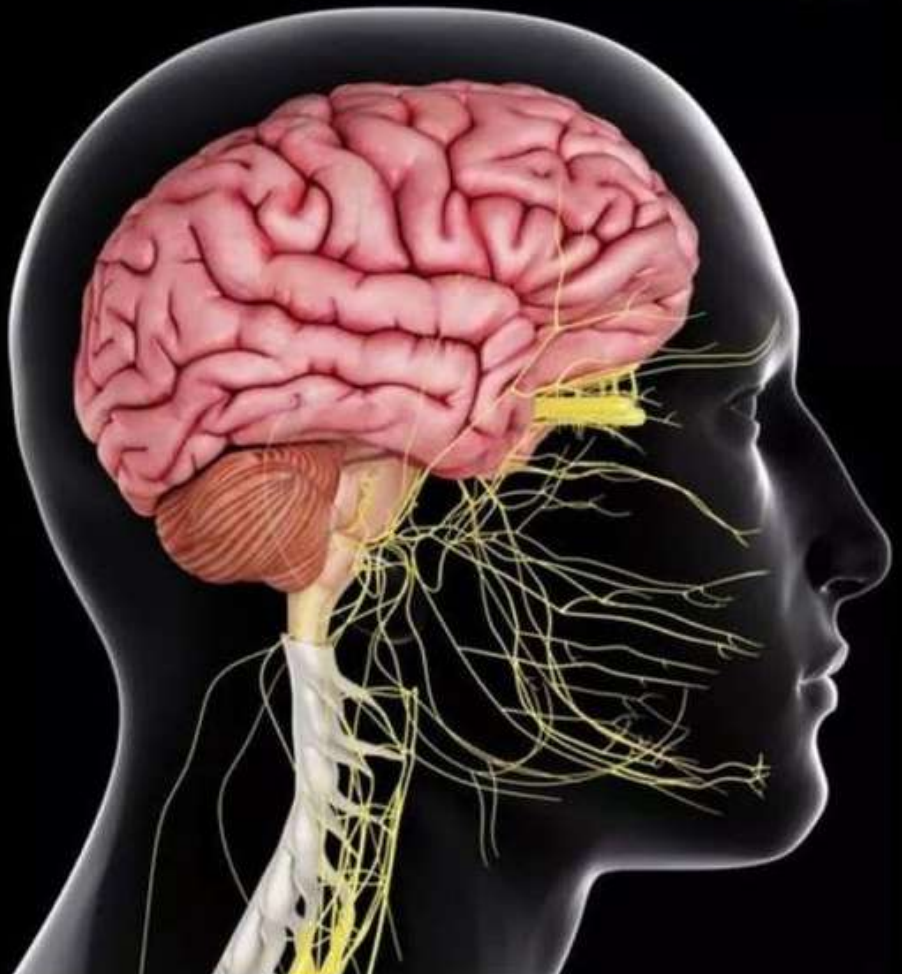
وَقُل رَّبِّ زِدْنِي عِلْمًا



النادي الطبي

CENTRAL NERVOUS SYSTEM

SUBJECT : Pharmacology

LEC NO. : 2

DONE BY : Rahaf omoush

Content:
Dr notes
Some other notes
Lippincott figures
Lippincott Qs

Opioids

Pharmacology and Toxicology

Central Nervous System Module

Third Year Medical Students

Tareq Saleh

Faculty of Medicine

The Hashemite University

Textbook: pp. 180-193

Pain

- “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”
- Acute or chronic
- Consequence of complex neurochemical processes in the peripheral and central nervous systems
- Subjective

International Association for the Study of Pain

Pain

Pain severity determines which drug to use

Acute pain = analgesics

Chronic/severe pain=opioids

Opioids carry a high risk for abuse and dependance

As a dr be careful to assess the patient's pain enough DO NOT BE TRICKED

Pain

Types of pain

Receptors located viscerally /inside the organs kr the while body so the activation of them causes a general pain

- **Nociceptive pain:** pain due to an actual or potentially tissue-damaging injury that is transduced and transmitted via nociceptors.

Examples: somatic pain, cancer pain, postoperative pain

Neurological problem/ more located pain /less general

- **Neuropathic pain:** pain arising as a direct consequence of a lesion or disease of the somatosensory system.

Examples: carpal tunnel syndrome, chemotherapy-induced peripheral neuropathy, postherpetic neuralgia.

Opioids arent the best choice to use here

- **Others**

Definitions

the dr didnt talk much here actually he mentioned them through the slides randomly

Hyperalgesia: abnormally increased sensitivity to pain

Allodynia: pain resulting from an originally non-painful stimulus

Hypoalgesia: decreased sensitivity to painful stimuli

Know th difference here

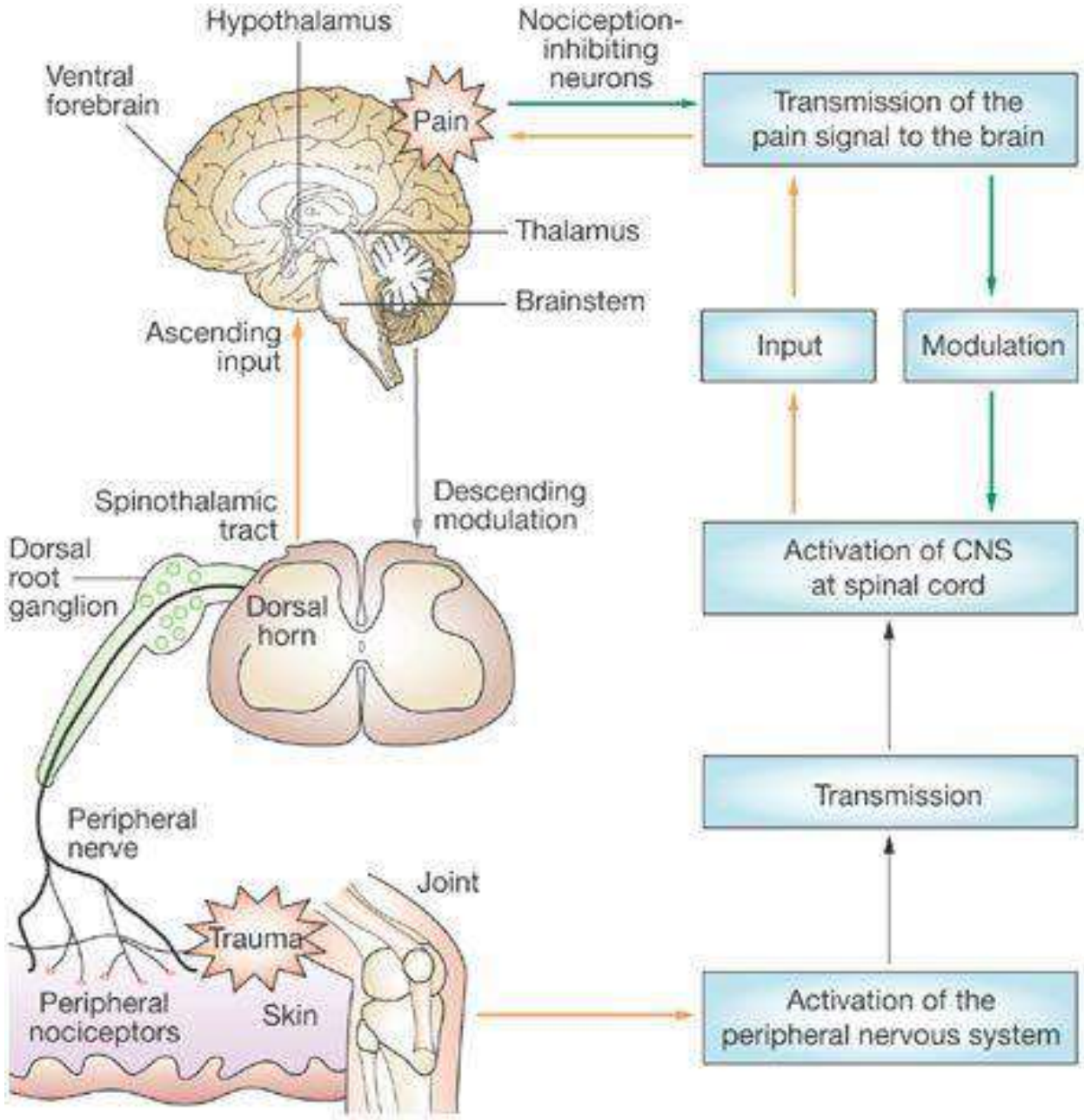
Analgesia: reduction or relief of pain sensation without affecting other sensations

Anesthesia: local or general reduction or absence of all sensations (touch, pain, temperature, …) with or without loss of motor function. This may be accompanied by loss of consciousness

