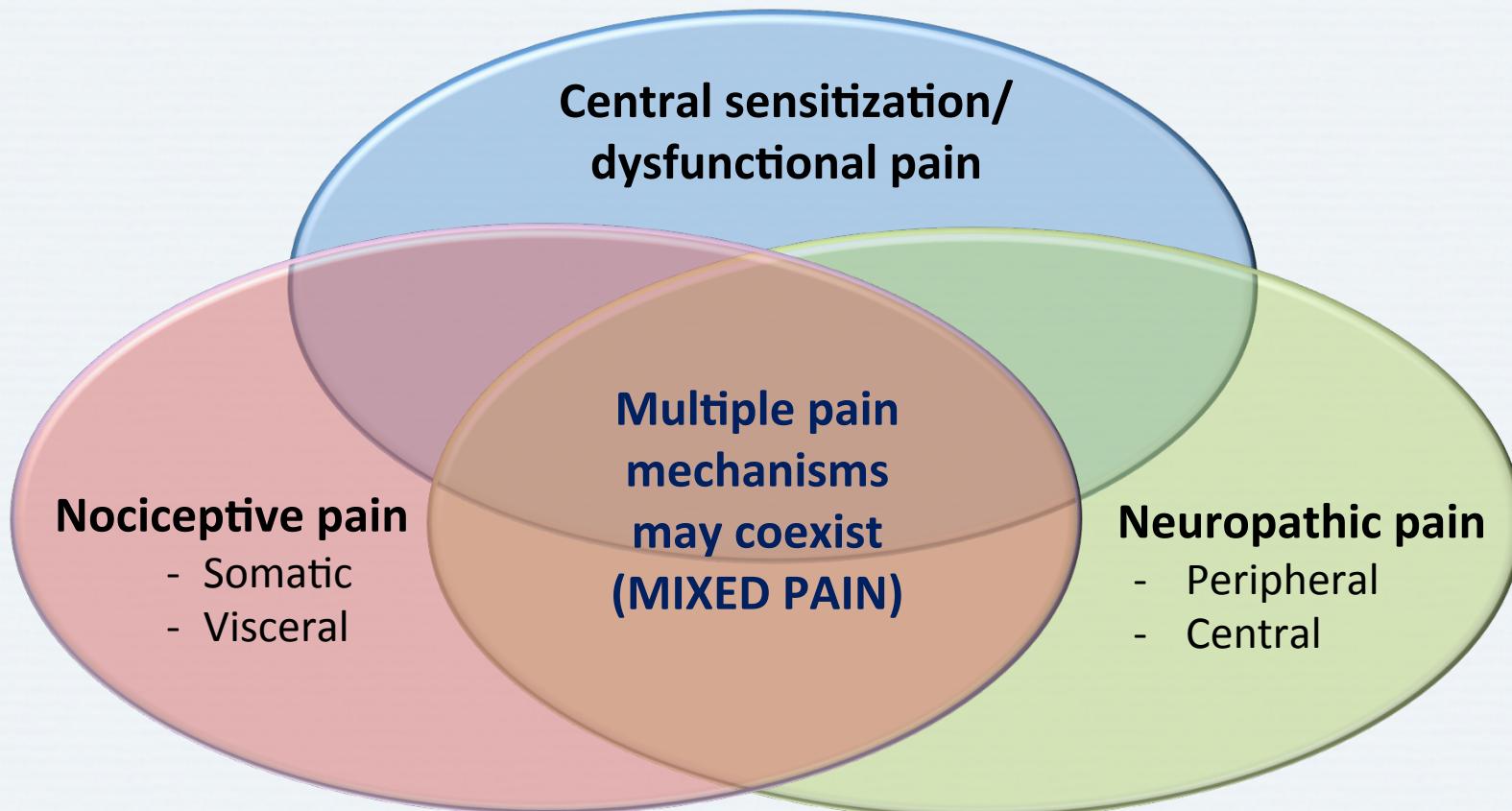
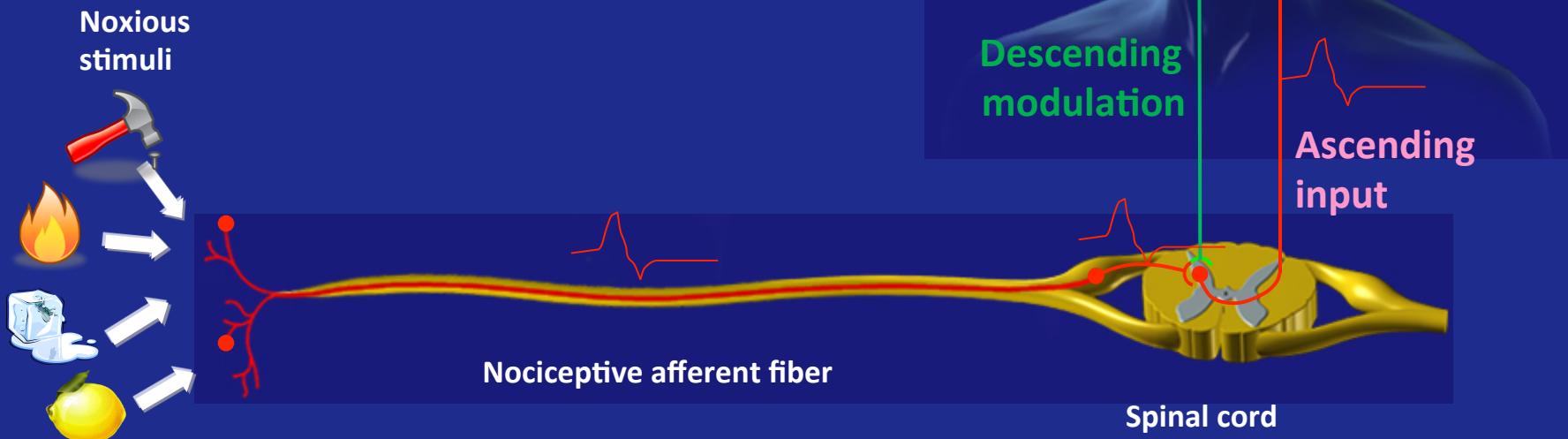

