Acute and Chronic Pain

Apple and Oranges

Implications for its assessment

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PAIN - DEFINITION

"Pain is a sensory, unpleasant and emotional experience associated with actual or potential tissue damage, or described in terms of such damage"

International Association for the Study of Pain (IASP),1979

Proposed revised definition: "Pain is a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components."

Updating the definition of pain, de Williams et al. Pain 2016;157:2420–2423.

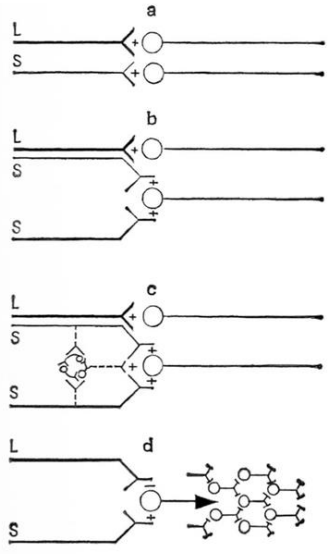
Pain

Commonly occurring, great suffering for the individual, high costs for the society, clinical challenge

(Gerdle et al. 2004; Mantyselkä, 2003; Lundberg, SBU 2006; Harstall and Opsina, 2003)

NOCICEPTION is not PAIN

Evolution of Pain Theories



19thC: Von Frey's specificity theory: large and small fibres transmit touch and pain specifically, to specific touch or pain centres in the brain

19thC: Goldscheider's Summation theory: small fibres converge onto a dorsal horn cell, and touch is carried on large fibres

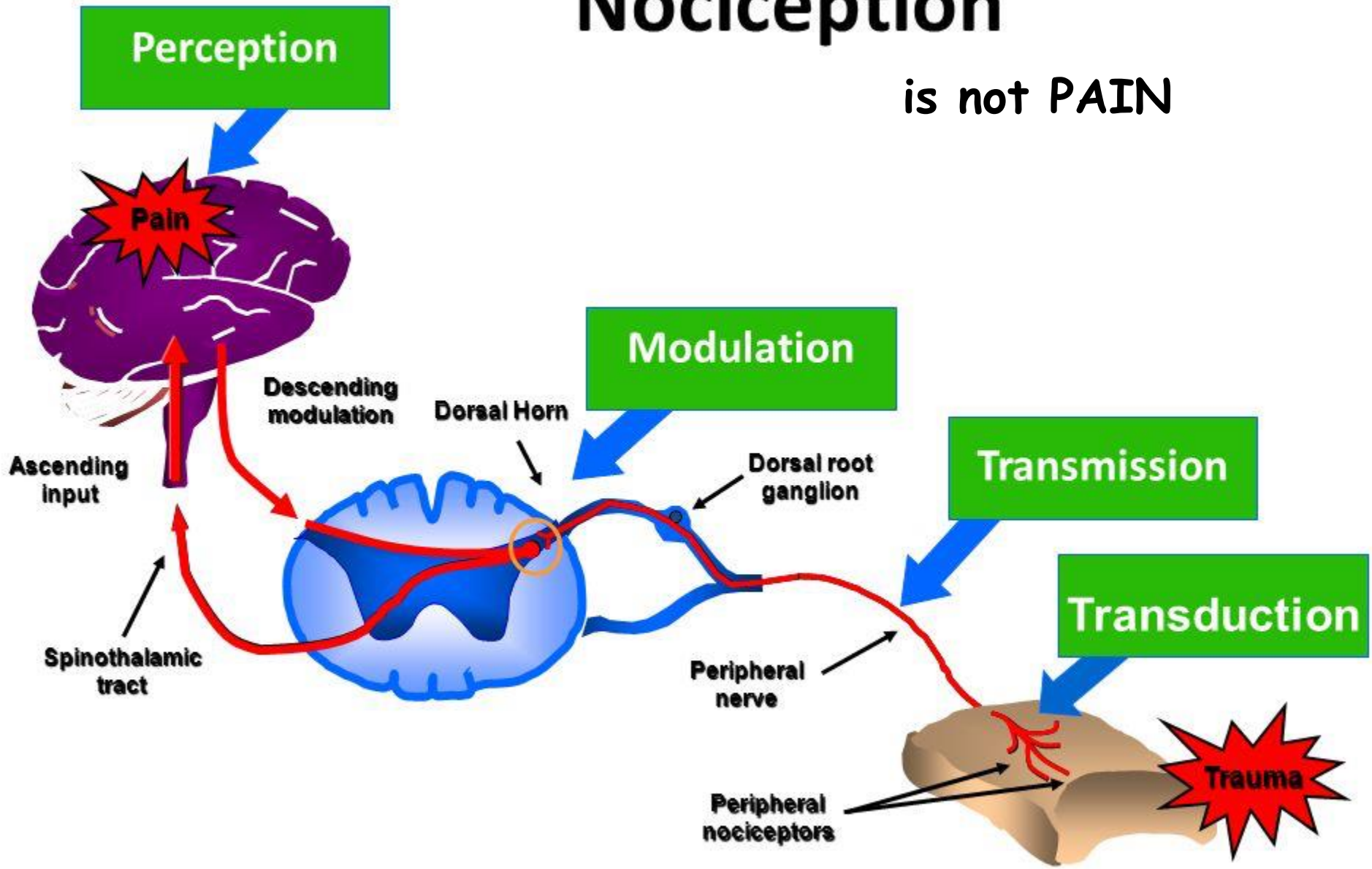
1943: Livingston's reverberatory circuit model: dorsal horn cell bombarded by self-exciting neuron circuit transmits abnormally patterned volleys to brain

1959: Noordenbos' sensory interaction theory: large fibres inhibit, small ones excite central transmission neurons; comprises multi-synaptic afferent system.

Image: adapted from p. 163, Melzack & Wall, Challenge of Pain, 1996 ed.