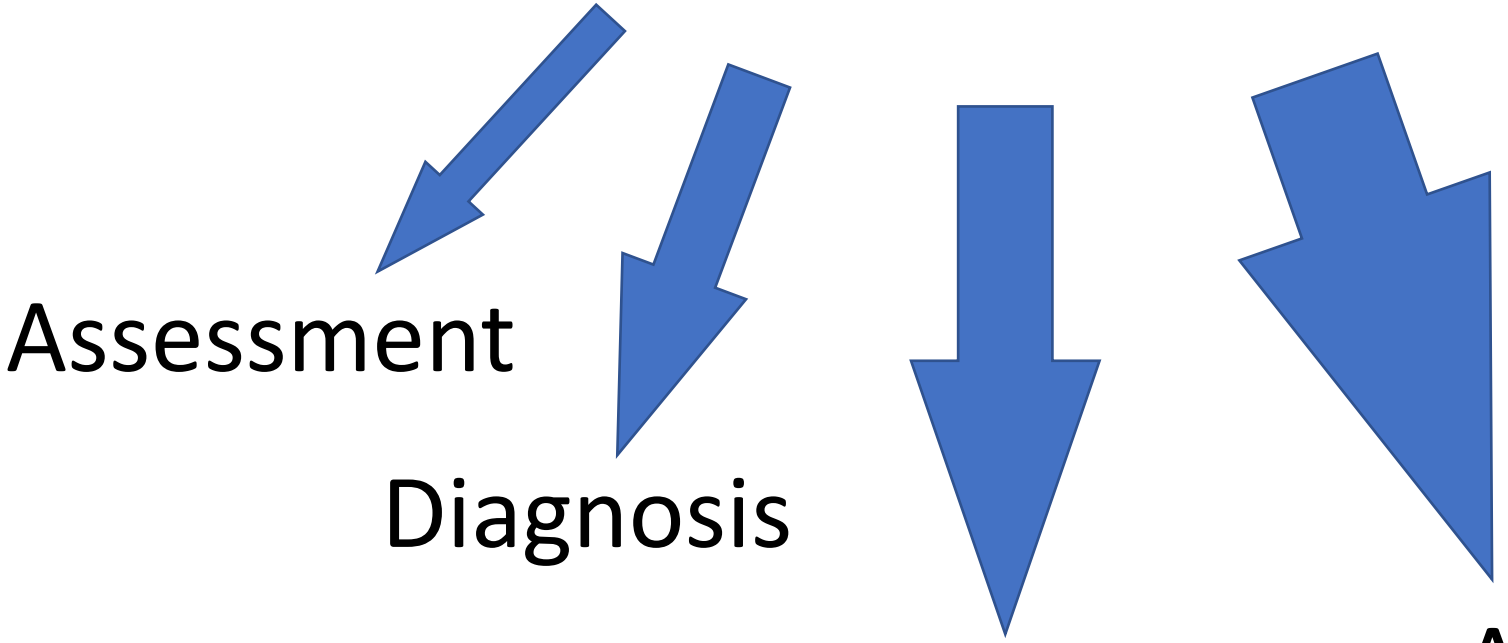
Paresthesia: abnormal or altered sensation of the body (numbness, tingling, or burning)

Wasnt mentioned!

The Pain Pathway



How to manage pain?



Analgesics

- Paracetamol
- NSAIDs
- Opioids

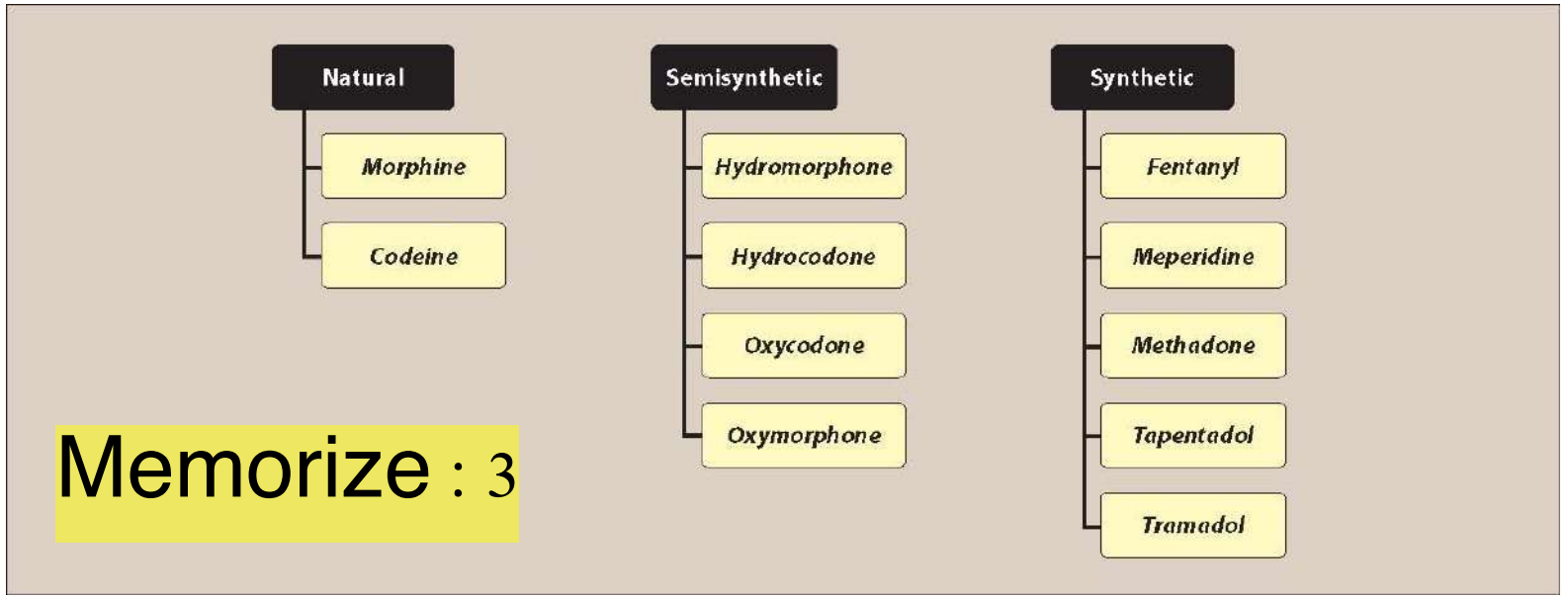
Can you tell the difference between these terms:

- Opium?
- Opioid?
- Opiate?
- Narcotic?

Morphine like other substances (the whole lec topic)

Opioids

- *Opioids* are natural, semi-synthetic or synthetic compounds that bind specifically to opioid receptors and share the properties of one or more of the naturally occurring endogenous opioids



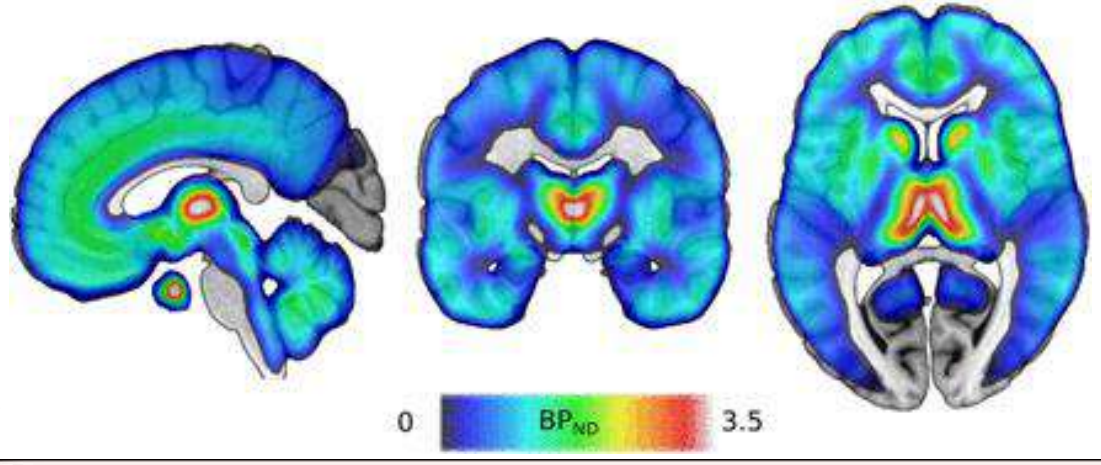
Opioids exert their effect through receptors that are called :

Opioid Receptors

- Distributed throughout the CNS Predominant in :
  - Nucleus of tractus solitaries
  - PAG Periacquiductal grey matter
  - Cerebral cortex
  - Thalamus
  - Spinal cord

  But also….
  - Gut
  - Bladder

Periphrally:



If we considered opioids are naturally compounds (from the opium plant) or even if it was a synthetic/semisythetic substances , why do they have receptors in the human brain?

