

Ambulatory Pain Management

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Disclosure

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	Company
Consultant and Speaker's Bureau	Endo Pharmaceuticals, Alpharma Inc., and Pfizer Inc.
Grant Research	Endo Pharmaceuticals

Objectives

- Learn how to interview a pain patient
- Review pharmacology of pain medications
- Common treatments for the pain patient
- Understand the pathophysiology of pain

CASE STUDY

- Patient is a 53 year old female with a 10 year history of Diabetes Mellitus. Patient has severe pain in feet and legs VAS 9 (1-10) for 1 year. Patient admits to not using her insulin and blood sugars are usually above 200. You have no medical records.
- Diagnosed with osteoarthritis of both knees
- History of Lumbar spinal stenosis

Case Study

- Works as a waitress but struggles
- Limited income

Case Study

- Patient taking Neurontin 600mg (Gabapentin) TID
- Percocet 7.5/325 (Oxycodone HCl-Acetaminophen) 5-6/day
- Never has had physical therapy but feels gets exercise at work
- Corticosteroid injections provided no relief

- Does this patient have pain?
- Is Neurontin (Gabapentin) appropriate?
- Is Percocet (Oxycodone HCl-Acetaminophen) appropriate?
- How to get started?

Acute vs Chronic Pain States

Acute

vs

Chronic

- Associated with tissue damage
- Increased autonomic nervous activity
- Resolves with healing of injury
- Serves protective function

- Extends beyond expected period of healing
- No protective function
- Degrades health and functioning
- Contributes to depressed mood