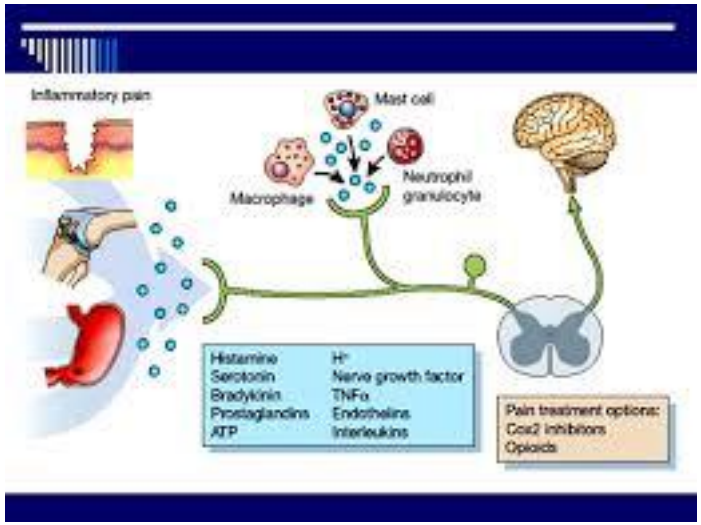
Nociception

is not PAIN



Adapted from Gottschalk A et al. *Am Fam Physician*. 2001;63:1981, and Kehlet H et al. *Anesth Analg*. 1993;77:1049.

