



Universidade de São Paulo - USP
Faculdade de Medicina de Ribeirão Preto - FMRP
Laboratório de Neurociências de dor e emoções
Disciplina de Neurofisiologia comparada



Dor



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Definição da dor

“Uma experiência sensorial e emocional desagradável associada ou semelhante à associada a um dano tecidual real ou potencial”



IASP

INTERNATIONAL ASSOCIATION
FOR THE STUDY OF PAIN

CELEBRATING | 1974-2024



NOCICEPÇÃO:

**“O processo neural de codificação
de estímulos nocivos”**



Classificação

Tempo

Agudo

Crônico

Localização

Periférica

Central

Visceral

Somática

Origem/Mecanismo

Nociceptiva

Neuropática

Nociplástica



NOCICEPTORES

Receptores sensoriais especializados que fornecem informações sobre a lesão tecidual

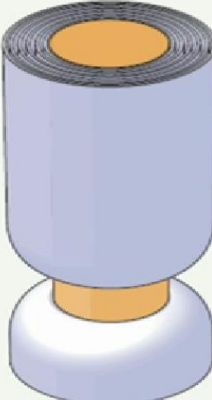



Mecânicos

Térmicos

Polimodais

Silenciosos

Fibras de transmissão

Axônios cutâneos	A α	A β	A δ Fibra A delta	C Fibra C
				
Diâmetro (μ m)	13–20	6–12	1–5	0,2–1,5
Velocidade (m/s)	80–120	35–75	5–30	0,5–2
Receptores sensoriais	Proprioceptores musculares	Mecanor-receptores do tato	Temperatura não nociva e nociceptores	Temperatura não nociva e nociceptores