Nociceptive vs Neuropathic Pain States

Nociceptive

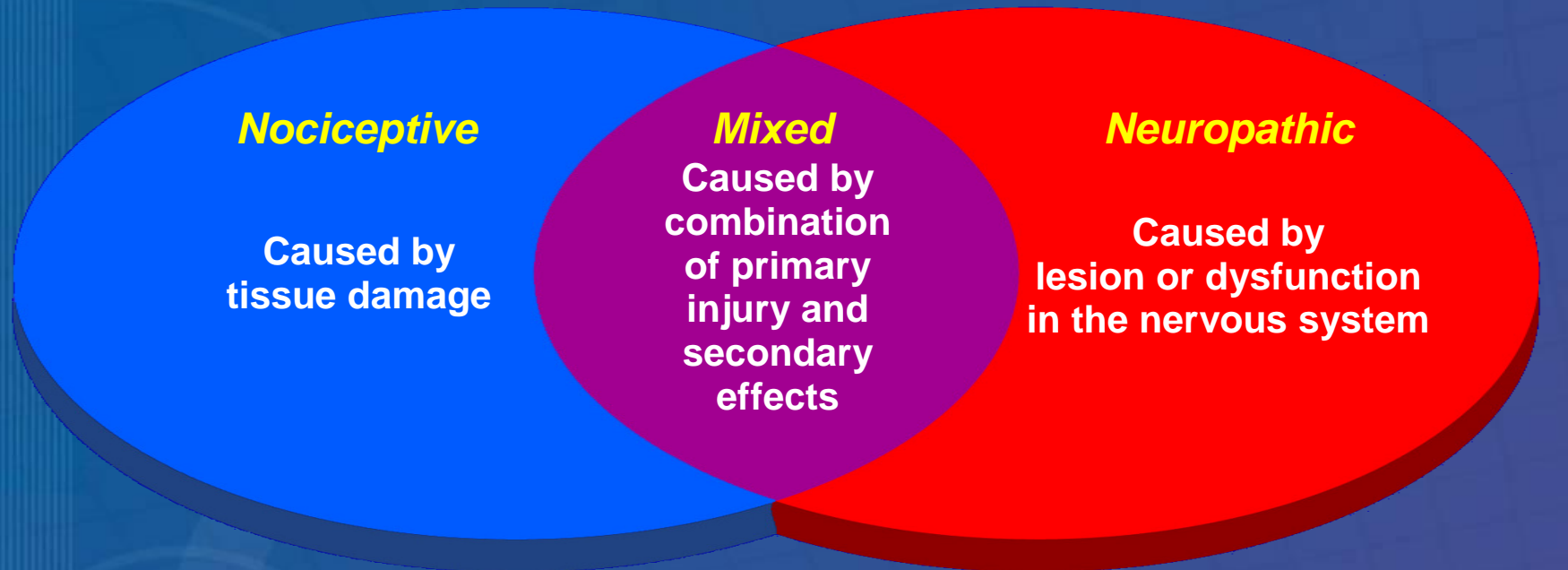
vs

Neuropathic

- Arises from stimulus outside of nervous system
- Proportionate to receptor stimulation
- When acute, serves protective function

- Arises from primary lesion or dysfunction in nervous system
- No nociceptive stimulation required
- Disproportionate to receptor stimulation
- Other evidence of nerve damage

Examples of Nociceptive and Neuropathic Pain



- Arthritis
- Mechanical low back pain
- Sports/exercise injuries
- Postoperative pain

- Low back pain
- Fibromyalgia
- Neck pain
- Cancer pain

- Painful DPN
- PHN
- Neuropathic low back pain
- Trigeminal neuralgia
- Central poststroke pain
- Complex regional pain syndrome
- Distal HIV polyneuropathy

Pain Assessment

- Quality: sharp shooting, numbness, burning
- Intensity: VAS (0-10)
- Duration: constant, intermittent, worse at night
- associated symptoms: bowel/bladder incont.
- Medical/Surgical History:
- opportunistic infections history: herpes, CMV, Lymes, toxoplasmosis, HIV
- Treatments that have failed

Pain Assessment

- Social History:
 - Live alone or partnered
 - Single or multiple story homes
 - Assistive devices
 - Falls
 - Drive
 - Hobbies
- Goals for treatment: work, childcare, school, sports

Physical Exam

- Upper motor neuron vs. lower motor neuron

Physical Exam

- Upper motor neuron:
 - hyper-reflexia
 - spasticity
 - hoffmans/babinski
 - frontal release signs
 - ataxia, tremor, dysmetria

Physical Exam

- Lower Motor Neuron
 - decreased reflexes
 - weakness

Upper Motor Neuron

- Metabolic: common drug effects
- Lymphoma: CNS tumors
- Primary or metastatic cancer
- CVA: thalamic syndrome, hand-shoulder syndrome
- Myelopathy: stenosis
- Infectious disease: meningitis, lymes disease
- Neurological: MS
- Dementia

Lower Motor Neuron

- Peripheral Sensory Neuropathy
- Mononeuropathy: femoral
- Radiculopathies
- myopathy: CPK
 - Drug effects
- Arthropathies: OA
- Autoimmune: RA
- Infectious Disease: Herpes zoster

Normal Pain Pathways

TRANSMISSION

MODULATION

Key:

RVM = rostroventral medulla

PAG = periaqueductal grey

C = cingulate cortex

F = frontal cortex

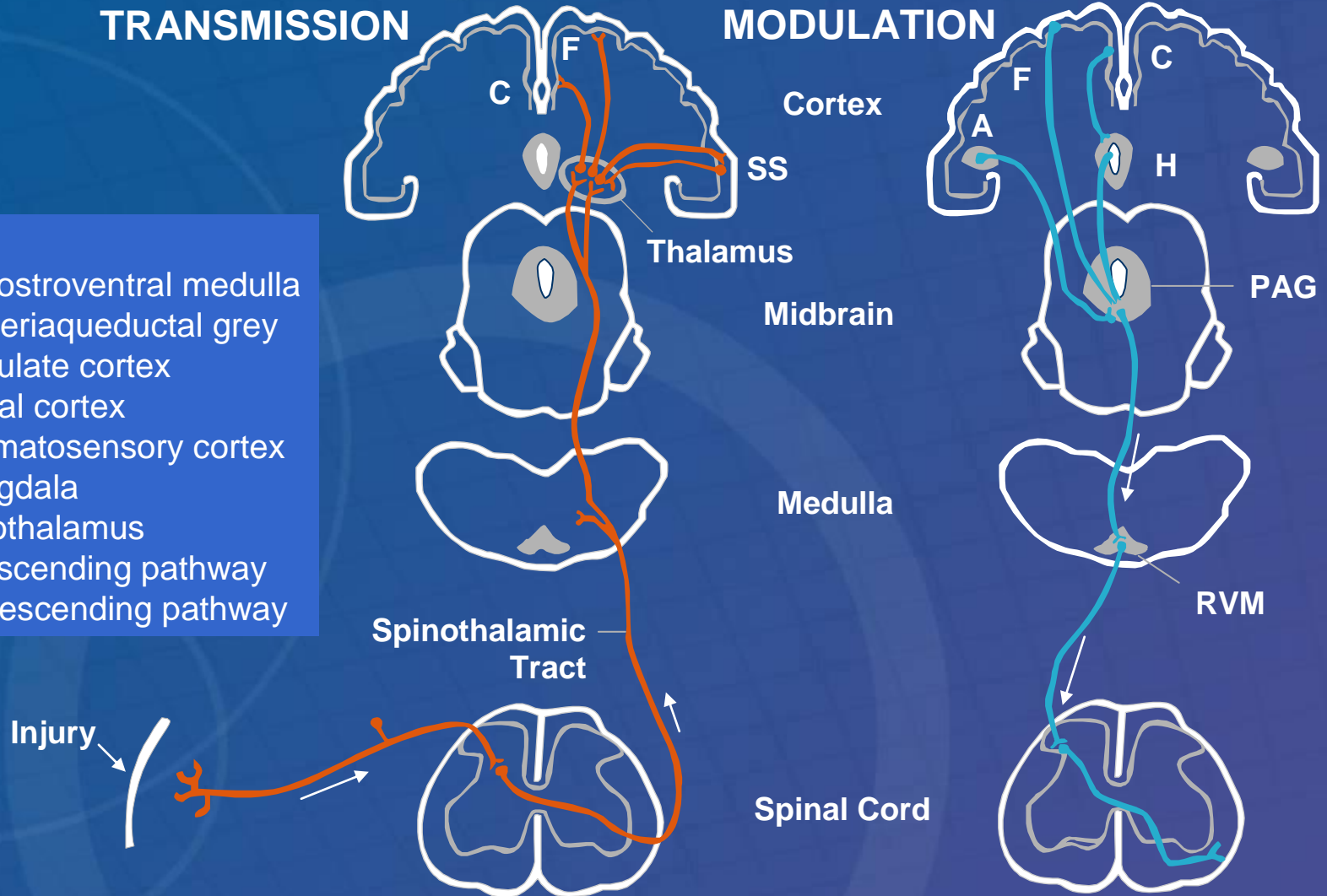
SS = somatosensory cortex

A = amygdala

H = hypothalamus

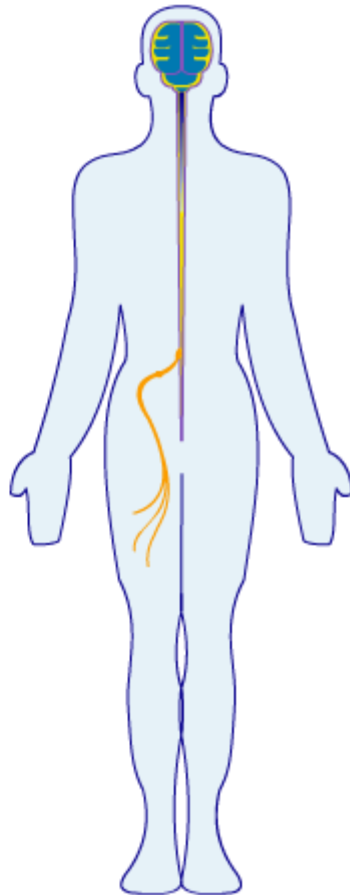
— Ascending pathway

— Descending pathway



Adapted with permission, from Fields. In: *The Placebo Effect: An Interdisciplinary Exploration*. 1997.