Thats bcuz we have our own endogenous opioids which are :

1. Endorphins
2. Enkephalins
3. Dynorphins

Opioid Receptors

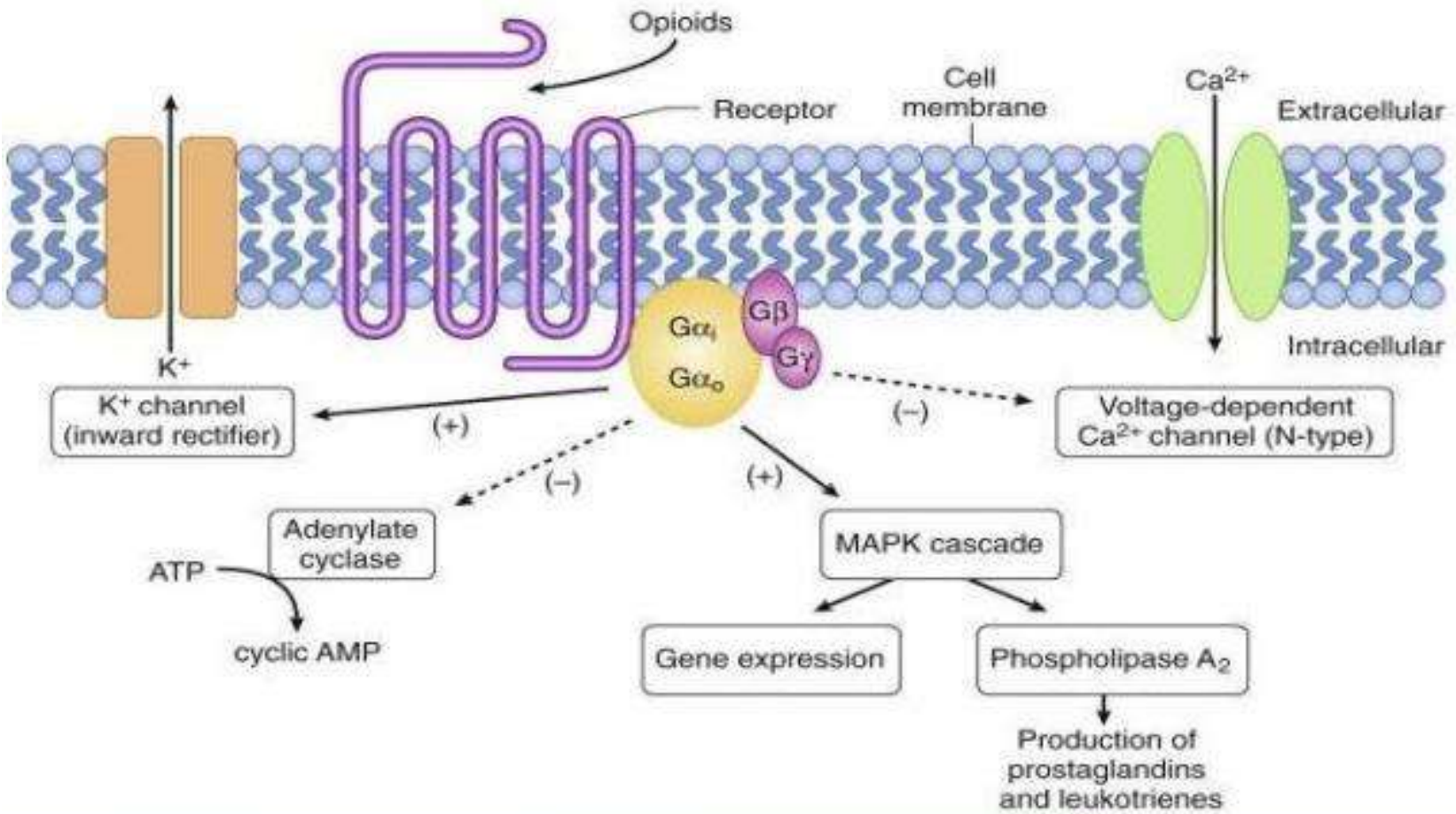
Each substance bind to its own receptor

Opioid Receptor	MOST IMP μ	Gamma δ	κ
Endogenous opioid	*Endorphins*	*Enkephalins*	*Dynorphins*
Effect	Analgesia, euphoria, respiratory depression, constipation, sedation, meiosis	Seizures, analgesia? Lesser effect	Dysphoria, analgesia? Lesser effect

State of being extremly happy and excited

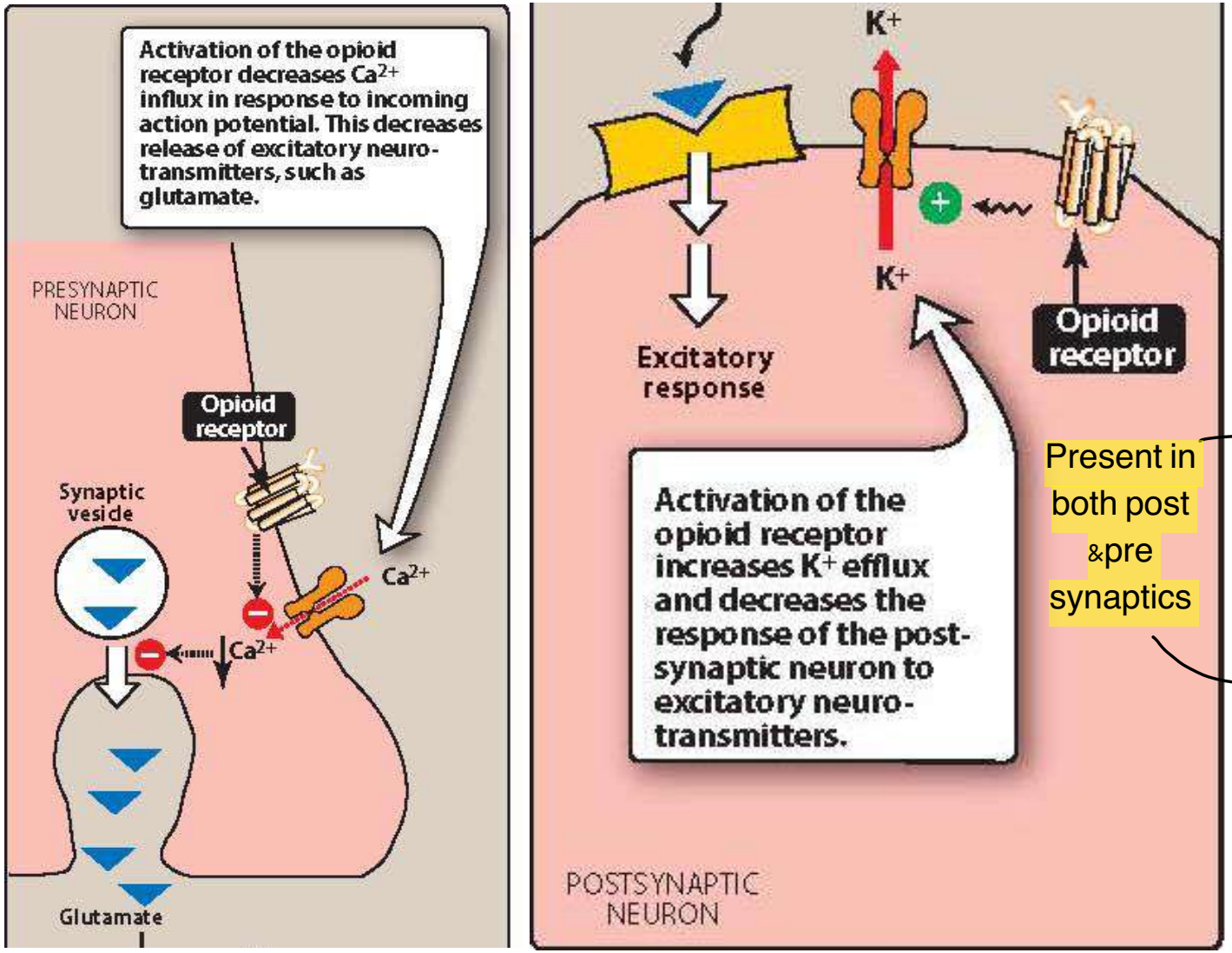
Wasnt mentioned!

Opioids: Mechanism of Action



To suppress pain =means to suppress the sensory signals of it =induce inhibitory function

Opioids: Mechanism of Action



G protein-coupled receptors (GPCRs) [$G_{i/o}$ (inhibitory)]

More hyperpolarization =more negativity=mor difficulty to be stimulated again

Present in both post &pre synaptics

Inhibit adenylyl cyclase

Increase *postsynaptic* K^+ efflux

Reduce *presynaptic* Ca^{++} influx

Reduces the action potentials

Memorize & be careful of the cat ones

Opioids

Phenanthrenes	Action on Opioid Receptors
Morphine	Agonist
Codeine	Agonist
Oxycodone	Agonist
Oxymorphone	Agonist
Hydromorphone	Agonist
Hydrocodone	Agonist
Buprenorphine	Partial agonist
Nalbuphine	Mixed Agonist/Antagonist
Butorphanol	Mixed Agonist/Antagonist

Benzmorphan	
Pentazocine	Mixed Agonist/Antagonist
Phenylpiperidines	
Fentanyl	Agonist
Alfentanil	Agonist
Sufentanil	Agonist
Meperidine	Agonist
Diphenylheptane	
Methadone	Agonist

Opioid Agonists

- Morphine
- Codeine
- Oxycodone
- Oxymorphone
- Hydrocodone
- Fentanyl
- Methadone
- Meperidine

Morphine

- Natural نبتة الأفيون
- Derived from *papaver somniferum*
- After the Greek god of dreams

“ Morpheus”

