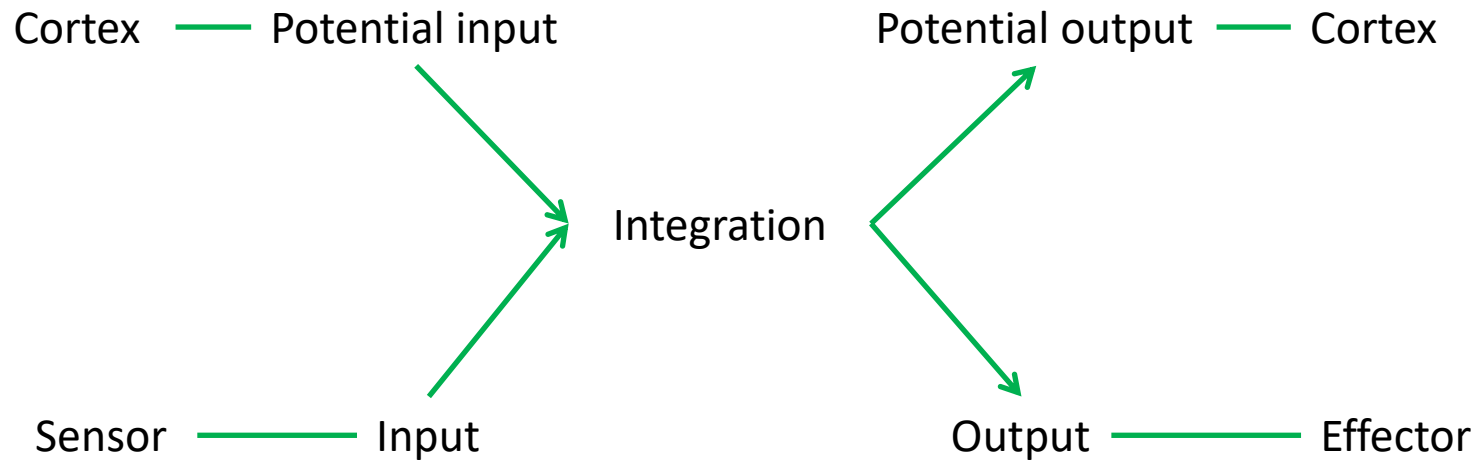


5

**Somatosensitivity,
viscerosensitivity, proprioception
and pain I**

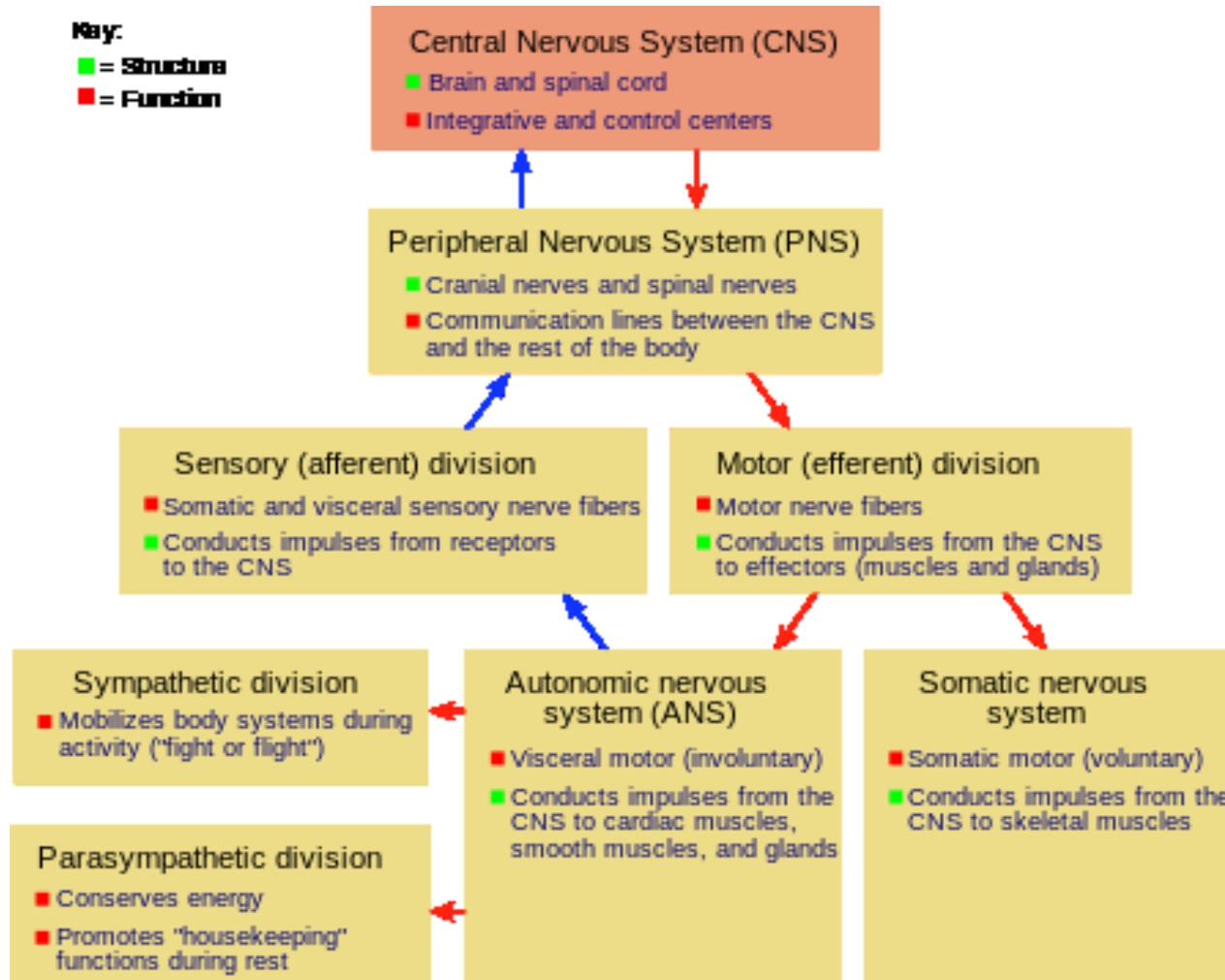