PATHOPHYSIOLOGY

A faint, abstract graphic in the bottom right corner consists of a light blue wash that tapers to the right, with a thin white line extending from its top edge towards the center of the slide.

Pathophysiological Classification of Pain



Nociception: Neural Process of Encoding Noxious Stimuli



Consequences of encoding may be autonomic (e.g., elevated blood pressure) or behavioral (motor withdrawal reflex or more complex nocifensive behavior). Pain perception is not necessarily implied.

Nociceptive Pain

- Usually aching or throbbing and well-localized
- Usually time-limited
 - Resolves when damaged tissue heals
 - Can be chronic
- Generally responds to conventional analgesics

Nociceptive Cancer Pain Syndromes

Origin of Pain	Pain Syndromes
Visceral	<ul style="list-style-type: none">• Hepatic distension syndrome• Midline retroperitoneal syndrome• Chronic intestinal obstruction• Peritoneal carcinomatosis• Malignant perineal pain• Adrenal pain syndrome• Ureteric obstruction
Somatic	<ul style="list-style-type: none">• Tumor-related bone pain• Tumor-related soft tissue pain• Paraneoplastic pain syndromes (<i>e.g.</i>, muscle cramps

What Is Neuropathic Pain?

Neuropathic Pain

Pain caused by a lesion or disease of the somatosensory nervous system

Peripheral Neuropathic Pain

*Pain caused by a lesion or disease of the **peripheral somatosensory nervous system***

Central Neuropathic Pain

*Pain caused by a lesion or disease of the **central somatosensory nervous system***

Neuropathic Pain

- Pain often described as tingling, shock-like, and burning
 - Commonly associated with numbness
- Almost always a chronic condition
- Responds poorly to conventional analgesics