Fibras de transmissão

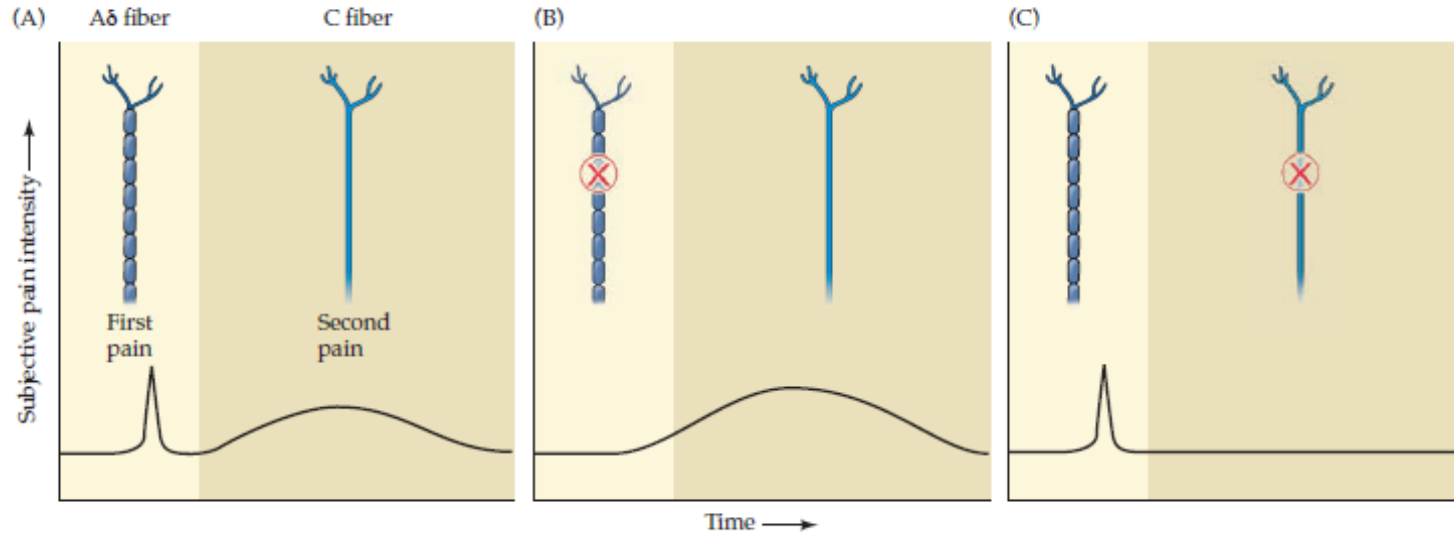


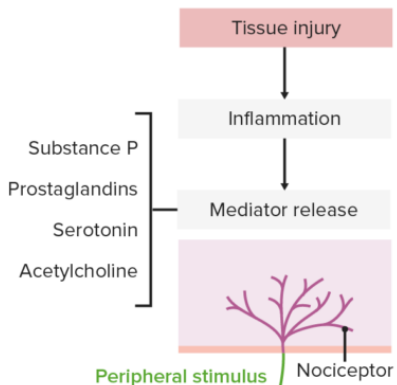
FIGURE 10.2 First and second pain. Pain can be separated into an early perception of sharp pain and a later sensation that is described as having a duller, burning quality. (A) First and second pain, as these sensations are called, are carried by different axons, as can be shown by (B) the selective blockade of the more rapidly conducting myelinated axons that carry the sensation of first pain, or (C) blockade of the more slowly conducting C fibers that carry the sensation of second pain. (After Fields, 1990.)