Morphine

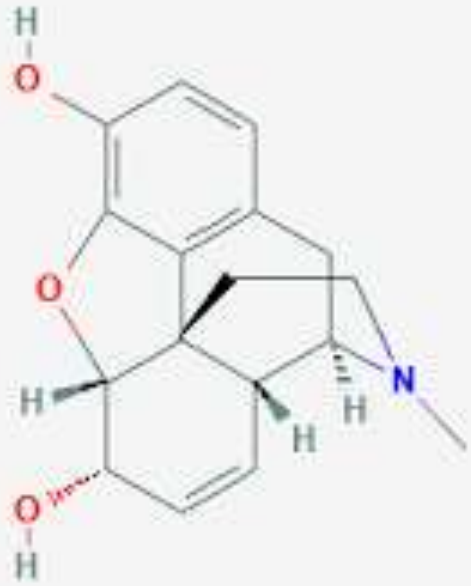
Mechanism of action

- Binds to opioid receptors (mainly **μ**)- full agonist
  - CNS, gut, bladder

Literally binds everywhere

- Decreases the release of many excitatory transmitters from nerve terminals carrying nociceptive stimuli

To suppress the pain signals

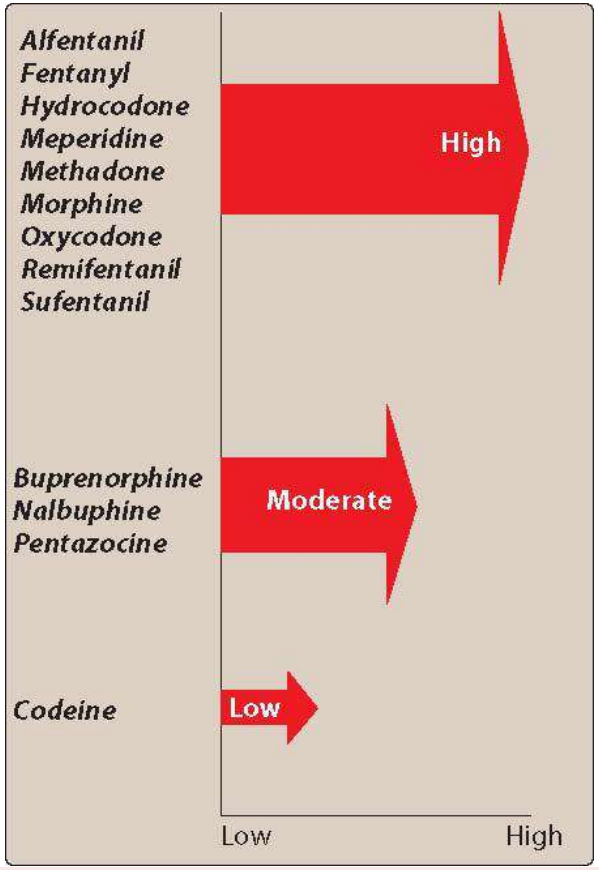


Morphine

Morphine

Actions:

- **Analgesia**
  - without loss of consciousness
  - raises pain threshold (spinal cord) By that the previous pain stimulants wont be able to atimulate and send singals again.
  - alters perception of pain (brain)
    - ❖ still aware of pain, but not unpleasant
  - nociceptive >>> neuropathic



Normal doses= reduces pain sensation& alters the perception of it to a lesser imapct

Higher doses= causes sedation

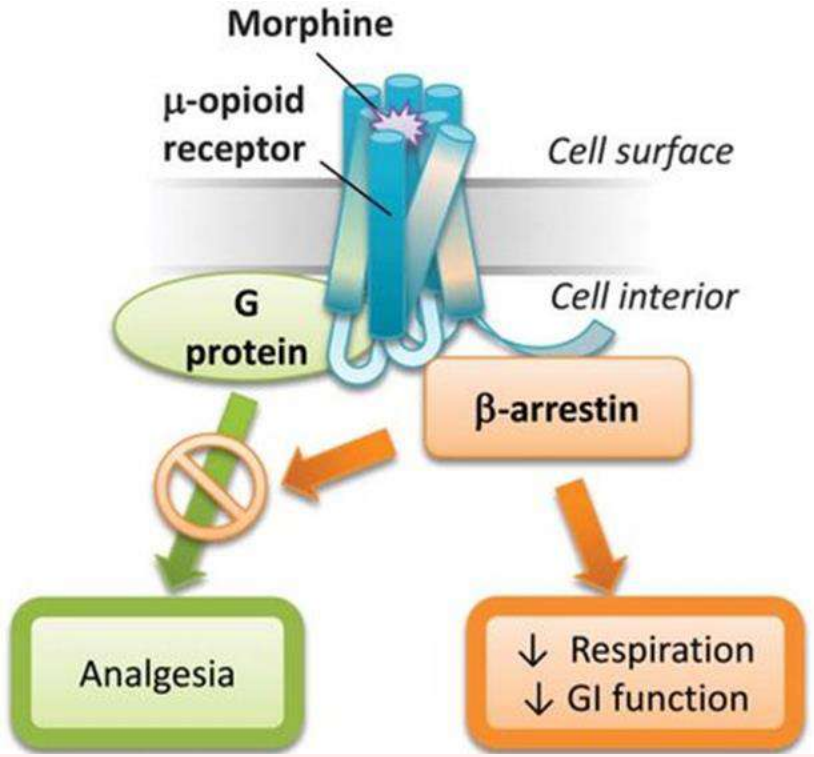
Doesnt seem like an inhibition effect ? Why so ?

a: opioids activate the rewards pathway which in turn has both psychological +physical effects

Morphine

Actions:

- **Euphoria** = Happines & excitment
  - sense of contentment and well-being
  - caused by the disinhibition of the dopamine-containing neurons of the ventral tegmental area
- **Respiratory depression**
  - reduces the sensitivity of respiratory center to CO_2
  - most common cause of death from opioid overdose.
  - Tolerance develops quickly