Common Descriptors of Neuropathic Pain



Burning



Tingling



Pins and needles



Electric shock-like



Numbness

Numbness is a cardinal sign of nerve damage

Nociceptive vs. Neuropathic Pain

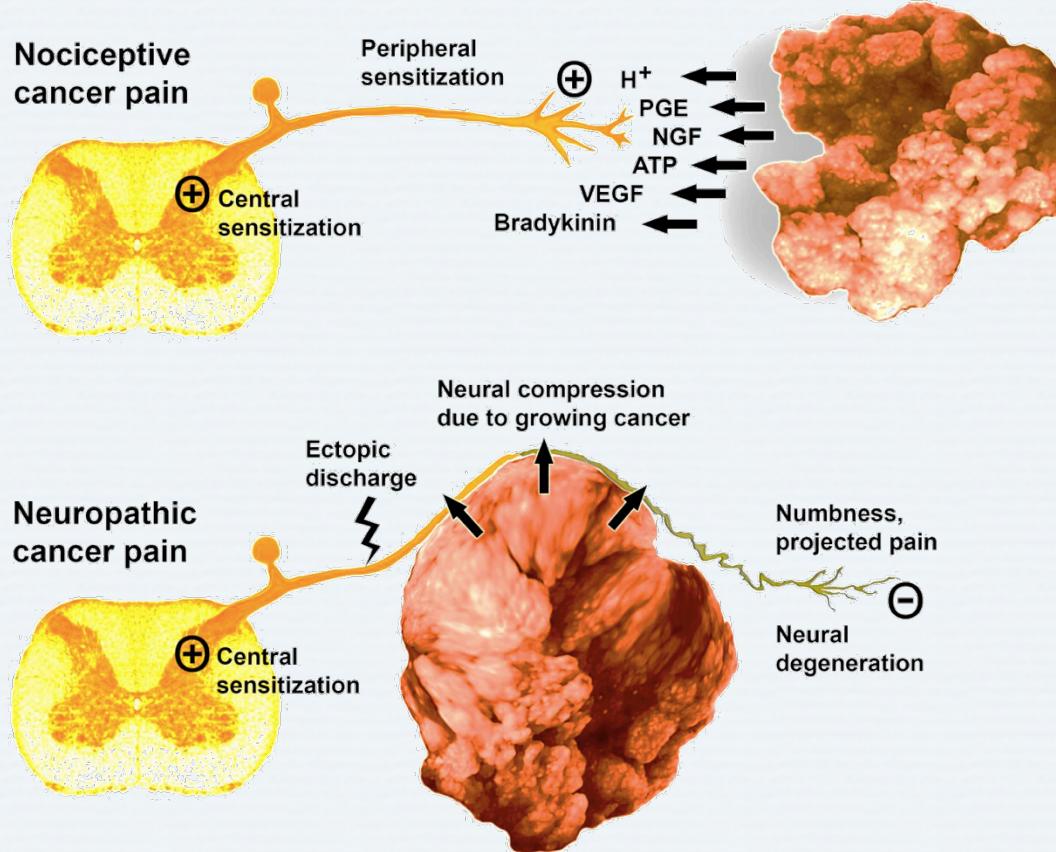
Nociceptive

- Usually aching or throbbing and well-localized
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Neuropathic

- Pain often described as tingling, shock-like, and burning
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Mixed Nociceptive and Neuropathic Pain in Cancer