NOCICEPTION is Plastic



Sensitization

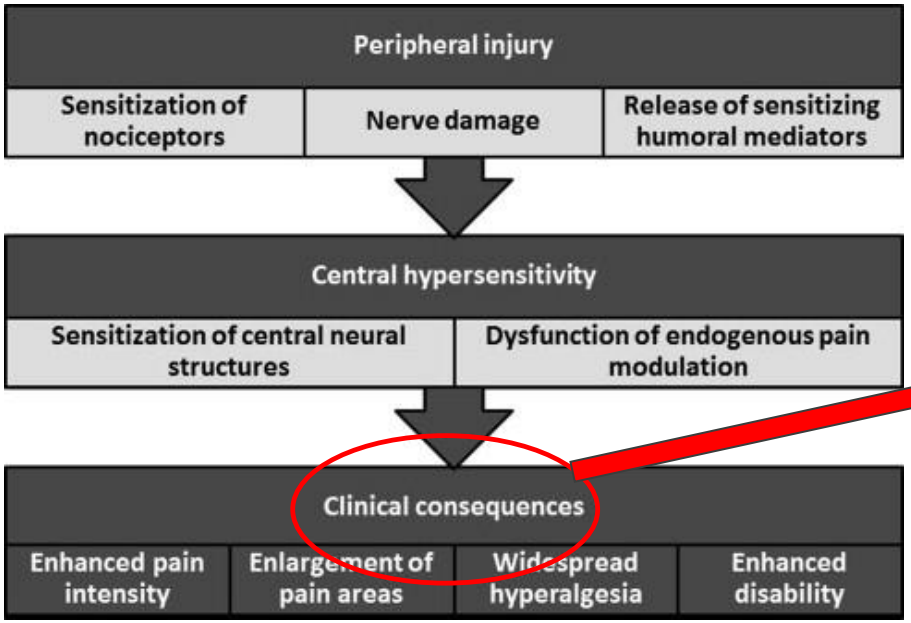
Sensitization

PG /NGF

Nociceptive Non-Nociceptive

Sensitization

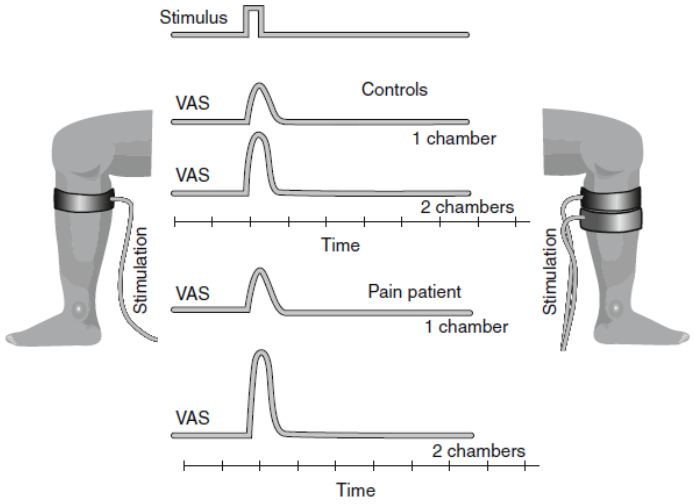
Hypersensitivity as consequence of pain

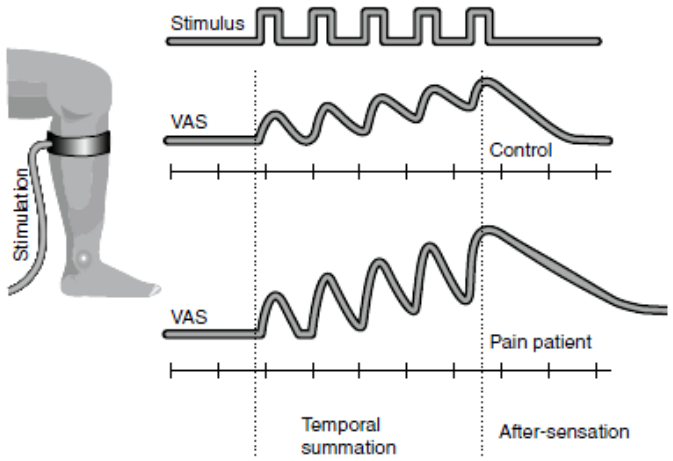


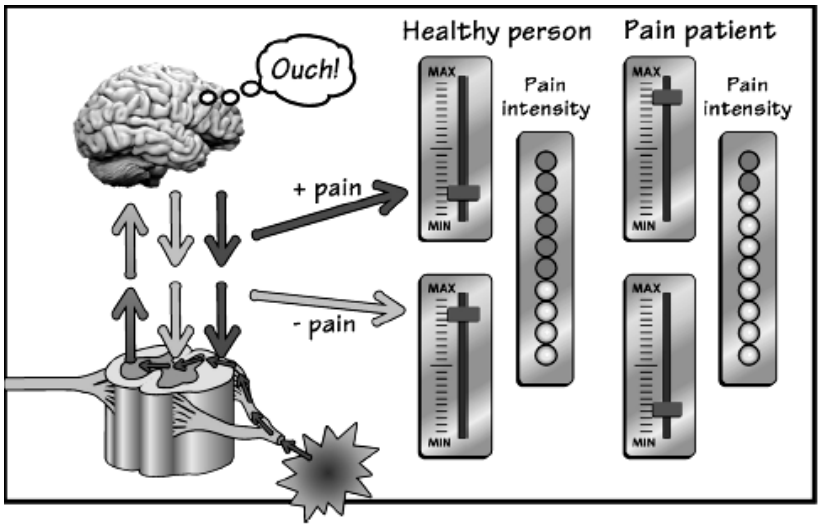
- Allodynia – mechanical, thermal
- Hyperalgesia
- Increased temporal summation
- Increased spatial summation
- Increased after sensation
- Decreased pain threshold (The minimum intensity of a stimulus that is perceived as painful) – tested by mechanical, electrical, thermal, ischemic stimulation
- Increased frequency of triggerpoints

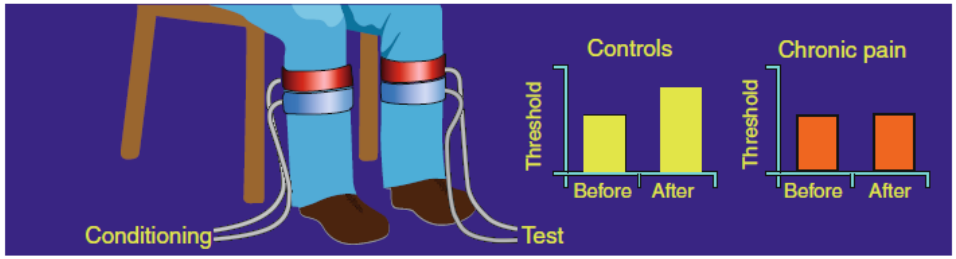
Michele Curatolo, Lars Arendt-Nielsen Central Hypersensitivity in Chronic Musculoskeletal Pain Physical Medicine and Rehabilitation Clinics of North America, Volume 26, Issue 2, 2015, 175–184

Clinical findings in nociceptive/inflammatory pain due to longtime joint involvement