Fisiologia da dor



Transdução



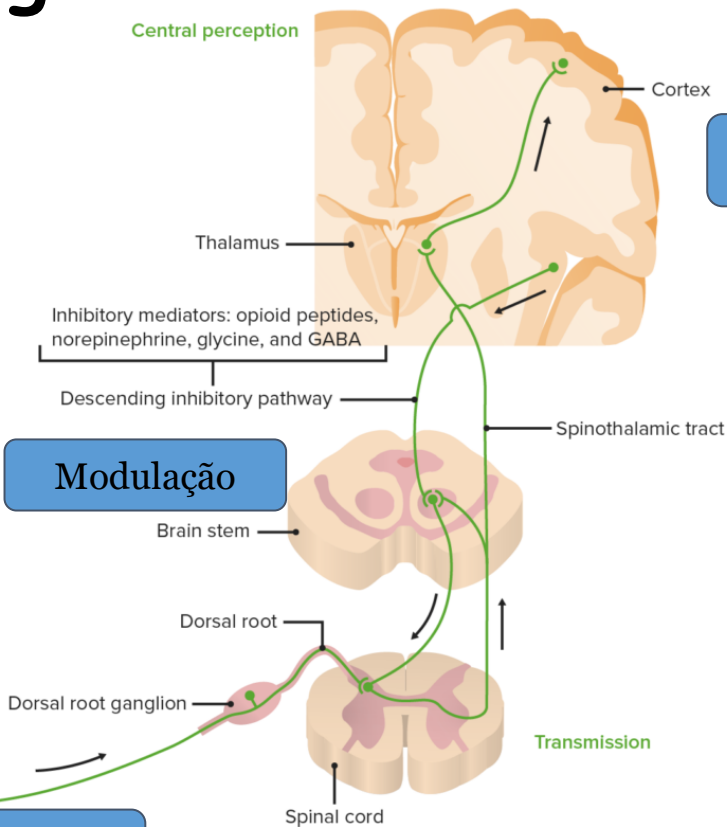
Signal transduction

Peripheral nerve

Conduction

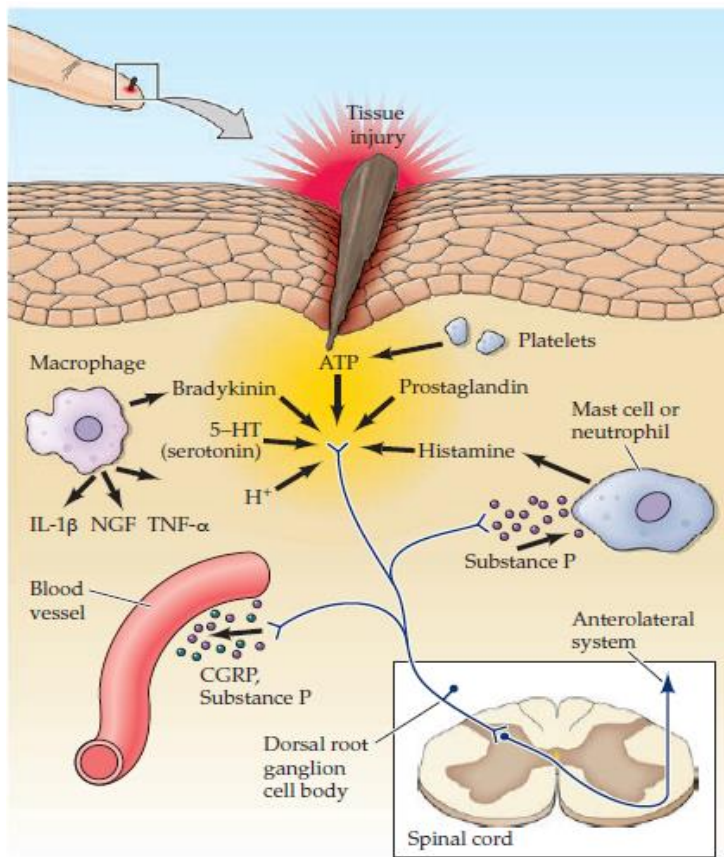
Transmissão

Modulação



Percepção

Transdução



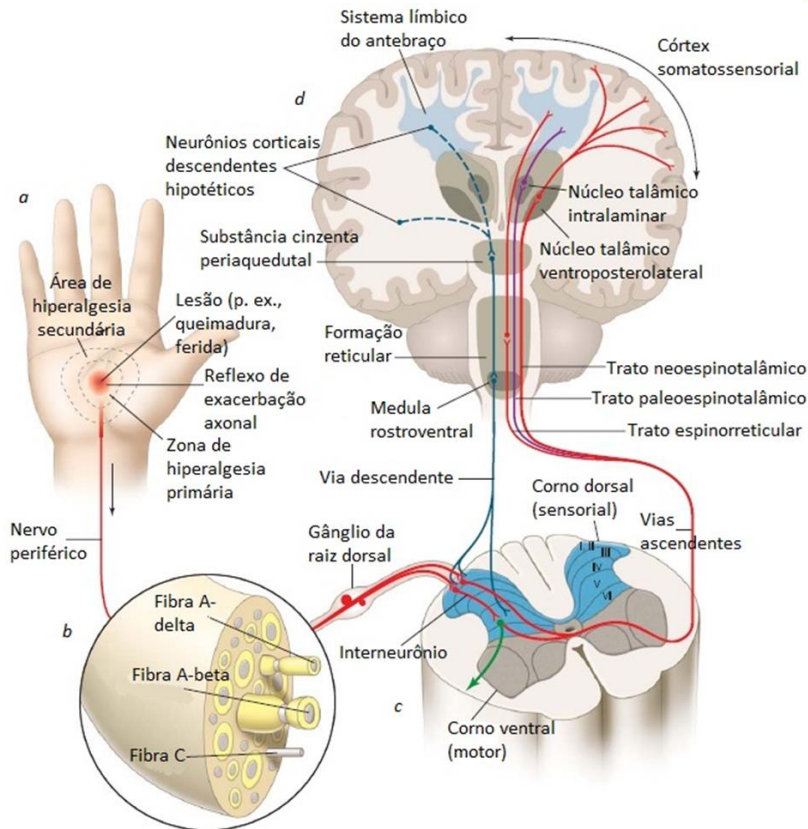
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Transmissão