Normal and Abnormal Synaptic Neurotransmission



Supraspinal Influences on Nociceptive Processing

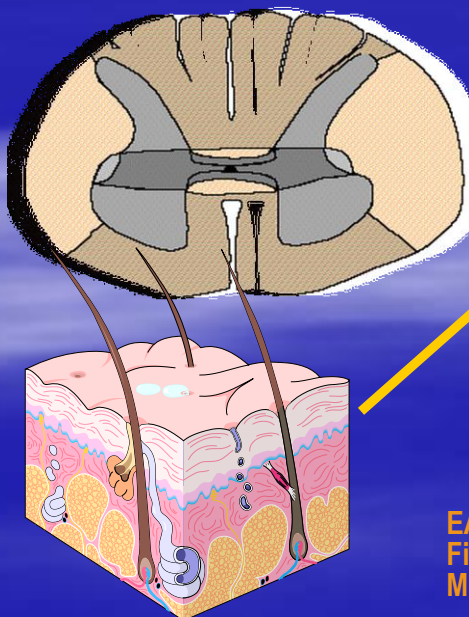
Facilitation

- ▶ Substance P
- ▶ Glutamate and EAA
- ▶ Serotonin (5-HT_{2a} and 5-HT_{3a} receptors)

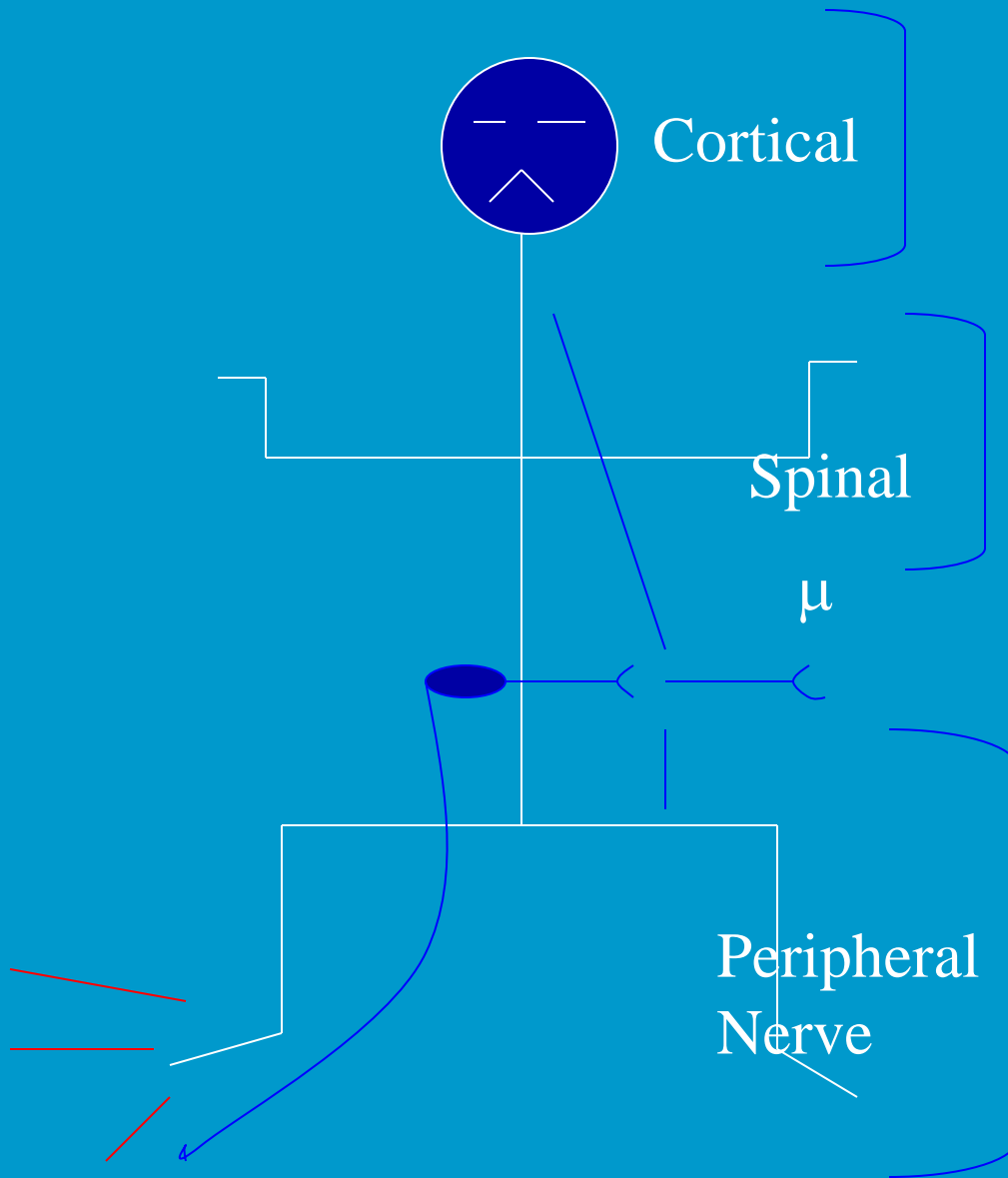


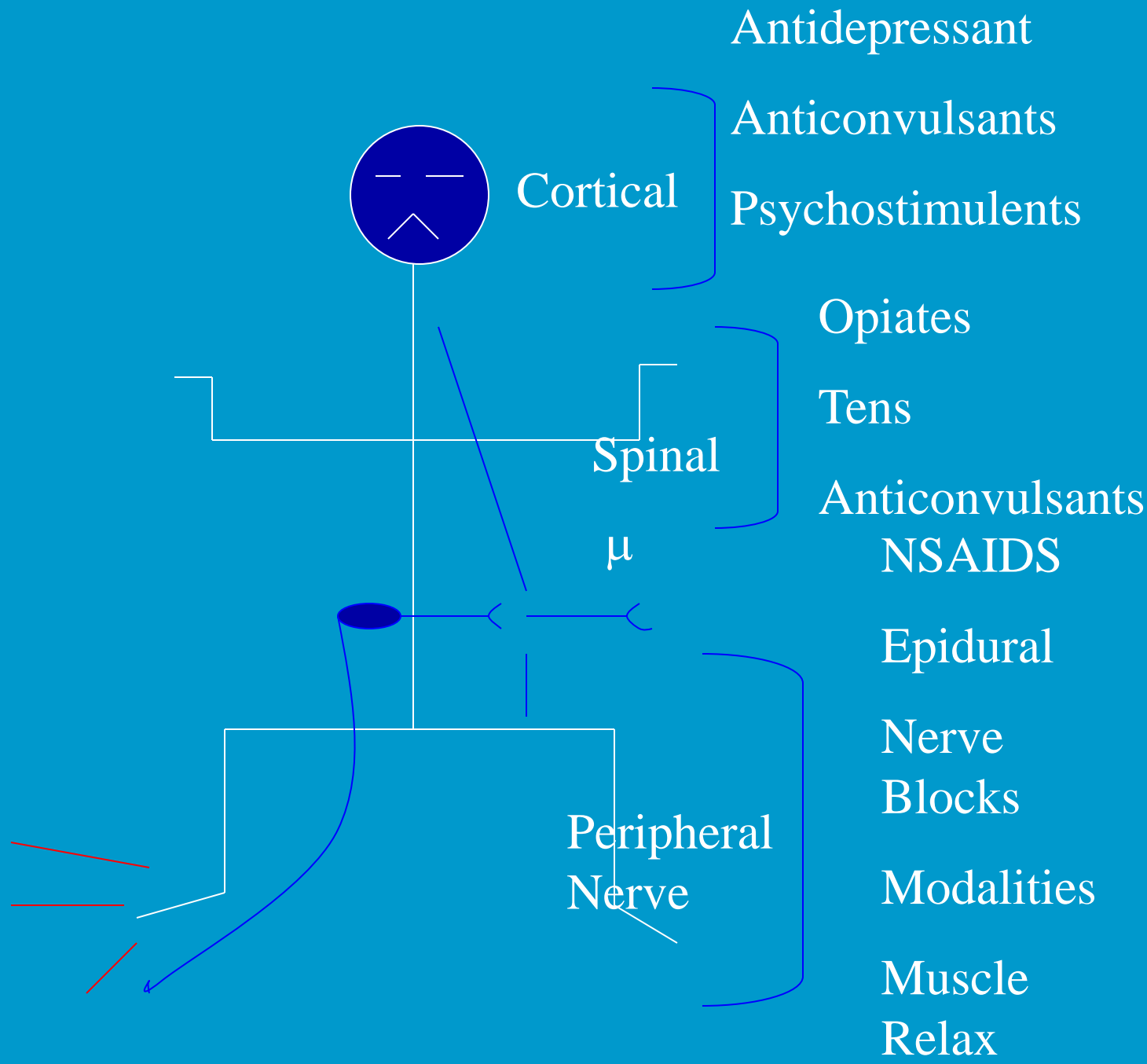
Inhibition

- ▶ Descending antinociceptive pathways
 - ▷ Noradrenaline-serotonin (5-HT_{1a} and 5-HT_{1b} receptors)
 - ▷ Opioids
- ▶ GABA



EAA=excitatory amino acids. 5-HT=serotonin.
Fields HL, et al. In: Wall PD, et al., eds. *Textbook of Pain*. 4th ed; 1999:309-329.
Millan MJ. *Prog Neurobiol*. 2002;66(6):355-474.