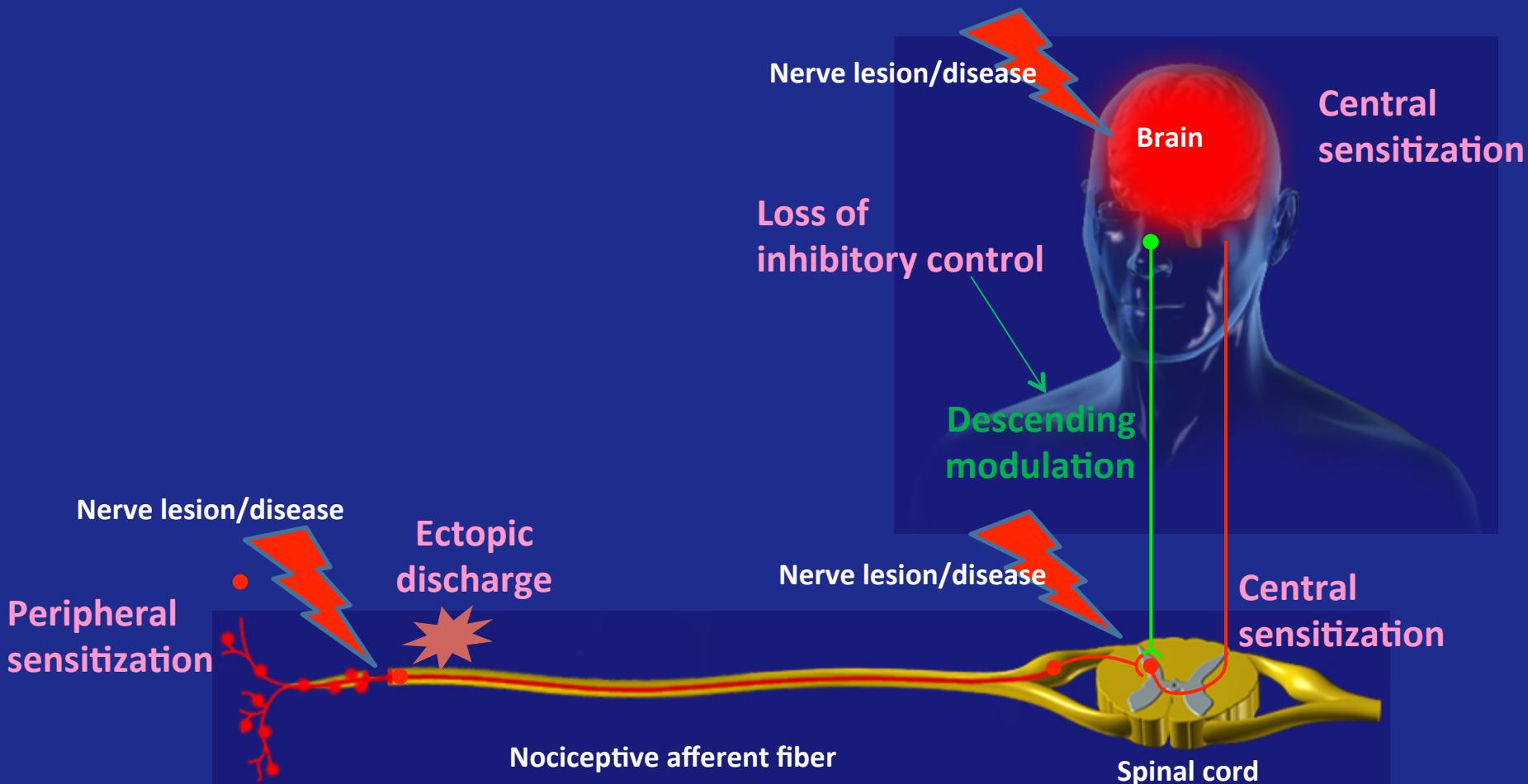
Sensitization

Peripheral and central sensitization

Axonal damage

Degeneration and regeneration

Mechanisms of Neuropathic Pain



Clinical Example of Nociceptive Cancer-Related Pain

- Bone metastases
 - Pain may be due to
 - Direct invasion
 - Secondary pathologic fracture
 - Damage to adjacent structures

Clinical Example of Nociceptive Cancer Pain

- Epidural spinal cord compression
 - Can cause pain and potentially irreversible loss of neurologic function
 - Diagnosed through radiographic evidence of indentation of the thecal sac

Clinical Examples of Neuropathic Cancer Pain

- Malignant painful radiculopathy
- Plexopathies
- Metastatic spine compression
- Painful peripheral neuropathies
- Paraneoplastic sensory neuropathy

Transduction via Endogenous Mediators

Noxious stimuli

- Mechanical 
- Thermal 
- Chemical 

Mediators

- Prostaglandins
- Leukotrienes
- Substance P
- Histamine
- Bradykinin
- Serotonin
- Hydroxyacids
- Reactive oxygen species
- Inflammatory cytokines and chemokines

Receptors/channels on nociceptors



Pathophysiology of Neuropathic Pain

Peripheral mechanisms

- Membrane hyperexcitability
- Ectopic discharges
- Transcriptional changes

Central mechanisms

Hyperexcitability

Loss of
inhibitory controls

Reorganization

Sensitization

- Peripheral
- Central

Neuropathic
pain

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