The role of nervous system

ANTICIPATION

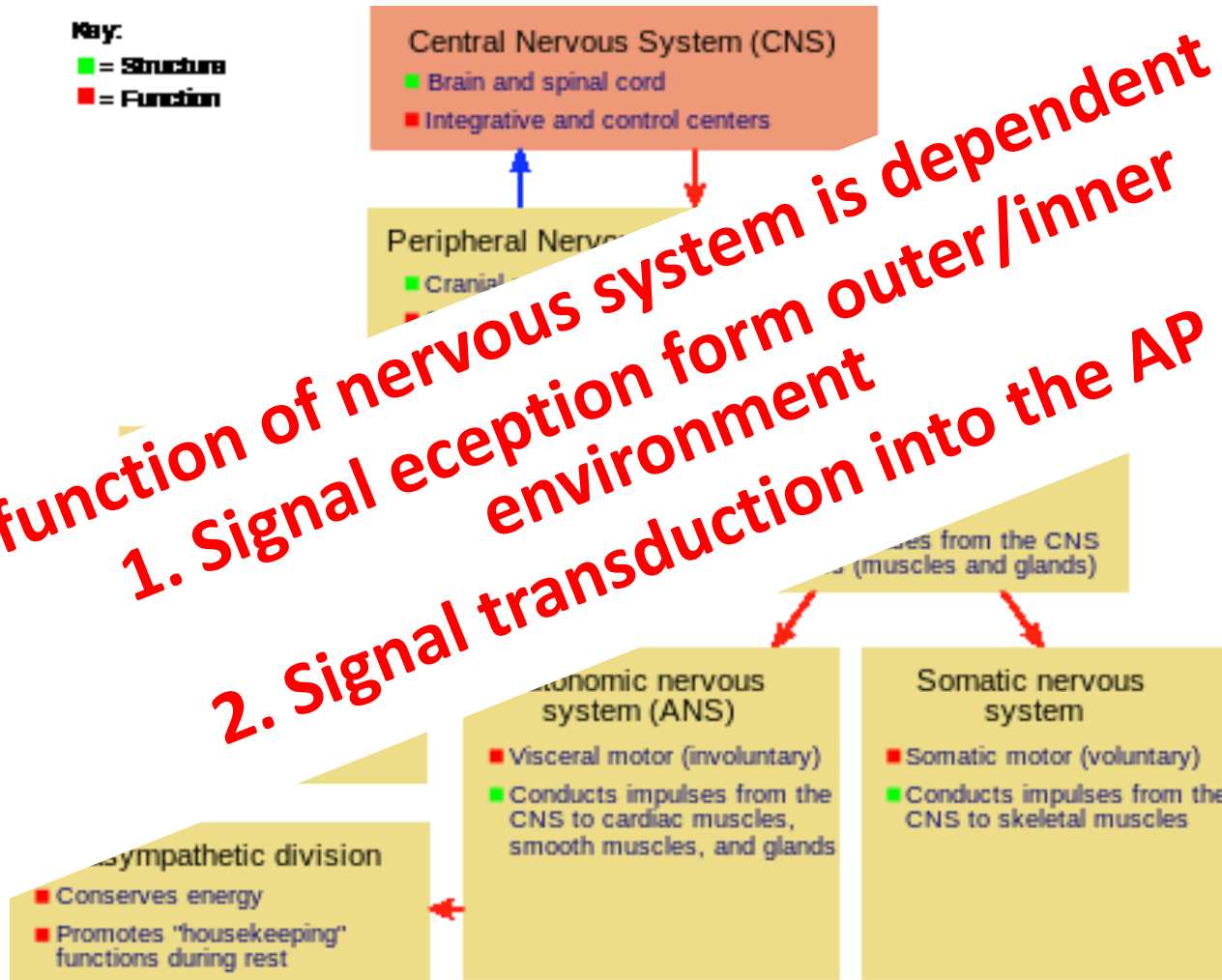


REGULATION

The division of nervous system