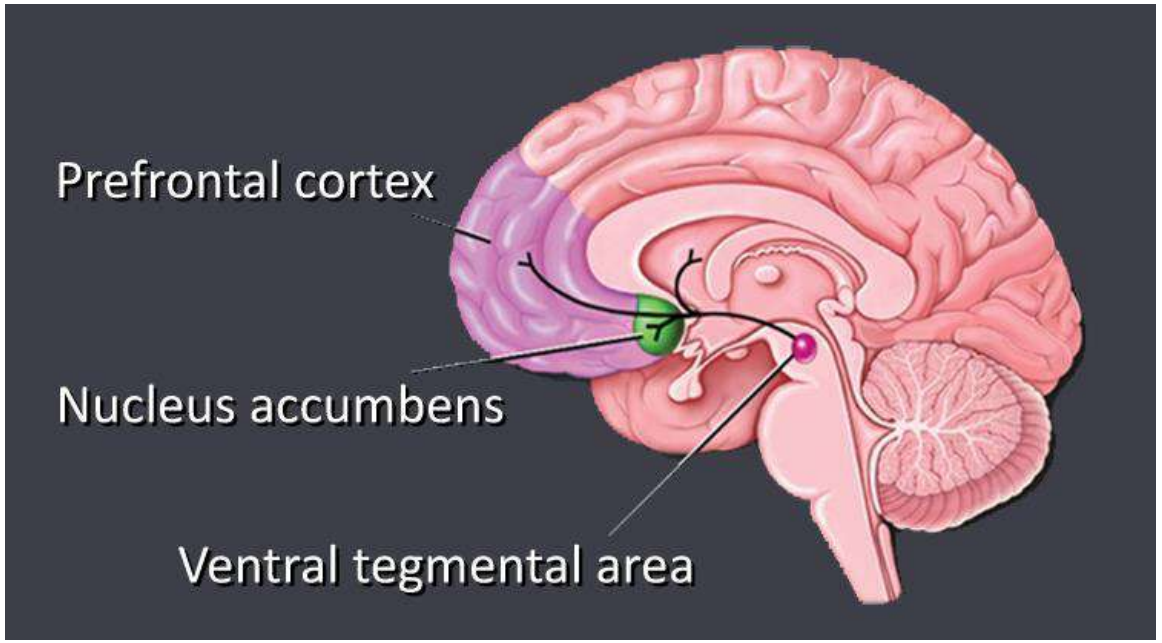


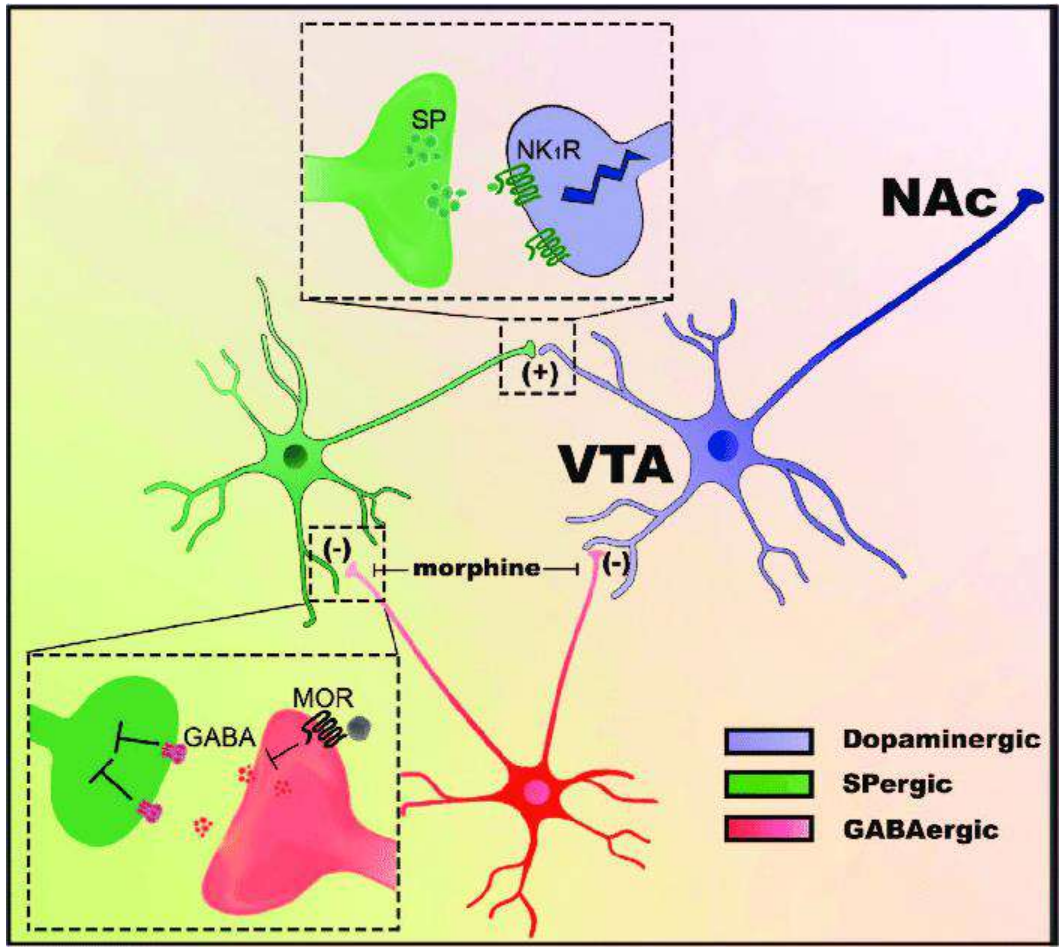
Increased co2 in blood = increaes respiration (naturally)
But Morphine reduces Co2 sensitivity so eventually it doesnt wash out the body =leads to RESPIRATORY FAILURE

Also goes on smoking cigs ,Madrid winning a match or even eating your fav dish

Morphine and the Reward Pathway

So how ? By inhibiting an inhibition mechanism then its called Disinhibition.





Morphine

Actions:

- **↓ cough reflex**

 - both morphine and codeine have *antitussive* effect.

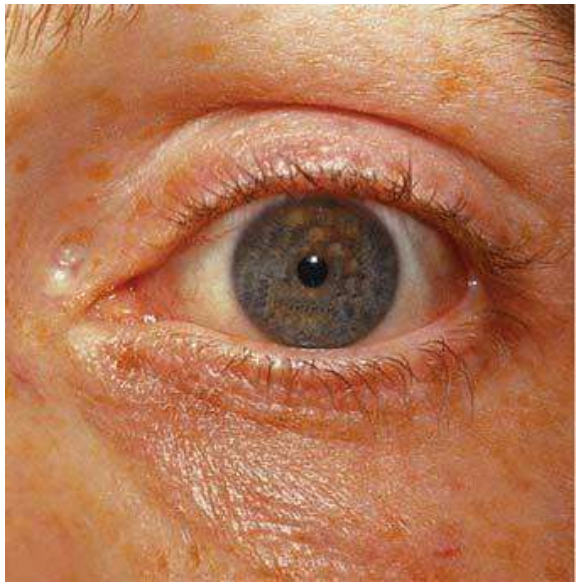
- **Miosis**

 - *pinpoint pupil*

A sign to predict if your comatic patient might have had an opioid beside other signs ofc.

 - results from **μ** and **κ** receptors

 - no tolerance to this effect



meiosis

Morphine

Actions:

- **Emesis**

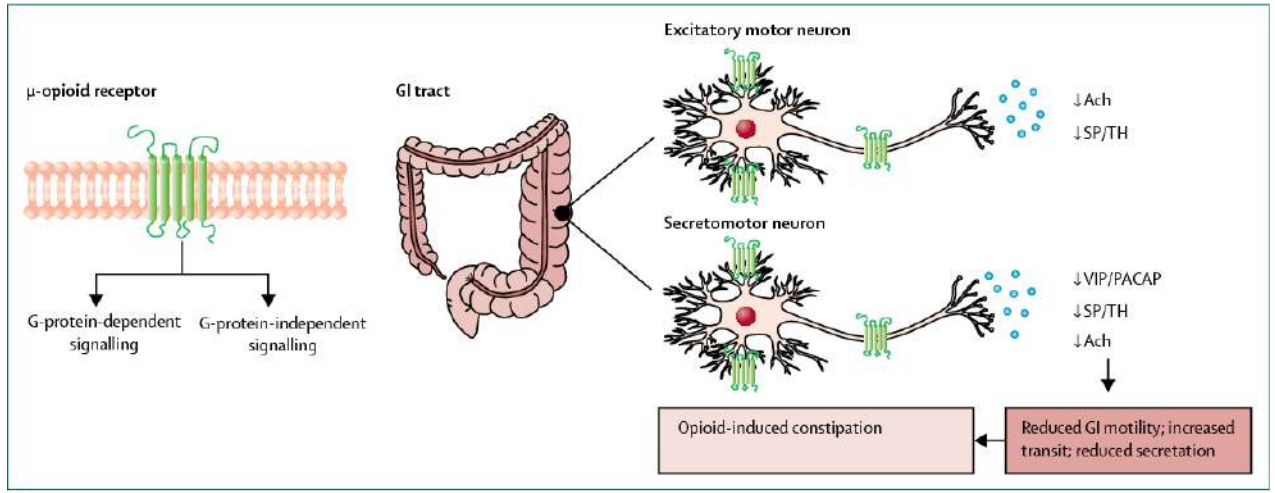
- stimulates the chemoreceptor trigger zone in area postrema → vomiting+nausea

- **GI tract**

- ↓ gut motility ↑ intestinal smooth muscle tone ↑ anal sphincter tone

- constipation Major

- little tolerance to this effect



Means no matter how much of a dose your patient will take the constipation effect wont be altered or tolerated.

Can be used as an antidiarrheal without the risk of addiction/ tolerance?

a: use an opioid that doesnt cross the BBB = LOPERAMIDE.

Morphine

Actions:

- **Cardiovascular** Reduces cardiac preload (soooo imp)

- Peripheral vasodilation most prominent effect due to histamine release and decreased adrenergic tone

- Very high doses may produce bradycardia and hypotension

- Contraindicated in patients with severe brain/head injury +asthmatics+allergics.

- **Histamine release**

- Enhance the release of histamine from mast cells, causing urticaria, sweating, and vasodilation.

Morphine

Actions:

- **Urinary retention**:

- Due to contraction of sphincter, inhibition of reflex of urination and increase ADH.

- **OPIAD: opioid-induced androgen deficiency**

- **Labor**

- increases second stage of labor.

How? Relieves labor pain.

(Lippincott's) Opioid side effects

Hypotension

Dysphoria (anxiety, depression, or unease)

Sedation

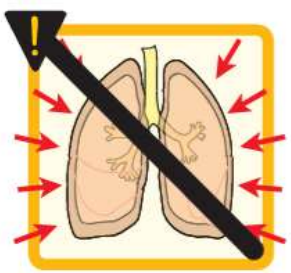
Constipation

Urinary retention

Nausea

Potential for addiction

Respiratory depression



Morphine is used with caution/contraindicated in patients with bronchial asthma. WHY?

Obviously bcuz of the respiratory failure

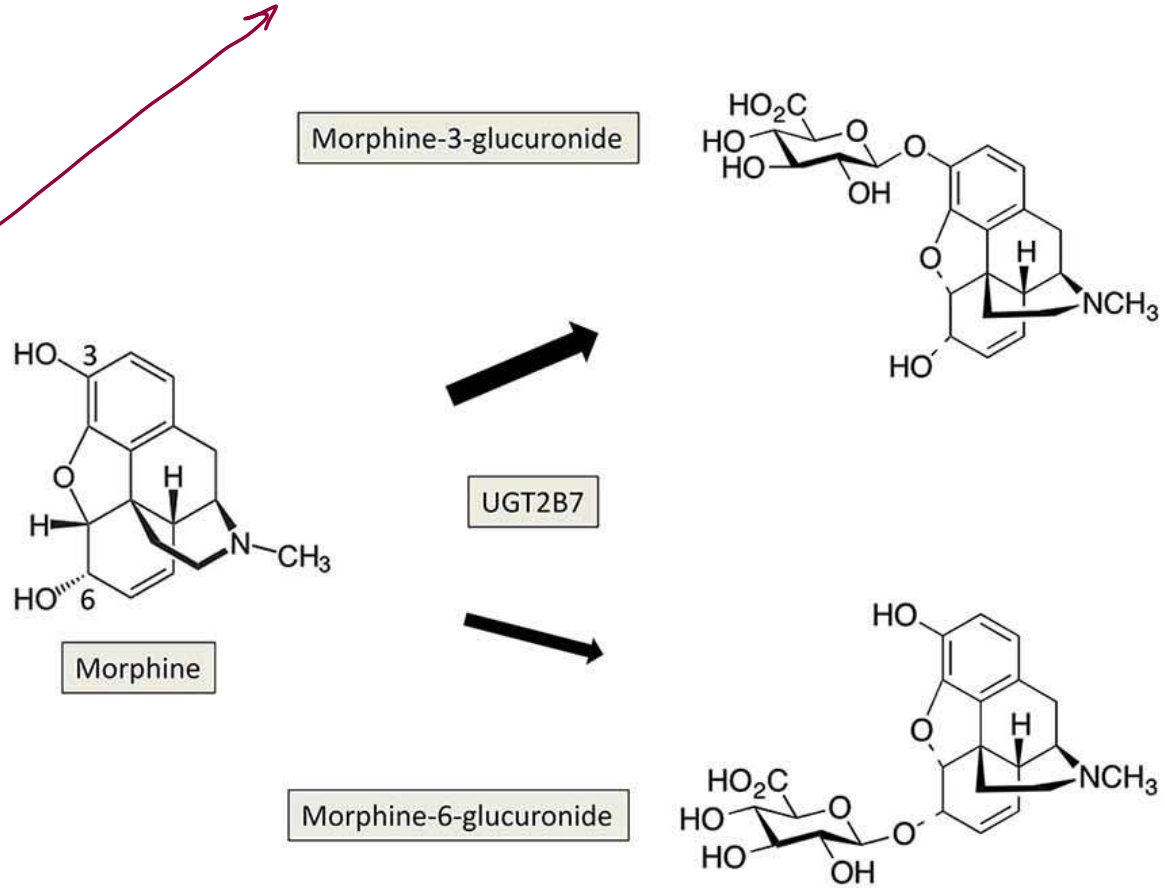
Crosses the BBB to a good limit but isnt the most potent drug.

