

Pain Healing

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Definitions

Acute pain less than 30 days

Chronic pain more than 30 days or longer than expected time for healing

Sensitization: peripheral and central,
nerves respond to non pain stimulus , cytokines

Pain nerves smart

repetitive stimulation improved signals

substance p mast cell degranulates

histamine

NGF

bradykinin

serotonin

H ion

Prostaglandin

calcitonin g related protein

neural plasticity brain smarter

background stimulus cortex central nervous system smarter in plasticity.

Activated glia currently thought to be party responsible for continuing central pain as a neural immune system

Sensitization may occur peripherally which includes:

- Allodynia (pain is felt from things that normally don't cause pain)
- Inflammation with prostaglandin, bradykinin, or serotonin which alters the nerve sensitivity
- Receptive field enlargement so that more nerves in the surrounding area respond to pain
- Substance P is released and there is prolonged depolarization of the pain nerve firing

Mediators that influence excitation of spine neurons include prostaglandins, nitric oxide, opioids, and adrenergic agonists

Sensitization ATTACK ATTACK

Dorsal horn rewire and wind up

NMDA

neurokinin, nitric oxide

• **Central sensitization**

Decreased threshold for nerve firing (less stimulus is required for a nerve to signal pain)

Decreased inhibition of pain transmission

Increase in nerve firing

Cortical brain map changes

Nerve stimulators

Stimulators for a nerve to fire:

- Trauma (mechanical, thermal, chemical)
- Mediators
- Prostaglandins
- Leukotrienes
- Substance P
- Histamine
- Bradykinin
- Serotonin
- Hydroxy acids
- Reactive oxygen species
- Inflammatory cytokines and chemokines

The body tries **to decrease** pain:

Increase the normal inhibitory down flow from the brain

Increase input from the large sensory fibers of vibration and touch

Decrease small fiber input

“Let food be thy medicine and
medicine be thy food”

- Why?
- IL1, IL6, TNF alpha (6 infusion, allodynia) neuropathic allodynia from TNF
- Peripheral sensitization cytokines, nerves fire and more sensitized with less stimulus

Inflammatory Foods

- Sugar
- Wheat
- Milk
- Solanaceae
- MSG (glutamate)
- High temperature fried foods

Weather

- Barometric pressure Boyles law
- High pressure smaller balloon
- Low pressure larger balloon
- Nerves are an enclosed space
- “How weather can affect joint pain and what to do about it.”
Katherine Kam Web MD
- Jun Sato “Low barometric pressure aggravates neuropathic pain in guinea pigs”

Weather and pain reports

- Argentina in patients who had pain
- rheumatism, osteoarthritis, fibromyalgia
- osteoarthritis, decreased pain with low temperature, high humidity
- fibromyalgia more pain with low temperature, high atmospheric pressure
- rheumatoid arthritis more pain with low temperature, high humidity, and high atmospheric pressure
- <https://www.medicalnewstoday.com/releases/93858.php>

Website

(aches and pain , bad hair day, influenza, air stagnation, attentiveness)

Weather and Pain

- The rate and magnitude of atmospheric pressure change that aggravate pain-related behavior of nerve injured rats.

- Funakubo M1, Sato J, Obata K, Mizumura K.
- Int J Biometeorol. 2011 May;55(3):319-26. doi: 10.1007/s00484-010-0339-8. Epub 2010 Jun 24.

Topical Medications

- Topical NSAIDS
- Other topicals
- Ketoprofen
- Ketamine 5-15%
- Mixtures

Vitamin D actions

- Attaches to the nerves in fascia, neurogenic inflammation
- Increases anti-inflammatory cytokines inhibits the anti-inflammatory Th2 response
- Inhibits Th1 inflammation
- Decreases inflammatory cytokines TNF alpha, IL2, IL6 cytokines like IL10
- Inhibits mitosis
- Downregulates glucocorticoid expression

Vitamin D

Modulates fibroblast proliferation in collagen synthesis

Inhibits secretions of mast cells

Inhibits increase in spine density

Increases brain-derived neurotrophic factor

Positively affects nerve functioning

Prevents neurodegeneration and increases myelin repair

Decreases damage in traumatic brain injury

Damage to tissue, accumulation of inflammatory chemicals, opioid receptors and electrical charges. Opioid receptor accumulation occurs at an injury site to attract the body's own endorphins.