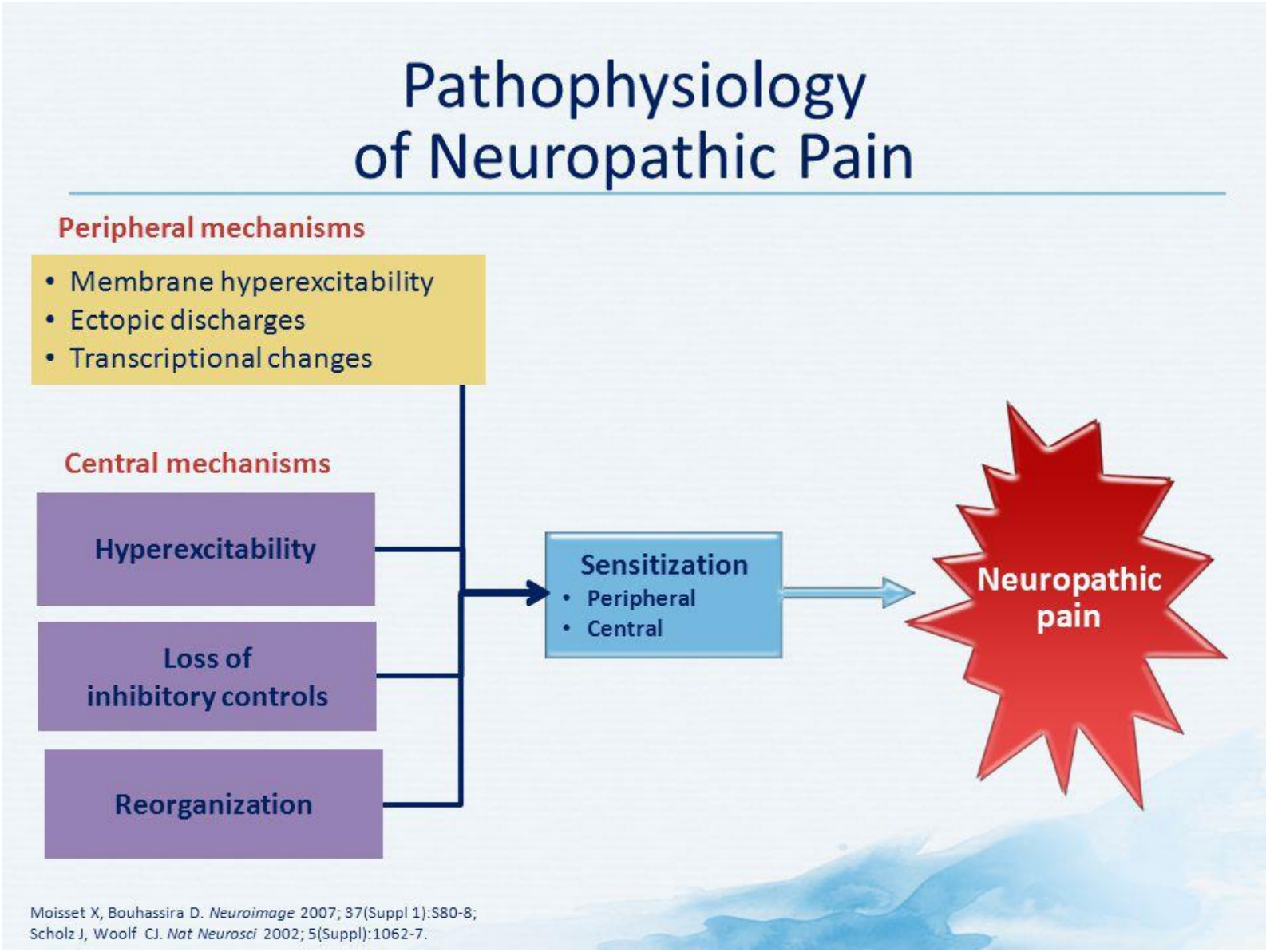






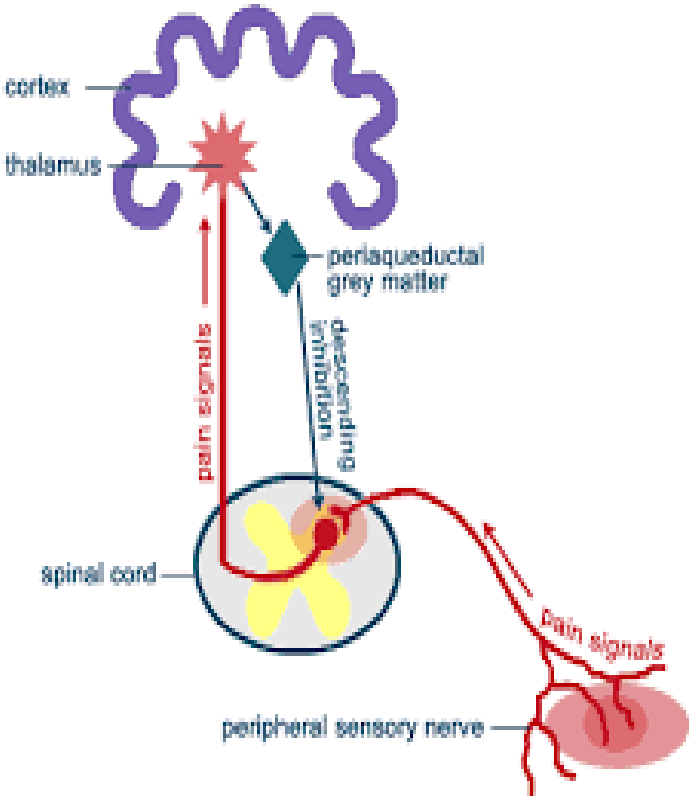


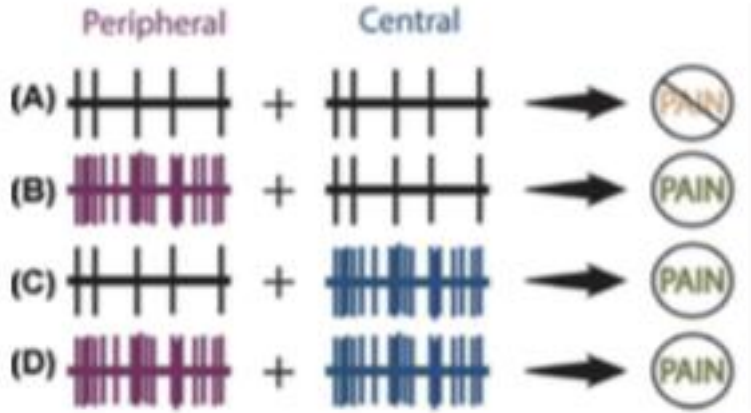
Arendt-Nielsen et al., Altered central sensitization