Neurônio de primeira ordem
Sistema periférico

Sinapse com o neurônio de segunda ordem
Medula espinhal

Neuronios de tercer ordem,
estão no nível supraespinhal
Cérebro



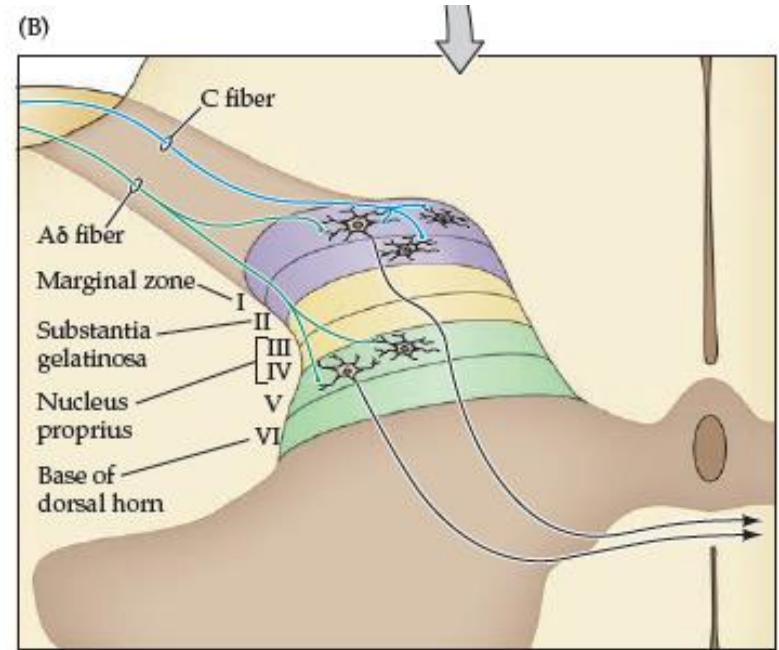
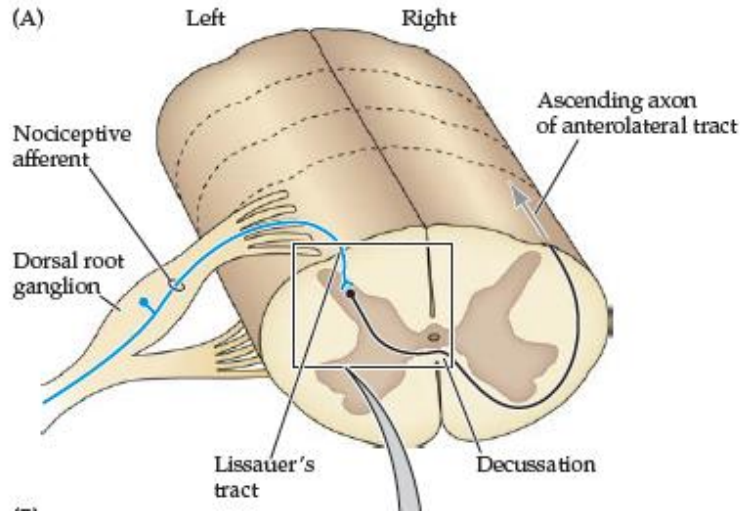
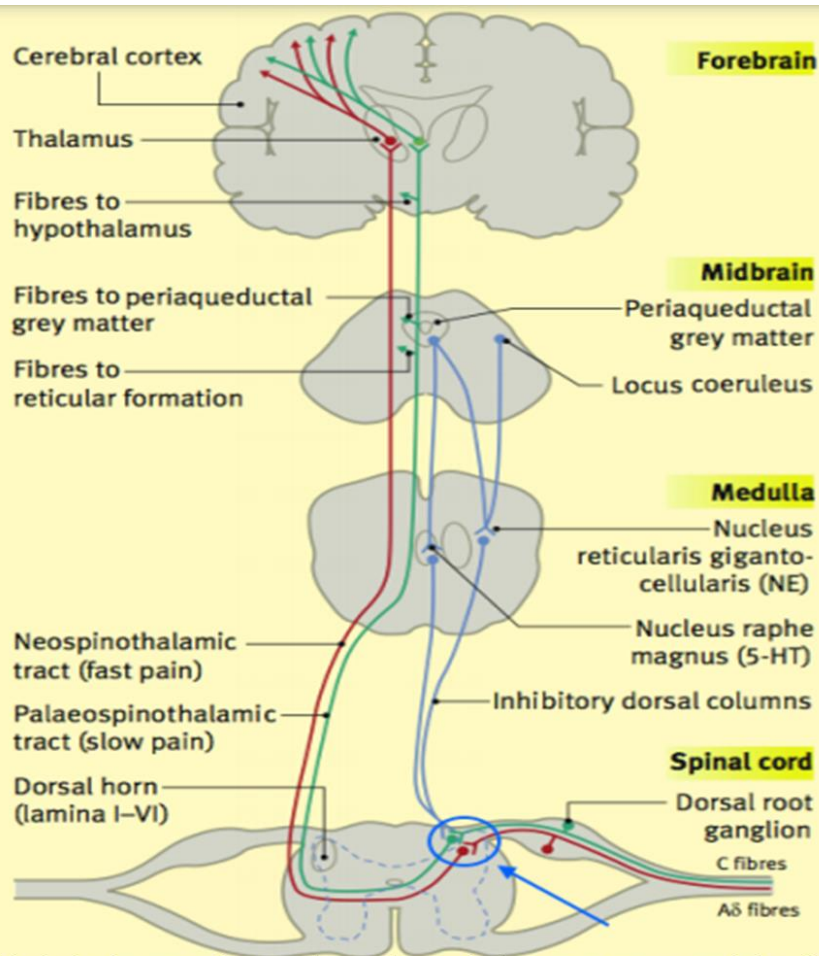
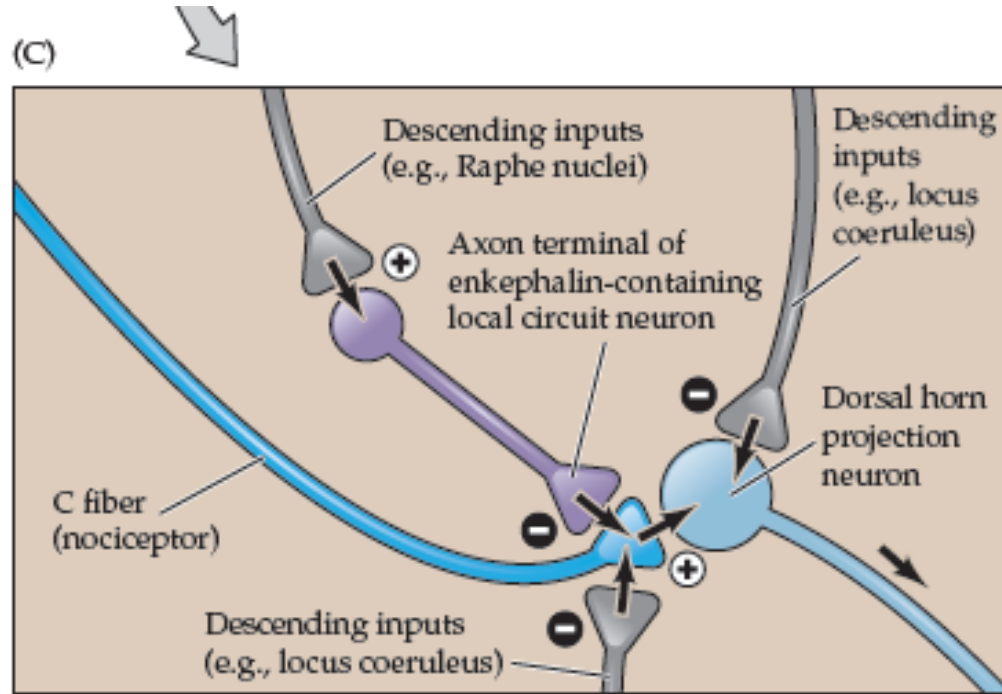