Morphine

Pregnants who are addicted or tolerant give birth to babies who are also tolerant like them.

Pharmacokinetics

- **Administration:** *IM, IV, SC* – best effect
- **Distribution:** enters all body tissues (including fetus) – contraindicated for analgesia in labor
- **Metabolism**: glucuronidated into 2 metabolites:
  - ❖ Morphine-6-glucuronide: potent analgesic (M6G)
  - ❖ Morphine-3-glucuronide: not an analgesic (M3G)
- **Duration of action**: 4-5 h in opioid-naïve patients.



Morphine

Analgesia

- Postoperative pain
- Renal colic
- Cancer-associated pain

MI, Acute Pulmonary Edema (LFV)

- To decrease preload
- Pain

Preanesthetic

Yes Morphine suppresses the cough reflex but isnt the appropirate one , codeine is

Antitussive?

- Codeine is better

Therapeutic Uses

Can you use morphine as antidiarrheal? No.

THE BLACK BOXES!

Summary of Morphine's Therapeutic Uses

Therapeutic Use	Comments
Analgesia	*Morphine* is the prototype opioid agonist. Opioids are used for pain in trauma, cancer, and other types of severe pain.
Treatment of diarrhea	Opioids decrease the motility and increase the tone of intestinal circular smooth muscle. [Note: Agents commonly used include *diphenoxylate* and *loperamide* (see Chapter 31).]
Relief of cough	*Morphine* does suppress the cough reflex, but *codeine* and *dextromethorphan* are more commonly used.
Treatment of acute pulmonary edema	Intravenous *morphine* dramatically relieves dyspnea caused by pulmonary edema associated with left ventricular failure, possibly via the vasodilatory effect. This, in effect, decreases cardiac preload and afterload, as well as anxiety experienced by the patient.
Anesthesia	Opioids are used as pre-anesthetic medications, for systemic and spinal anesthesia, and for postoperative analgesia.

Morphine

Tolerance: so you need to increase the dose each time

- Happens to analgesic + respiratory depressant + euphoric + sedative effects
- Not to miotic or constipating effects (problem?) Sí 😿
- Cross tolerance develops between opioids

Dependence

- Physical
- Psychological

Opioid Agonists

- Morphine
- Codeine
- Oxycodone
- Oxymorphone
- Hydrocodone
- Fentanyl
- Methadone
- Meperidine

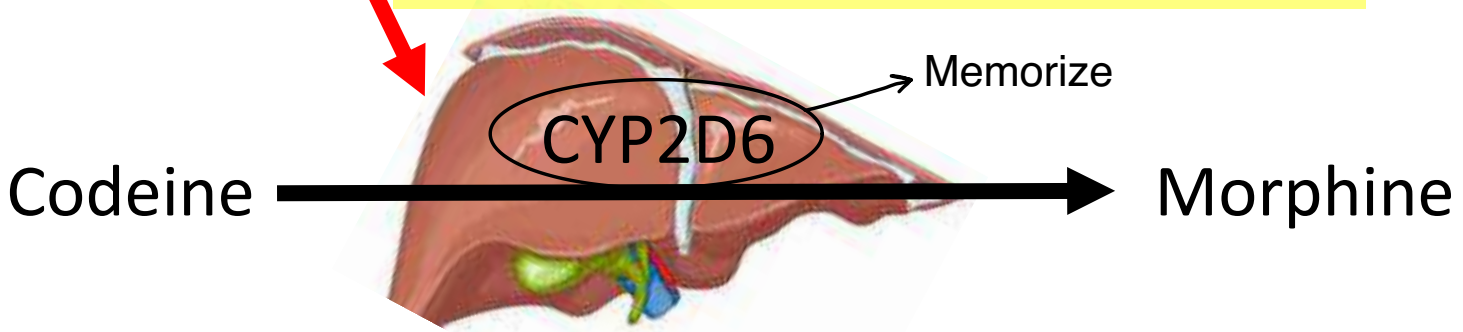
Codeine

Natural

Weak analgesic

than morphine

Prodrug of Morphine



Required for the analgesic effects

Yes it causes tolerance

Uses:

- mild/moderate pain (+paracetamol)
- Antitussive (dextromorphan preferred)

-used over-the counter?????? No.

Opioid Agonists

- Morphine
- Codeine
- Oxycodone
- Oxymorphone
- Hydrocodone
- Fentanyl
- Methadone
- Meperidine

Oxycodone

highly abused

semisynthetic

oxycodone >>
morphine (orally)

Street-drug addiction uses 😿

Hospital
use only for
severe pain

oxymorphone
>>>>>>>>>>
morphine
(parenterally)

oxymorphone
>>> morphine
(orally)

Outpatient use

semisynthetic

Oxymorphone

Opioid Agonists

- Morphine
- Codeine
- Oxycodone
- Oxymorphone
- Hydrocodone
- Fentanyl
- Methadone
- Meperidine

Hydrocodone

semisynthetic

Hydrocodone=morphine

(orally)

Analgesic effect

Uses

- moderate to severe pain (+ibuprofen or paracetamol)
- antitussive

Opioid Agonists

- Morphine
- Codeine
- Oxycodone
- Oxymorphone
- Hydrocodone
- Fentanyl
- Methadone
- Meperidine

Fentanyl

Only only used on patients who are already exposed to opioids before

Contraindicated in opioid-naïve patients

Synthetic

Fentanyl 100-folds > morphine

Uses

- Postoperative pain, epidural analgesia in labor
- Cancer pain
- Anesthesia (sedative) Major operations

Kinetics

- Rapid onset of action (15-30 mins)
- Short duration of action

Opioid Agonists

- Morphine
- Codeine
- Oxycodone
- Oxymorphone
- Hydrocodone
- Fentanyl
- Methadone
- Meperidine

Methadone

Synthetic

- Methadone ≠ morphine
- μ agonist
- NMDA antagonist
- SNRI

Uses

- Analgesia (against nociceptive and neuropathic pain)
- Detoxification of opioids and heroin (treatment of opioid abuse)

Bcuz it has minimal withdrawal symptoms rather than the other drugs

Opioid Agonists

- Morphine
- Codeine
- Oxycodone
- Oxymorphone
- Hydrocodone
- Fentanyl
- Methadone
- Meperidine

Pregnancy

Meperidine (Pethidine)

Synthetic

- κ agonist
- Some μ agonist activity
- anticholinergic

Uses

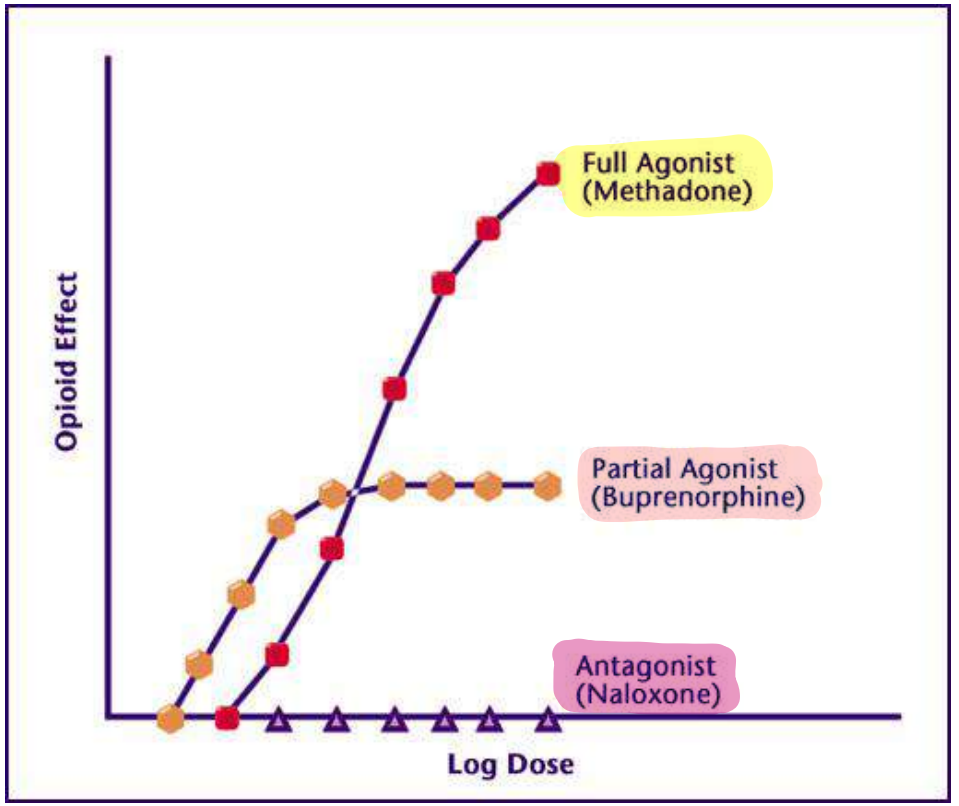
- Used only for short-term analgesia management
- Preferred over morphine during labor