and pain modulation in the CNS in chronic joint pain. Durr Osteopors Rep 2015;13:225-234.



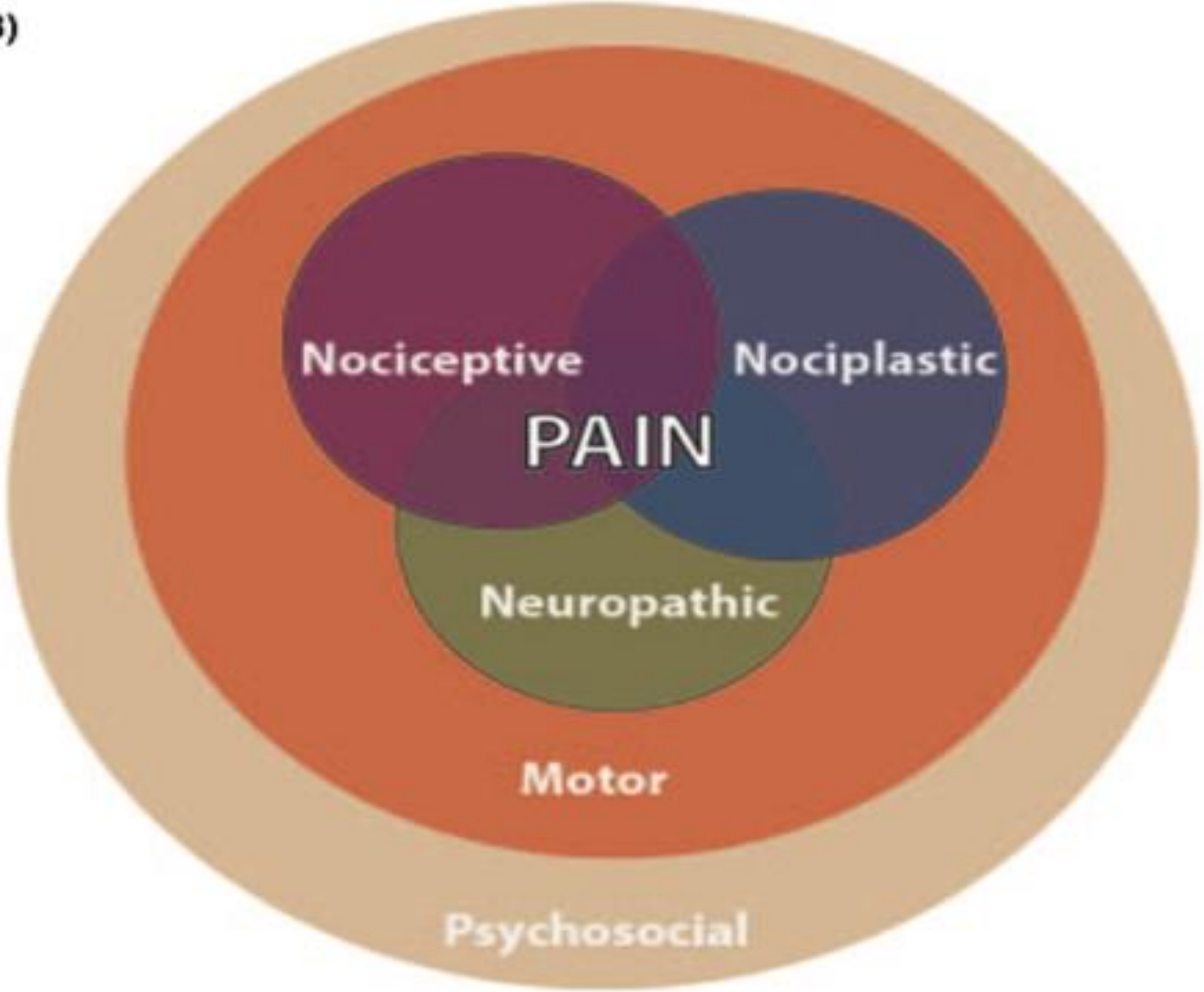
Stimulus evoked /Spontaneous
Non-Nociceptive