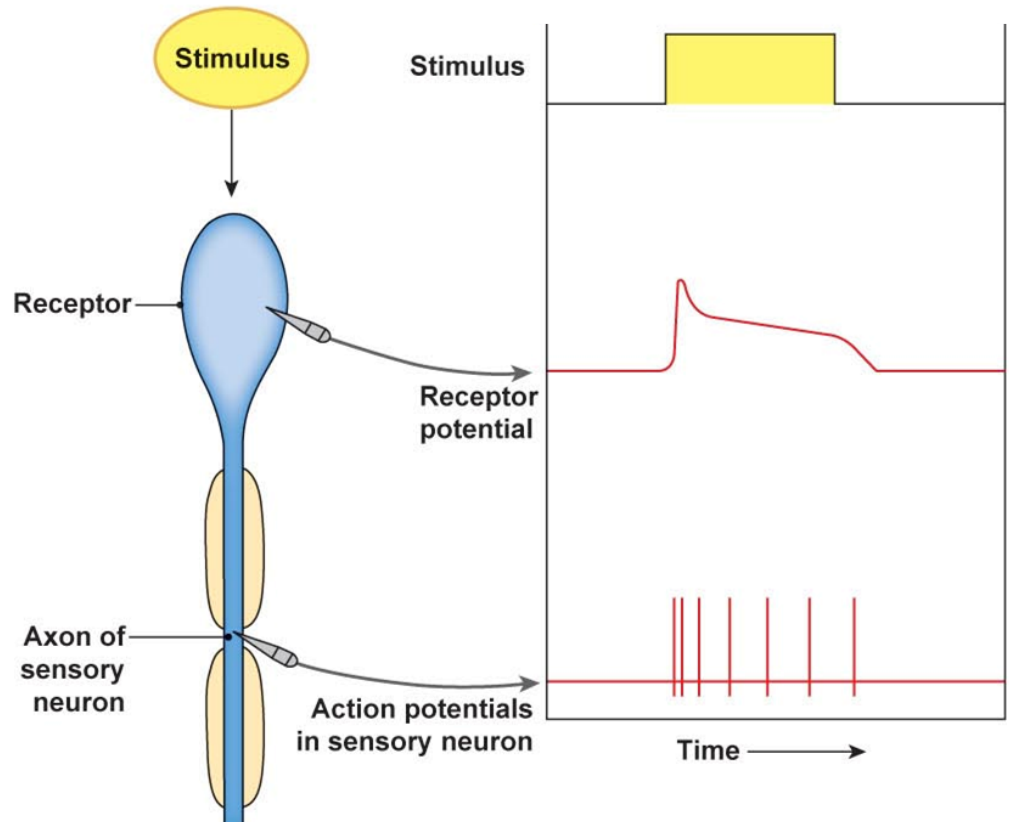


The division of nervous system

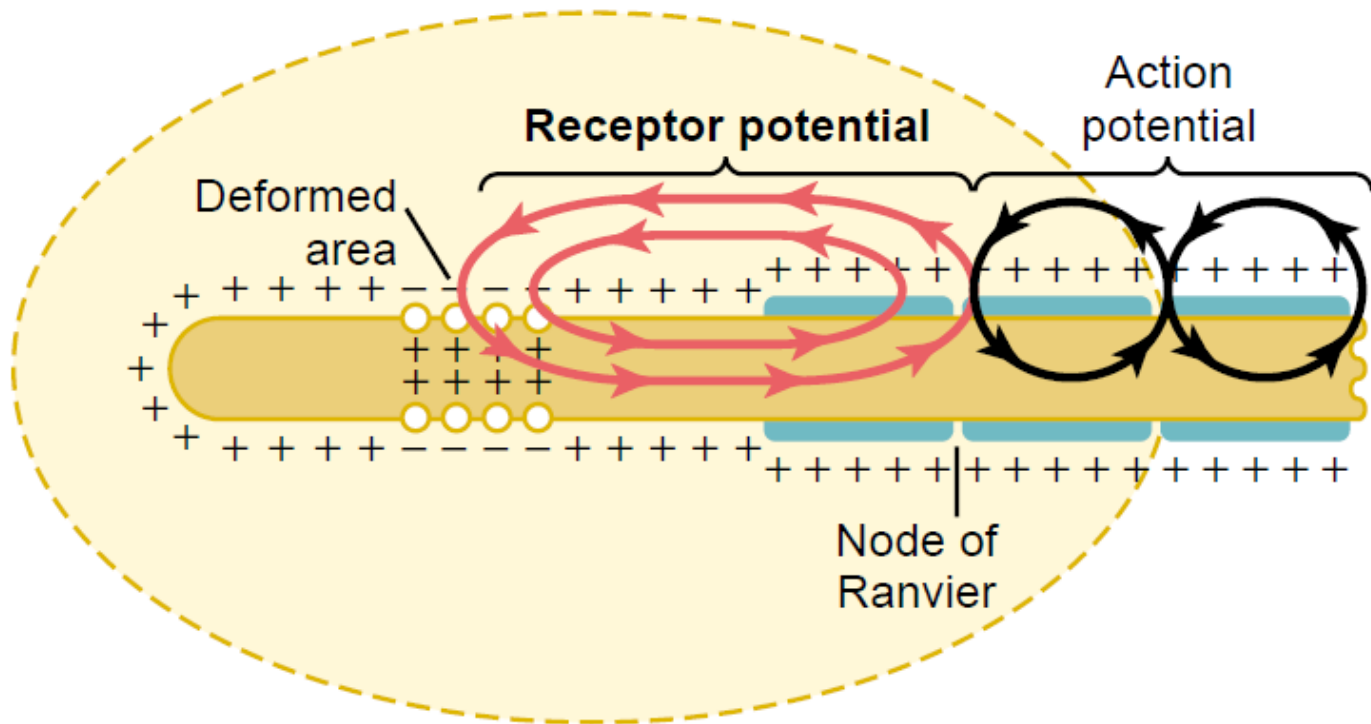


Receptors/sensors

- Energy convertor
 - Signal reception
 - Signal transformation
- Receptor potential
- Generator potential
- Action potential