Most imp of thr whole slide

Opioid Partial Agonists
Mixed Agonist-Antagonist

- Partial opioid agonists bind to opioid receptors but have only partial efficacy relative to full opioid agonists.

- Buprenorphine
- Pentazocine
- Nalbuphine



Buprenorphine

Partial agonist at μ
Antagonist at κ

Little sedation, respiratory depression, hypotension

Combined with naloxone (antagonist). Why?

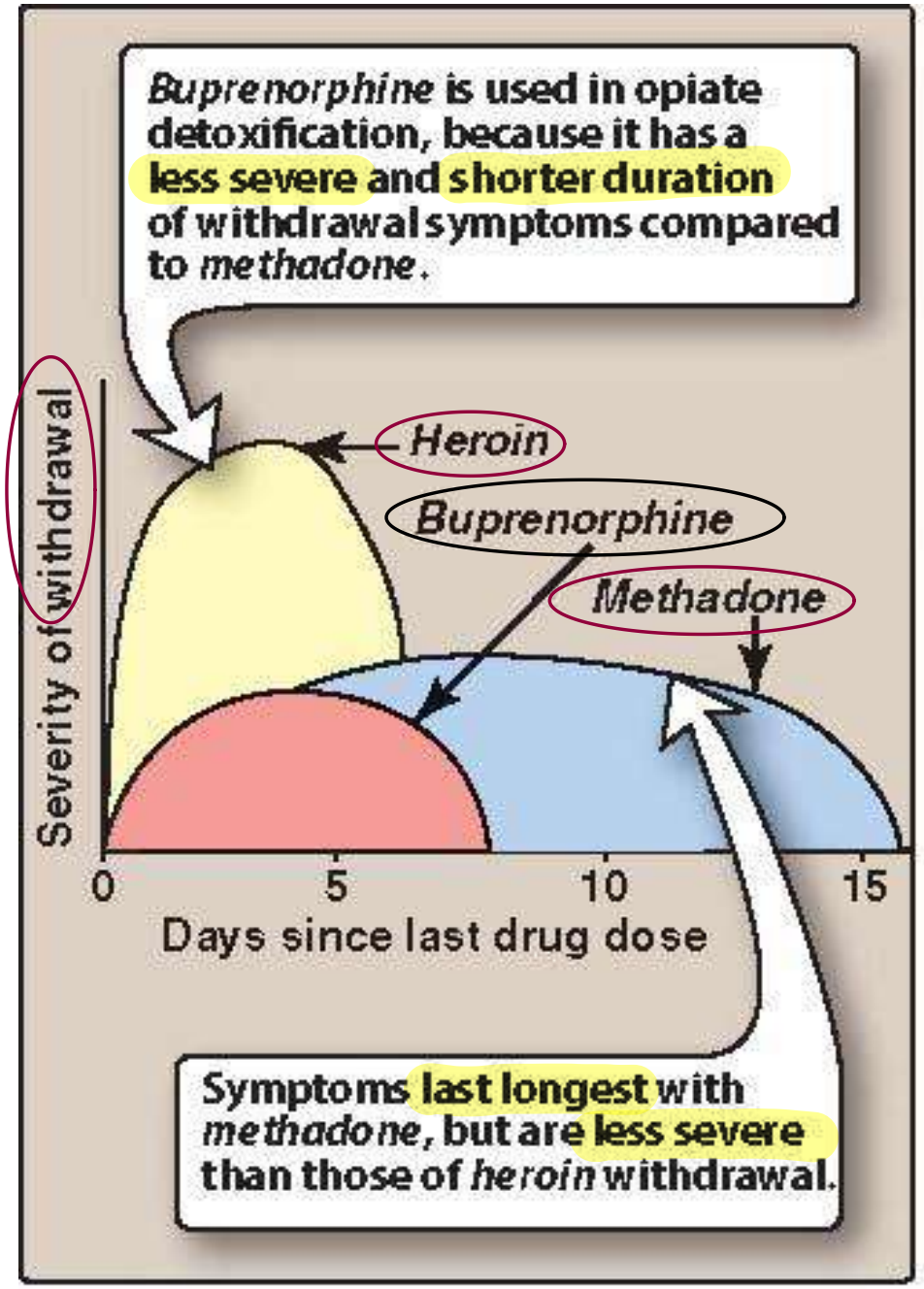
To treat addiction without having a major withdrawal symptoms

Uses

- Used for opioid detoxication
- Moderate to severe pain

Imp

Difference between
-Sedation: reduction of awarness / consciousness
-Analgesia: reduction of pain sensation



Opioid Partial Agonists

- Partial opioid agonists bind to opioid receptors but have only partial efficacy relative to full opioid agonists.

- Buprenorphine
- Pentazocine
- Nalbuphine

Slide wasnt mentioned

Pentazocine

Partial agonist at κ

Antagonist at μ and δ

Totally opposite to buprenorohine

Less euphoria

Contraindicated in patients with coronary artery disease

Uses

- Analgesia (limited use because of side effects)

Other Analgesics

- Tapentadol
- Tramadol

Tramadol

Street drug

Binds and acts on μ

SNRI

Serotonin–Norepinephrine reuptake inhibition

Less respiratory depression than morphine

Highly abused

Overdose is possible

Uses

- Analgesia (moderate to severe pain)

  Cancer related pain

Opioid Antagonists

- Naloxone
- Naltrexone

Antidote

Naloxone

Causes abrupt withdrawal

Non selective

Competitive antagonist at μ, κ and δ

Pan-opioid blocker /

Can precipitate withdrawal

Administered IV

Half-life: 30-81 minutes

Uses

- Used to reverse coma and respiratory depression of opioid overdose

(Best choice)

Opioid Antagonists

- Naloxone
- Naltrexone

Naltrexone

Longer duration of action than naloxone

Oral

Outpatient purposes

Uses

- Used for opioid detoxication (maintenance)
- Used to decrease cravings in patients with alcohol dependence

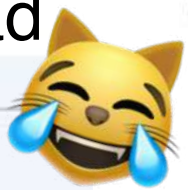
Opioid dependance ttt summary: 😼

(3options)

1. Full agonist : Methadone
2. Partial agonist: Buprenorphine
3. Antagonist: Naltrexone

High-Yield Terms to Learn

No one’s gonna read



Opiate	A drug derived from alkaloids of the opium poppy
Opioid	The class of drugs that includes opiates, opiopeptins, and all synthetic and semisynthetic drugs that mimic the actions of the opiates
Opioid peptides	Endogenous peptides that act on opioid receptors
Opioid agonist	A drug that activates some or all opioid receptor subtypes and does not block any
Partial agonist	A drug that can activate an opioid receptor to effect a submaximal response
Opioid antagonist	A drug that blocks some or all opioid receptor subtypes
Mixed agonist-antagonist	A drug that activates some opioid receptor subtypes and blocks other opioid receptor subtypes

those are my answers not the dr's dont take them seriously 😾

Activation of μ opioid receptors by morphine can result in which of the following effects?

A) Hyperalgesia
B) Arousal
C) Diarrhea
D) Mydriasis
E) Nausea and vomiting

E

Morphine is in important component of the treatment of myocardial infarction. The beneficial effect of morphine in the treatment of MI is because of its ability to result in:

A) Decreased venous return (cardiac preload)
B) Increased stroke volume
C) Respiratory depression
D) Reduced peripheral vascular resistance
E) Lowered intracranial pressure

A

The opioid partial agonist that is indicated for the treatment of heroin and opioid dependence is Buprenorphine

The opioid antidote is Naloxone

The opioid agonist used to induce analgesia in labor as a replacement of morphine is Meperidine

Pregnancy

Metabolism of Codeine by CYP2D6 to morphine is required to produce its analgesic effects.

Which synthetic full-opioid agonist can be used as during anesthesia? Fentanyl

Lippincot Qs 😻

A 32-year-old man with a history of opioid addiction presents with cough due to a viral upper respiratory system infection. Which is appropriate symptomatic treatment for cough in this patient?