Nociplastic pain

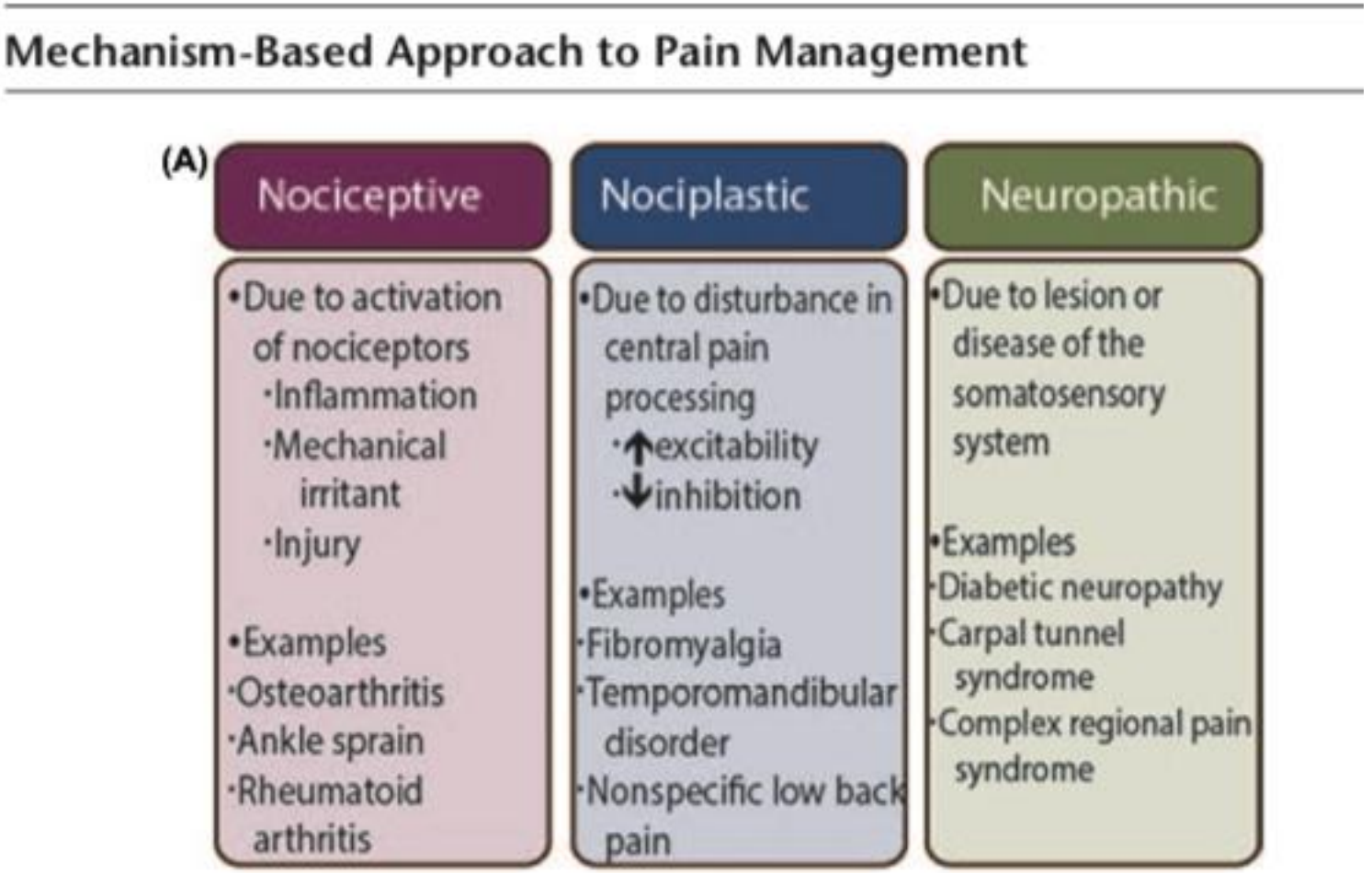




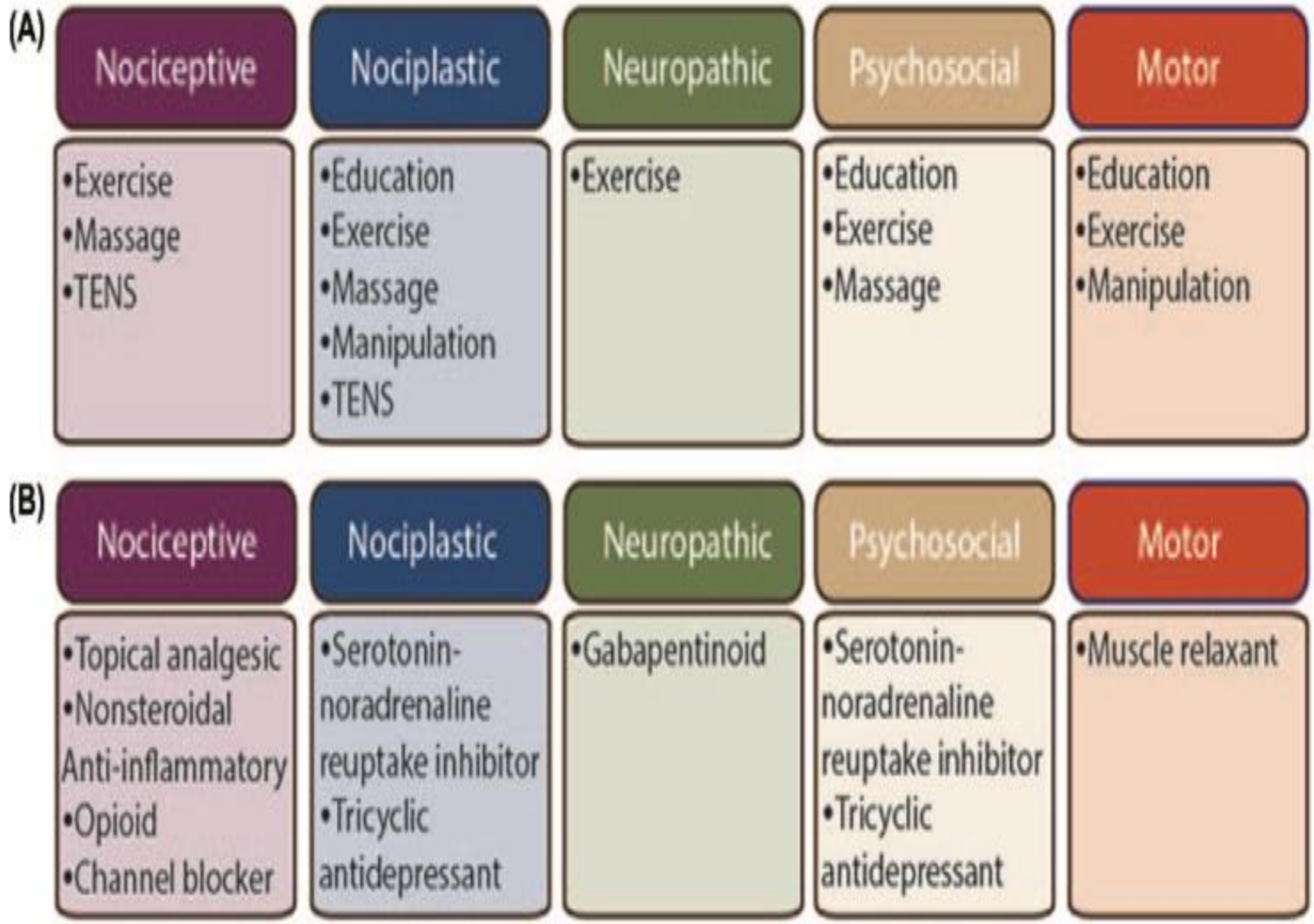
(B)


