

Opioids are powerful analgesic agents and have been widely used in clinical pain management for decades. Opiate receptors presynaptically modulate the release of NTs;

- acetylcholine
- norepinephrine
- dopamine
- Serotonin
- substance P

Opiate receptors act on G-peptides, linked to post-synaptic intracellular enzymes (such as adenylyl cyclase) or ion channels (such as K+, Ca++).

In high doses the opiates cause generalized CNS depression sufficient for surgical anesthesia.

Opioid receptor-evoked cellular responses

- **Direct G-protein bg or a subunit-mediated effects**
  . activation of an inwardly rectifying potassium channel
  . inhibition of voltage operated calcium channels (N, P, Q and R type)
  . inhibition of adenylyl cyclase

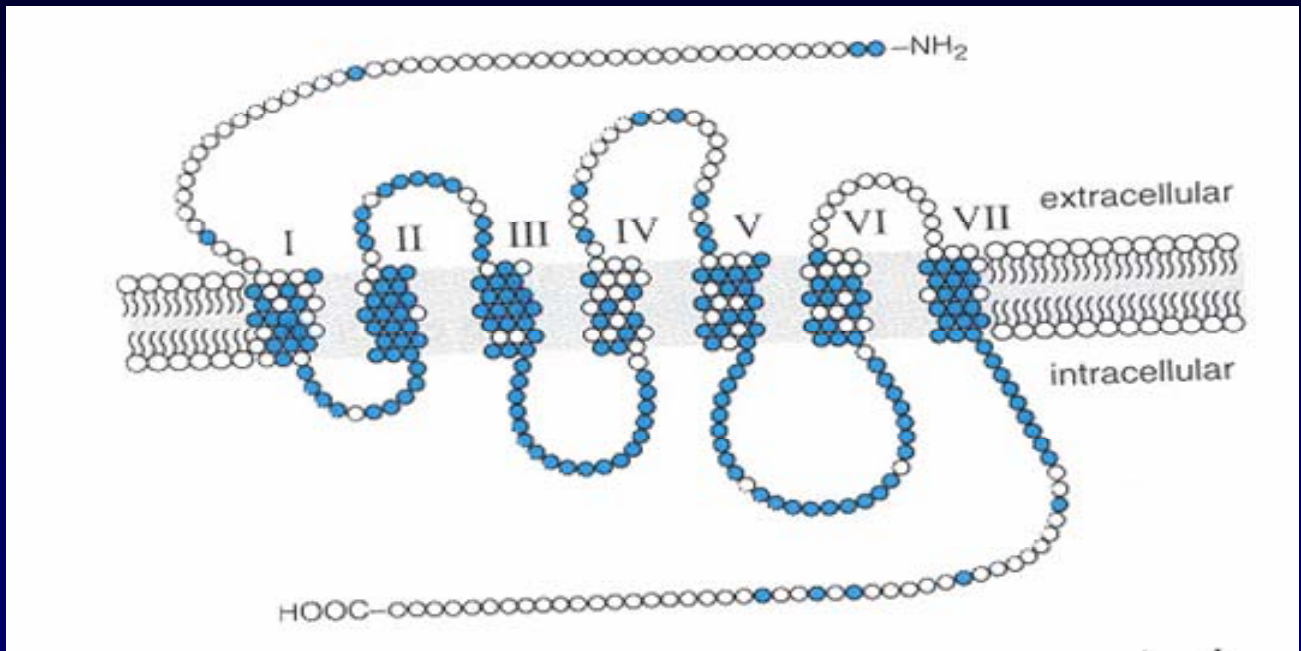
Responses of unknown intermediate mechanism

. activation of PLA2
. activation of PLCb (possibly direct G protein bg subunit activation)
. activation of MAPKinase
. activation of large conductance calcium-activated potassium channels
. activation of L type voltage operated calcium channels
. inhibition of T type voltage operated calcium channels
. direct inhibition of transmitter exocytosis

Types and Actions of Receptors

Receptor	Action
mu(μ1)	Spinal and supraspinal analgesia
mu(μ2)	respiratory depression, euphoria, vomiting, inhibition of gut motility, physical dependence
delta(δ)	Spinal analgesia
kappa (κ)	Spinal analgesia, supraspinal analgesia
sigma(σ)	Dysphoria, hallucination, cardiac stimulation

Mu Opiate Receptor



Source: Goodman and Gillman 9th ed, p. 526

Classification of Narcotic Opiate Ligands

- **Narcotic agonists** include natural opium alkaloids (eg, morphine, codeine), semisynthetic analogs (eg, hydromorphone, oxymorphone, oxycodone), and synthetic compounds (eg, meperidine, levorphanol, methadone, sufentanil, alfentanil, fentanyl, remifentanil, levomethadyl).

- **Mixed agonist-antagonist drugs** (eg, nalbuphine, pentazocine) have agonist activity at some receptors and antagonist activity at other receptors; also included are the partial agonists (eg,butorphanol, buprenorphine).

- **Narcotic antagonists:** Narcotic antagonists (eg, naloxone) do not have agonist activity at any of the opioid receptor sites. Antagonists block the opiate receptor, inhibit pharmacological activity of the agonist, and precipitate withdrawal in dependent patients.

Effects of Opiates

- Pain
- Learning and Memory
- Food Consumption (preferred food)
- Gastrointestinal and other autonmic functions (respiration, temperature, cardiovascular function, endocrine responses)

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