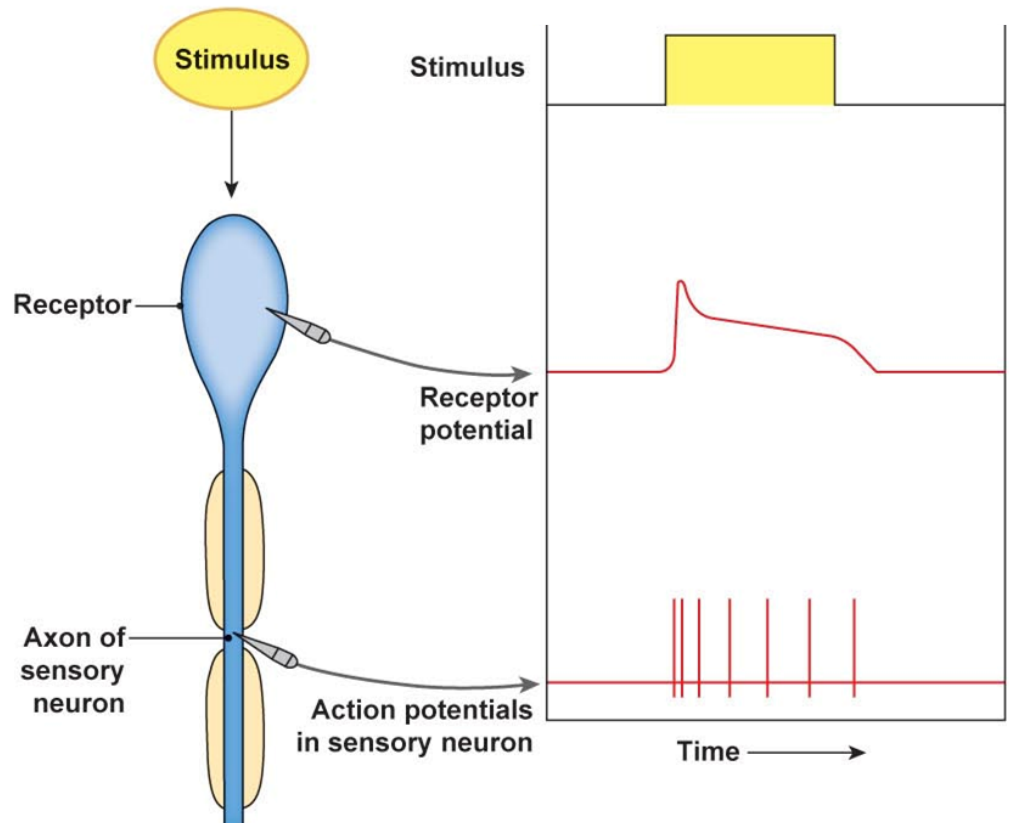


Receptor/generator and action potential



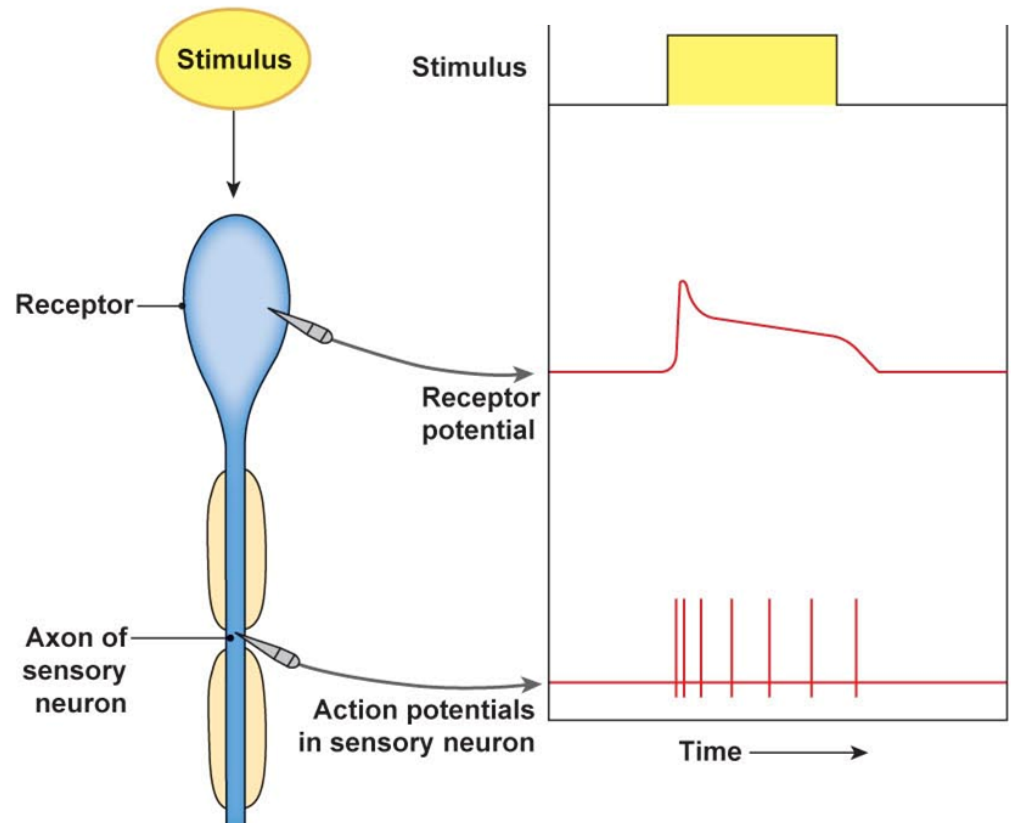
Receptors/sensors

- Energy convertor
 - Signal reception
 - Signal transformation
- Receptor potential
- Generator potential
- Action potential
- Adequate stimulus
- Non adequate stimulus



Receptors/sensors

- Energy convertor
 - Signal reception
 - Signal transformation
- Receptor potential