Nociceptive
Nociplastic
PAIN
Neuropathic
Motor
Psychosocial

Mechanistic based pain classification

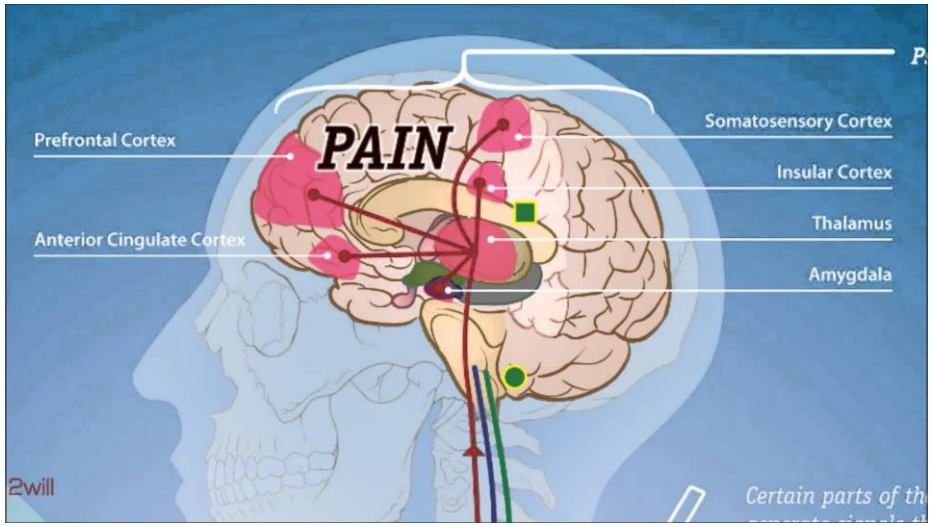


Mechanism-Based Approach to Pain Management



Central projections of nociceptive input into the brain

Sensory cortex-intensity + location



Frontal cortex

- **Cognitive**

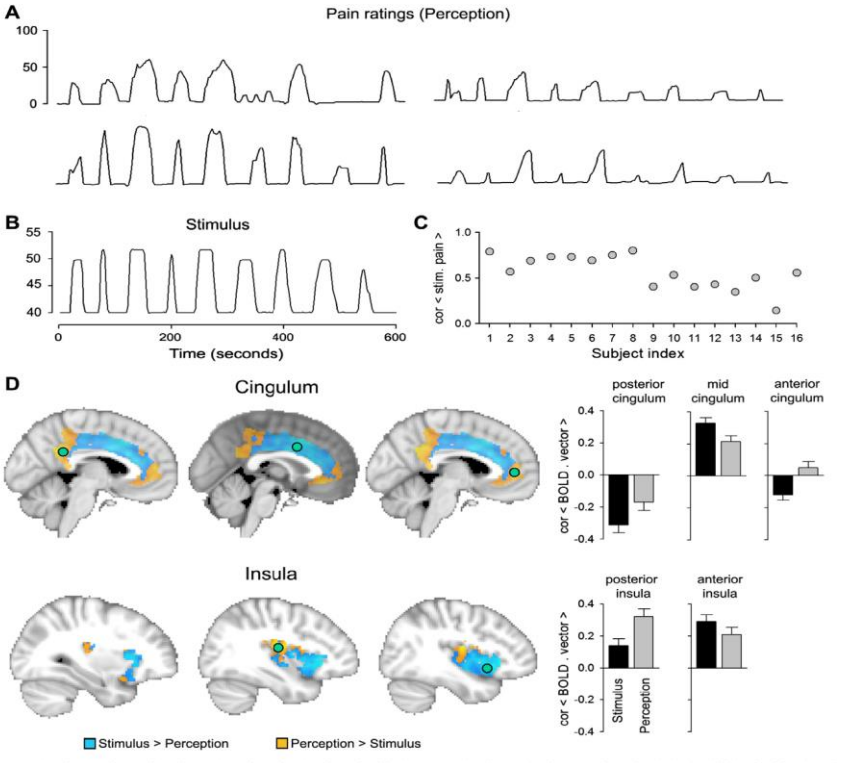
1. **Anxiety**
2. **Fear of movement**
3. **Catastrophizing**

Limbic structure – emotional

1. **Reduced deep sleep**
2. **Altered food intake**
3. **Social isolation**
4. **Depressed mode**

Central activity of nociceptive input into the brain –

Acute



Chronic

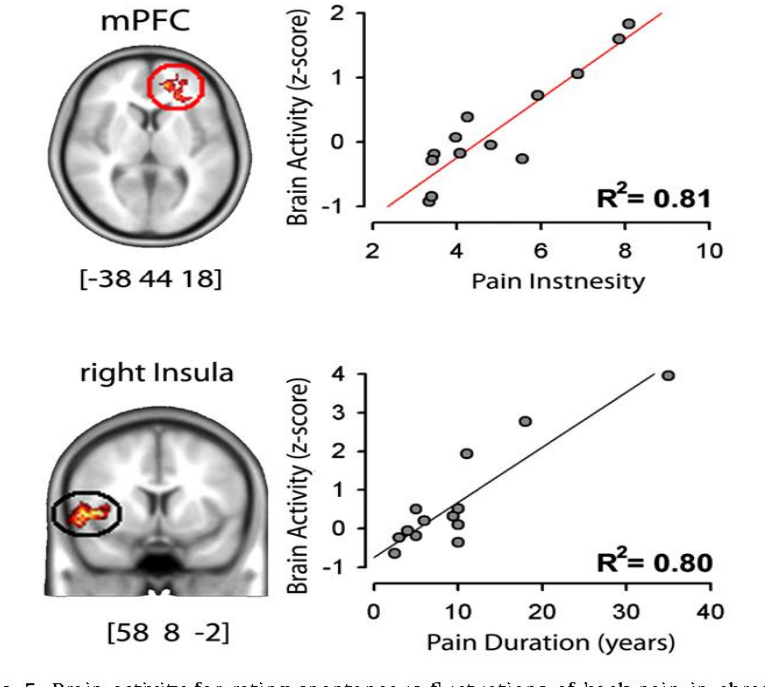
Stimulus evoked

Central activity in the chronic pain brain –

pFC – N Acc

Hippocampus

Default mode

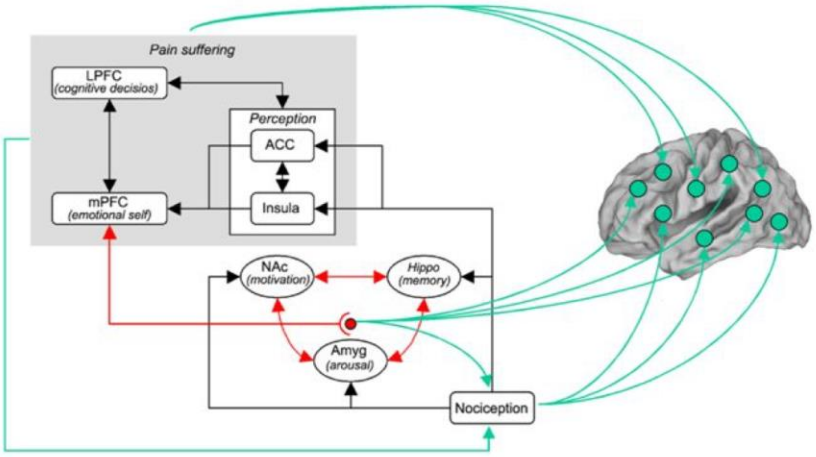


Constant Pain

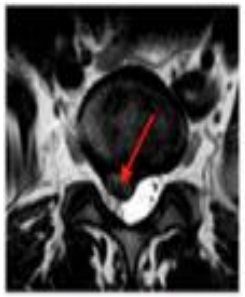
Chronic pain as emotional learning and memory

- Pain chronification is not simply a consequence of the pain being experienced repeatedly over a sustained time period.

- Cortico-striatal and cortrico-limbic brain circuitry may be directly involved in the development and maintenance of chronic pain.