FIGURE 10.3 The anterolateral system. (A) Primary afferents in the dorsal root ganglia send their axons via the dorsal roots to terminate in the dorsal horn of the spinal cord. Afferents branch and course for several segments up and down the spinal cord in Lissauer's tract, giving rise to collateral branches that terminate in the dorsal horn. Second-order neurons in the dorsal horn send their axons (black) across the midline to ascend to higher levels in the anterolateral column of the spinal cord. (B) C-fiber afferents terminate in Rexed's laminae I and II of the dorsal horn, while A fibers terminate in laminae I and V. The axons of second-order neurons in laminae I and V cross the midline and ascend to higher centers.

Modulação



Principais vias ascendentes e descendentes da dor e estruturas associadas. Adaptado de Steeds CE. *The anatomy and physiology of pain. Surgery* (Oxford). 2013.

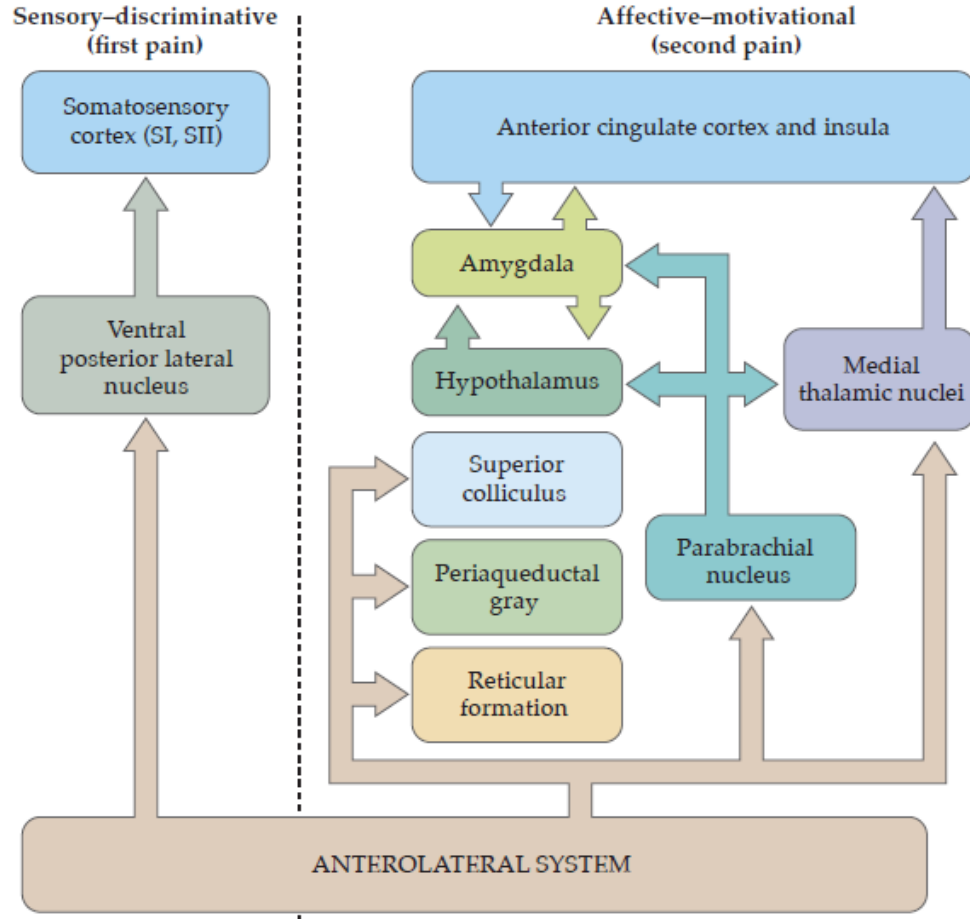


Descending inputs from the brainstem modulate the transmission of pain signals in the dorsal horn. Some inputs interact directly with dorsal horn projection neurons or the presynaptic terminals of C fibers. Others interact indirectly via enkephalin-containing local circuit neurons.

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Percepção

FIGURE 10.5 Two distinct aspects of the experience of pain. The anterolateral system supplies information to different structures in the brainstem and forebrain that contribute to different aspects of the experience of pain. The spinothalamic tract (left of dashed line) conveys signals that mediate the sensory discrimination of first pain. The affective and motivational aspects of second pain are mediated by complex pathways that reach integrative centers in the limbic forebrain.





OBRIGADO.....