- Generator potential
- Action potential
- Adequate stimulus
- Non adequate stimulus
- Mechanoreceptors
- Thermoreceptors
- Chemoreceptors
- Fotoreceptors



Receptors/sensors

- Energy convertor
 - Signal reception
 - Signal transformation

- Receptor

- C

- A

- Ad

- Non

- Mecha

- Thermo

- Chemore

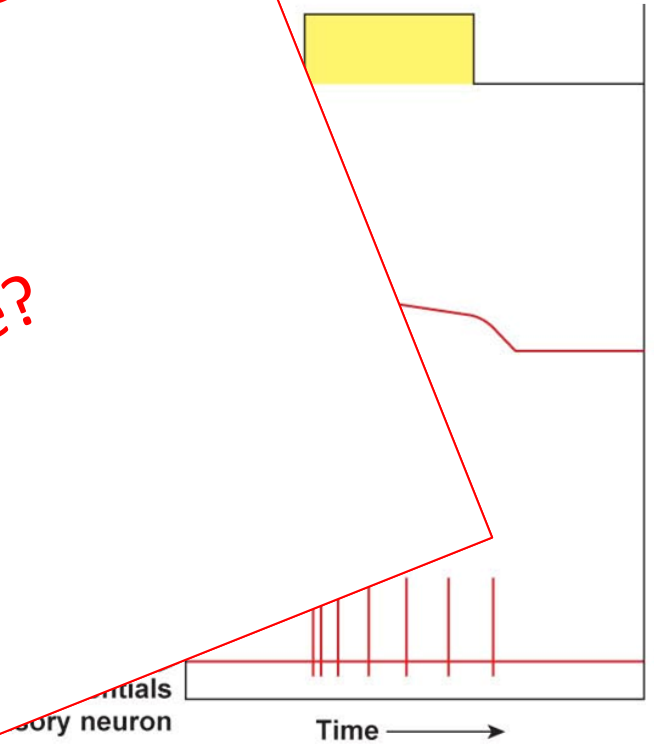
- Fotoreceptors

Basic attributes of stimulus

Qualitative

Modality - What?