Locally sequestered electrical (magnets, ultrasound, radiofrequency, infrared, and laser treatments)

"Topical and peripherally acting opioids." Pharmacologic reviews 2003 The mixtures of the medicines in cold cream are as follows:

Morphine: 30 mg tab crushed and mixed in 1-2 tabs per ounce of cold cream

Hydromorphone: 4 or 8 mg crushed and mixed in 1-2 ounces of cold cream

Oxycodone: 30 mg crushed and mixed in 1-2 ounces of cold cream

Supplements and Herbs

product (other than tobacco) made to supplement the diet, contains one or more of the following dietary ingredients:

"(A) a vitamin;

"(B) a mineral;

"(C) an herb or other botanical;

"(D) an amino acid;

"(E) a dietary substance for use by man to supplement the diet by increasing the total dietary intake; or

"(F) a concentrate, metabolite, constituent, extract, or combination of any ingredient described in clause

Herbs Devils claw

- iridoid glycoside, harpagoside
- S Africa
- Appearance
- Pain , liver disease, kidney disease, malaria, fever

Boswellia

- Frankinsense
- India Middle East Africa
- 5 lipo oxygenase inhibitor
- Deters wbcs from entering inflamed tissue

Feverfew

- Tanacetum parthenium, daisy family
- Asia, Balkans, Canada, Maryland
- Volatile oils
- Camphor, camphene, tricyclene, alpha-pinene, alpha-terpinene.
- Feverfew: inhibits prostaglandin synthesis.
- Extracts of the leaf inhibit prostaglandin.
- Tenat, a flavonoid in the leaf flower and seed blocks the synthesis of prostaglandin. Strong inhibitor of serotonin release from platelets.

Lemon balm: *mellisa officinalis*

- Mediterranean Iran S central Asia
- Carmelite water in German pharmacies
- Nfk beta, terpenes
- Eugenol relaxes spasm
- Inhibits glutamate release

Corydalis Bulbosa

- Corydalis Bulbosa
- Papaveraceae family. High mountains of East Africa, China, Japan, and the Himalayas. Perennial plant that grows in shade along edges of woods.
- Pink, purple, or white flowers.
- Traditional Chinese medicine, invigorate the chi.
- Nerve pain, menstrual pain, insomnia, and heart arrhythmias.
- Corydalis yanhusuo is the herb most commonly used by traditional Chinese herbalist for pain. It has been used by Chinese herbalist to stimulate the circulatory system and decrease pain. Corydalis for pain considered to be about forty percent as effective as morphine. Not addictive. Dehydrocorybulbine is under research currently by pharmaceutical companies for use as a non-narcotic pain reliever.

Vibration

- Vibratory anesthesia, dental, foot, facial
- Hollins Mc Dermott Harper: areas of brain responsible for inhibition pain sensation
- Pain inhibition several levels, includes the dorsal horn of the spinal cord, the brain stem, and sensory cortex and cingulate cortex.
- Vibration used to decrease pain for dermatological procedures.
"Vibration anesthesia: A noninvasive method of reducing discomfort prior to dermatologic procedures," Kevin C Smith MD, Stephen L Comite MD, Suprina Balasubramanian, Alan Carver MD and Judy F Liu
- Dermatology Online Journal 10 (2): 1, January 4, 2018

Putting it All Together

- Combination approach more effective
- Decrease or limit sensitization peripherally and centrally
- Vibration
- Treat the actual neurological changes!