A. Guaifenesin/dextromethorphan
B. Guaifenesin/codeine
C. Benzonatate
D. Montelukast

Correct answer = C. Benzonatate suppresses the cough reflex through peripheral action and has no abuse potential. Dextromethorphan, an opioid derivative, and codeine, an opioid, both have abuse potential. Montelukast is not indicated for cough suppression.

don't memorize the other drugs it's only to know the context.

14.7 A 64-year-old man is preparing for a total knee replacement. He is taking many medications that are metabolized by the CYP450 enzyme system and is worried about drug interactions with the pain medication that will be used following surgery. Which of the following opioids would have the lowest chance of drug interactions in this patient?

A. Methadone
B. Tapentadol
C. Tramadol
D. Oxycodone

Correct answer = B. Tapentadol is metabolized via glucuronidation and has not been shown to have any clinically relevant drug interactions associated with the CYP450 enzyme family. All other opioids listed are metabolized by one or more CYP450 enzymes and increase the risk of drug interactions.

14.1 Which of the agents listed is a phenanthrene opioid that exhibits a full and immediate response to treatment with naloxone in the case of overdose?

A. Meperidine
B. Morphine
C. Buprenorphine
D. Fentanyl

Correct answer = B. A morphine overdose can be effectively treated with naloxone, and morphine is a phenanthrene. Naloxone antagonizes the opioid by displacing it from the receptor, but there are cases in which naloxone is not effective. Meperidine is a phenylpiperidine, not a phenanthrene, and the active metabolite, normeperidine, is not reversible by naloxone. The effects of buprenorphine are only partially reversible by naloxone. In most cases of buprenorphine overdose, the dose of naloxone needs to be high and continuous due to the higher binding affinity to the mu receptor. Naloxone is effective for fentanyl overdoses; however, fentanyl is a phenylpiperidine, and not a phenanthrene.

14.2 A 76-year-old female with renal insufficiency has severe pain secondary to a compression fracture in the lumbar spine. She reports that the pain has been uncontrolled with tramadol, and it is decided to start treatment with an opioid. Which is the best opioid for this patient?

A. Meperidine
B. Fentanyl transdermal patch
C. Hydrocodone/acetaminophen
D. Morphine

Correct answer = C. Hydrocodone/acetaminophen is the best choice. It is very important to use a low dose and monitor closely for proper pain control and adverse effects. Meperidine should not be used for chronic pain, nor should it be used in a patient with renal insufficiency. The transdermal patch is not a good option, since her pain is considered acute and she is opioid naïve. Morphine is not the best choice due to the active metabolites that can accumulate in renal insufficiency.

14.3 Which statement about buprenorphine is correct?

A. Buprenorphine has a much higher incidence of opioid-induced respiratory depression compared to other μ agonists.
B. Buprenorphine has many dosage formulations, and all formulations can be prescribed for the treatment of pain or opioid dependence.
C. Buprenorphine has a lower number of drug–drug interactions compared to methadone.
D. Buprenorphine is a full μ agonist, an antagonist of the NMDA receptor, and a norepinephrine and serotonin reuptake inhibitor.

Correct answer = C. Buprenorphine is metabolized by the CYP3A4 system, so there are concerns about drug interactions; however, compared to methadone, which is metabolized by numerous CYP450 enzymes, the drug interaction concern for buprenorphine is much lower. Buprenorphine has a lower incidence of opioid-induced respiratory depression compared to the μ agonists due to the ceiling effect created by the partial μ agonist activity. Buprenorphine is available in many different dosage formulations, but these formulations are indicated for either pain management or medication-assisted treatment of opioid dependence, not both. Option D describes the mechanism of action of methadone. Buprenorphine is a potent partial μ agonist and a κ antagonist.

14.4 A 56-year-old patient has suffered with painful diabetic neuropathy and severe chronic back pain with radiculopathy secondary to spinal stenosis for many years. This patient has failed to receive relief from his neuropathic pain with first-line agents such as tricyclics, SNRIs, or anticonvulsants. Based on the mechanism of action, which opioid could be considered in this patient to treat both nociceptive and neuropathic pain?

A. Meperidine
B. Oxymorphone
C. Morphine
D. Tapentadol

Correct answer = D. Tapentadol has a unique mechanism of action in comparison with the other choices given. Tapentadol has a dual mechanism of action (μ agonist and norepinephrine reuptake inhibition), which has been shown to effectively treat neuropathic pain associated with diabetic peripheral neuropathy. All other μ agonists could help manage neuropathic pain, but in some situations, higher doses of opioids are needed to achieve efficacy.

14.5 Which of the following statements regarding methadone is correct?

A. Methadone is an excellent choice for analgesia in most patients because there are limited drug–drug interactions.
B. The equianalgesic potency of methadone is similar to that of morphine.
C. The duration of analgesia for methadone is much shorter than the elimination half-life.
D. The active metabolites of methadone accumulate in patients with renal dysfunction.

Correct Answer = C. The duration of analgesia is much shorter than the elimination half-life, leading to dangers of accumulation and increased potential for respiratory depression and death. The equianalgesic potency of methadone is extremely variable based on many factors, and only providers familiar with methadone should prescribe this agent. The drug interactions associated with methadone are numerous due to the multiple liver enzymes that metabolize the drug. Methadone does not have active metabolites, which makes it a treatment option in patients with renal dysfunction.

14.6 AN is a 57-year-old man who has been treated with oxycodone for chronic nonmalignant pain for over 2 years. He now reports increased pain in the afternoon while at work. Which of the following is a short-acting opioid and is the best choice for this patient's breakthrough pain?

A. Methadone
B. Fentanyl
C. Hydrocodone
D. Nalbuphine

Correct answer = C. Hydrocodone is a commonly used short-acting agent that is commercially available in combination with either acetaminophen or ibuprofen. Methadone should not routinely be used for breakthrough pain due to the unique pharmacokinetics and should be reserved for practitioners who have experience with this agent and understand the variables associated with this drug. Fentanyl is available in formulations for treatment of breakthrough pain for cancer treatment. It is not appropriate to use fentanyl in this type of chronic pain setting. Nalbuphine is a mixed agonist/antagonist analgesic that could precipitate withdrawal in patients who are currently taking a full μ agonist such as oxycodone.

14.8 Which of the following statements regarding adverse effects of opioid therapy is correct?

A. The risk of respiratory depression is highest during an initial opioid initiation or following a dose increase.
B. Opioid-induced constipation is only seen with the initiation of opioid therapy.
C. The incidence of nausea and sedation increases with long-term use of opioid therapy.
D. Decreased testosterone levels are commonly seen with short-term use of opioid therapy.

Correct answer = A. The risk of respiratory depression is highest when the opioid is first initiated or a dosage is raised (or sometimes a drug–drug interaction leads to higher opioid levels). Opioid-induced constipation can occur at any time during the therapy, and a patient does not develop a tolerance to this side effect. Side effects such as nausea and sedation commonly decrease after repeated dosing due to development of tolerance to these adverse effects. Chronic opioid exposure has been linked to decreased testosterone levels in males.

14.9 KM is a 64-year-old man who has been hospitalized following a car accident in which he sustained a broken leg and broken arm. He has been converted to oral morphine in anticipation of discharge from the hospital. Upon discharge, which medication should he receive along with the morphine?

A. Diphenhydramine
B. Methylphenidate
C. Senna
D. Docusate sodium

Correct answer = C. A bowel regimen should be prescribed with the initiation of the opioid since constipation is very common and can occur at any time, and tolerance to this adverse effect does not occur. Senna is a stimulant that is available over-the-counter. Docusate sodium is a stool softener that is ineffective in opioid-induced constipation when used as a single agent. Combination products that include both docusate and senna are commonly used and can be effective, mainly due to the actions of senna. Diphenhydramine can be used for urticaria that might occur with the initiation of an opioid, and methylphenidate has been used for opioid-induced sedation in certain situations, but these issues are not reported in this case.

14.10 AN is a 67-year-old man who has been treated with oxycodone for chronic nonmalignant pain with no changes in the dosing regimen for over 2 years. His pain has been fairly well controlled, and he remains active, reports satisfaction with his pain regimen, and denies any side effects. He has been recently diagnosed with COPD and obstructive sleep apnea (OSA). Which of the following options is the best treatment recommendation for him at this time?

A. Taper off all opioids due to increased risk of opioid-induced respiratory depression.
B. Prescribe naloxone nasal spray to have at home in case he experiences an opioid overdose.
C. Prescribe oral naloxone tablets to have at home in case he experiences an opioid overdose.
D. No action is needed at this time. His pain is well controlled, and he is reporting no side effects.

Correct answer = B. Because this patient has just been diagnosed with COPD and OSA, it is clear his risk for opioid-induced respiratory depression is greater. Since the pain is controlled and no side effects are reported, tapering off the opioids at this time is not the best answer. Because of the first-pass effect, naloxone is not clinically effective for management of an overdose when given orally. Therefore, the nasal spray is the best choice. Offering the at-home naloxone nasal spray, along with proper education, might be lifesaving if an overdose occurs. Providing proper education to the patient and caregivers on the importance of having the naloxone nasal spray at home and of calling emergency services is critical in case of an overdose situation.