Pain Management

- WHO Analgesic ladder

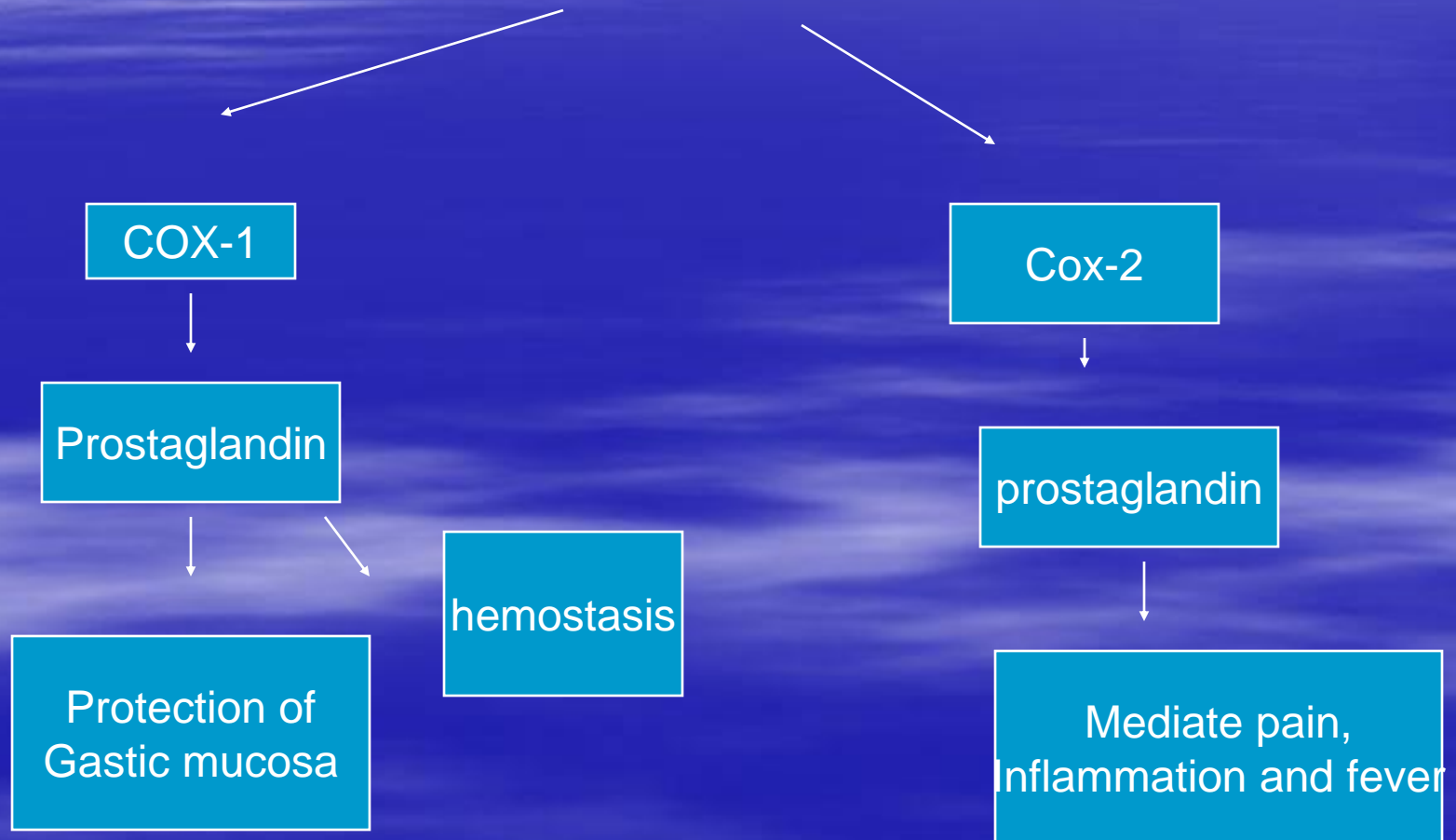


Metabolized by C450 2D6 isoenzymes

- Antiarrhythmics
- Beta-blockers
- Opiates
- Antipsychotics
- SSRI's
- TCA's
- Anti-retrovirals

Mechanism of Action of NSAID

■ Arachidonic Acid



Specificity of Agents

- Category inhibition
- Cox-2
- Cox-1

- Medications
 - Celecoxib
 - Aspirin
 - Diclofenac (oral, gel, patch)
 - Etodolac
 - Ibuprofen
 - Indomethacin
(Indomethacin-VariouS)
 - Meloxicam
 - Naprosyn (Naproxen)

Opioids

- Agonist and Agonist-antagonists
 - bind to opioid receptors
- sustained released and short acting agents
- Oral route is most preferred
- mainstay for moderate to severe pain
- never dose as PRN

Opioids

- Start with the lowest possible dose possible
- titrate the drug
- place the patient on a schedule and never PRN
- use combinations of opioids and non-opioids
- be aware of tolerance

Opioids

- Weaker Opioids analgesics:
 - oxycodone, hydrocodone, codeine
 - available in combinations with ASA/aceto.
- Stronger Opioid analgesics:
 - Roxicodone (Oxycodone HCl) immediate release
 - Oxycontin (Oxycodone HCl) sustained release
 - MSContin (Morphine Sulfate), MSIR
 - Methadone
 - Duragesic (Fentanyl)

Dosing of Opioids

- Long-acting agents for 24 hr. relief
- Short-acting agents for breakthrough pain
 - no more than 2 times daily (debated)
 - Combo drugs; Percocet (Oxycodone HCl), Vicodin (Hydrocodone Bitartrate-Acetaminophen), Lortab (Hydrocodone Bitartrate-Acetaminophen)
 - Uncombined drugs; Oxy IR (Oxycodone HCl), Actiq (Fentanyl Citrate)
- Treat side effects such as constipation

Methadone

- Long half life: 24-150hrs
- Duration of activity: 4-6hrs.
- Toxicity with overlapping half lives
- HIV meds can decrease the serum level of methadone
 - Immediate withdrawal

Methadone

- When switching to methadone to another analgesic: decrease 75-90% equi-analgesic dose
- Take maintenance Dose decrease 20% and divide to tid-qid.
- Short acting for withdrawal symptoms