Apkarian et al 2010

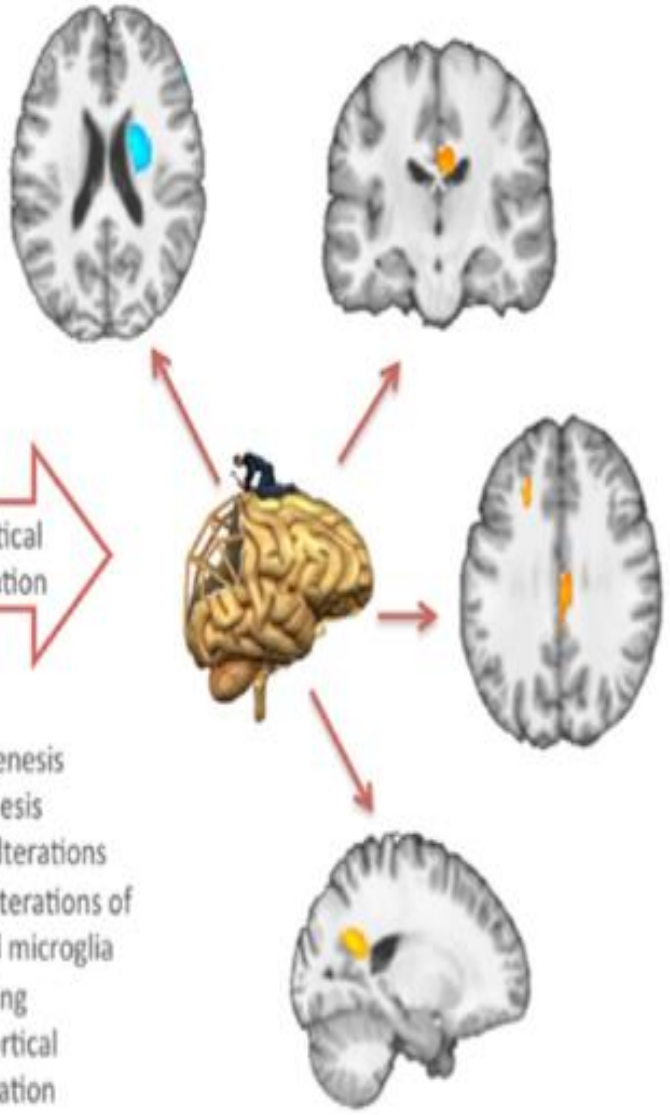


Low Back Pain

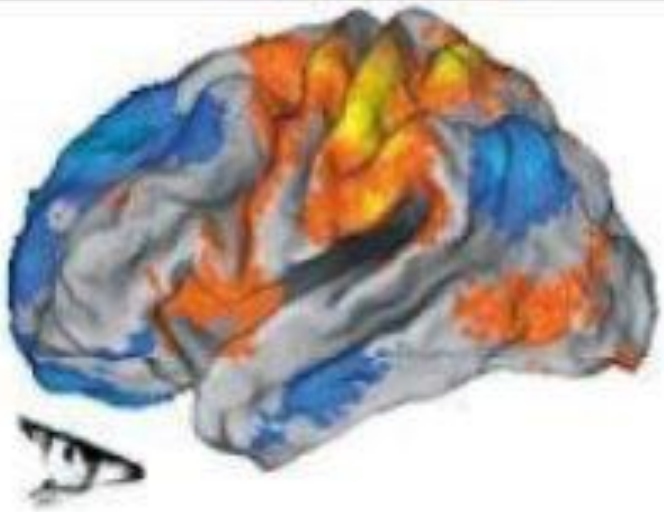
- Disc herniations
- Spinal stenosis
- Spondylolisthesis
- Spinal cysts
- Infections
- Neoplasms
- Fractures
- .....

(Sub-) Cortical Reorganization

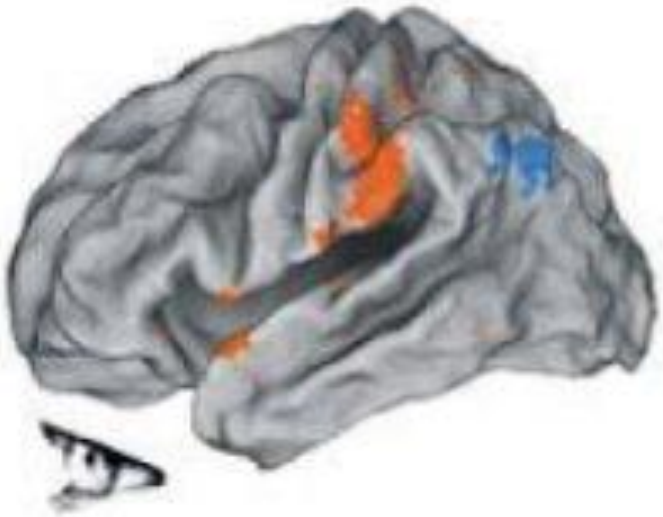
- Synaptogenesis
- Neurogenesis
- Cell size alterations
- Density alterations of astro- and microglia
- Cell swelling
- Shift of cortical representation
- .....



Healthy



Chronic pain



Low back pain - ICF

FMUQ - Försäkrings Medicinsk Utrednings Questionnaire

Functioning (activities and particiaption) was rated from
0 = No Difficulty
1 = Mild Difficulty
2 = Moderate Difficulty
3 = Severe Difficulty
4 = Extreme Difficulty or Cannot Do

As observed during testing (Objective)
As stated by the claimant (Subjective)

The questionnaire (FMUQ) was inspired by ("Nivåbeskrivningar, FK 7270 introduced by the Swedish Social Security Agency (Försakringskassan) and **International Classification of Functioning**, Disability and Health, known more commonly as ICF, is a **classification** of health and health-related domains.ICF is operationalized through the WHO Disability Assessment Schedule (WHODAS 2.0). https://www.socialstyrelsen.se/klassificeringochkoder/koderfunktionstillstandicf

Claimant diagnosed with Low back pain and Maladaptive stress reaction.

	0	1	2	3	4	Obj	Subj
d110 Watching			x			x	
d115 Listening	x					x	
d155 Acquiring skills		x				x	
d160 Focusing attention			X			x	
d210 Undertaking a single task		x				x	
d220 Undertaking multiple tasks			x			x	
d230 Carrying out daily routine			x				x
d240 Handling stress and other psychological demands				X		x	
d398 Communication, other specified	X					x	
d410 Changing basic body position				X		x	
d415 Maintaining a position			x			x	
d430 Lifting and carrying objects				X		x	
d440 Fine hand use	X					x	
d445 Hand and arm use			X			x	
d450 Walking			X			x	
d498 Mobility, other specified		X					x
d598 Self-care, other specified		X					x
d798 Interpersonal interactions and relationships, unspecified	X						x

Acute

Chronic