Transdermal

- 98% protein bound
 - Must have protein to be absorbed
 - Must have protein to be excreted
- Absorption of the drug increased as the temperature increases.
 - 101-103 degrees

Tramadol (Ultram)

- Centrally Acting Oral Opioid Agonist
- Serotonin and Noradrenergic
- Dizziness, Nausea and Headache

Antidepressants

- Works on serotonin and noradrenergic
- tricyclics, hetero, SNRI, SSRI
- potentiate the opiates
- treat depression as a side effect

Antidepressants

- Effexor: SSRI (Venlafaxine)
- Amitriptyline: tri
- Lithium
- Desipramine: tri
- Nortriptyline: tri
- Paxil: SSRI (Paroxetine)
- Prozac: SSRI (Fluoxetine)
- Serzone (Nefazodone)
- Wellbutrin (buPROPion): Aminoketone
- Zoloft: SSRI (Sertaline)
- Cymbalta: SNRI (duloxetine)

Most neurotransmitters are
inhibitory

Side-effects

- Urinary retention, anticholinergic, increased or decreased blood pressure, drowsiness, nausea, headache, sweating

Antidepressants

- Pain relief is related to serum level.
- Dose at night to allow improved sleep
- SSRI's are believed to be not as beneficial in pain relief until recently
- Warn patients about side effects

Anticonvulsants

- Gabapentine (Neurontin):
 - works on GABA
 - start at low doses and titrate upward
 - check renal profiles: renal excretion
 - potentiate opioids weakly
 - strong mood stabilizer

Anticonvulsants

- Valproic Acid: extreme caution in liver disease, monitor blood levels, neural tube defects in fetus, dizziness, headache, thrombocytopenia
- Phenytoin: nystagimus, lethary, ataxia, gingival hyperplasia, hepatic disease

Anticonvulsants

Gabitril (Tiagabine): GABA reuptake inhibitor, caution with liver disease, dizziness, fatigue, rare ophthalmologic effects

- Klonopin (Clonazepam): benzodiazepine
- Lamictal (Lamotrigine): rash (serious), dizziness, ataxia, fatigue, blurred vision
- Tegretal: aplastic anemia, rash (SJS), photosensitivity, dizziness

Anticonvulsants

- Topomax (Topiramate): sulfa mate: fatigue, dizziness, ataxia, paresthesia, kidney stones, mental cloudiness, weight loss.
- Zonégren: Somnolence, dizziness, anorexia, headache, nausea
- Lyrica (Pregabalin): Schedule V, sedation, weight gain
 - May be less sedating than Neurontin (Gabapentin)
 - Indicated for post-herpetic neuralgia, diabetic neuropathy

Antispasmodics

- Flexeril (Cyclobenzaprine): central acting, unknown mechanism, anticholinergic side effects
- baclofen: central acting, drowsiness, confusion, seizures with abrupt withdrawal
- parafon forte: central acting, GI upset, drowsiness

Muscle Relaxants

- Robaxane: central acting, drowsiness, dizziness, GI upset, blurred vision, headache
- Skelaxin (Metaxalone): central acting
leukopenia, hemolytic anemia, dizziness
- SOMA: addictive, dizziness, nausea
- Tizanidine: alpha adrenergic agonist, anticholinergic, fatigue, urinary retention

Psycho-stimulants

- Serotonin and noradrenergic
- potentiate opioids
- powerful mood stabilizer
- improves appetite when wasting
- improves sedation
- dose in am and noon only

Topical

- Lidoderm patch (Lidocaine)
- Capsaicin
- Ketamine topical (compound pharm)
- Flector Patch (diclofenac)
- Voltaren Gel (diclofenac)

Drug Abuse and Opioids

- Not as common in the elderly
- Place patient in a drug agreement
 - monthly visit
 - one pharmacy only
 - can not use, sell, trade drugs
 - take as specified - no renewals
- Detox when appropriate - not when sick
- Treat other symptoms: depression