Localization - Where?



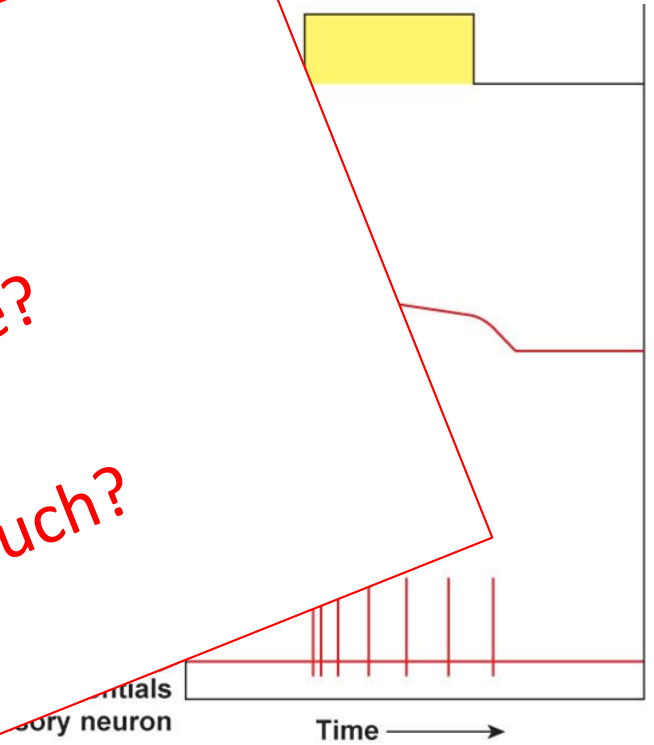
Receptors/sensors

- Energy convertor
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- Fotoreceptors

Basic attributes of stimulus

Qualitative
Modality - What?
Localization - Where?

Quantitative
Intensity - How much?



Receptors/sensors

- Energy convertor
 - Signal reception
 - Signal transformation

- Receptor

- C

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- Ad

- Non

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- Fotoreceptors

Basic attributes of stimulus

Qualitative

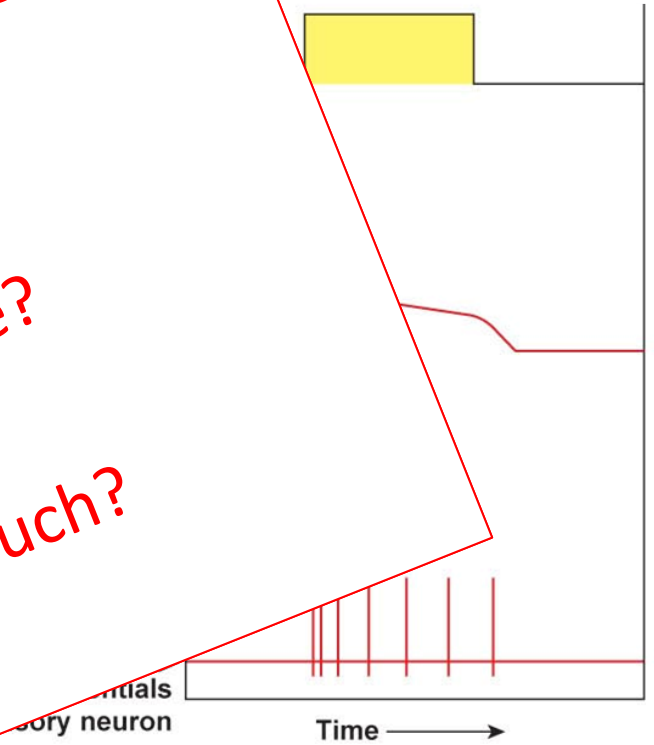
Modality - What?

Localization - Where?

Quantitative

Intensity - How much?

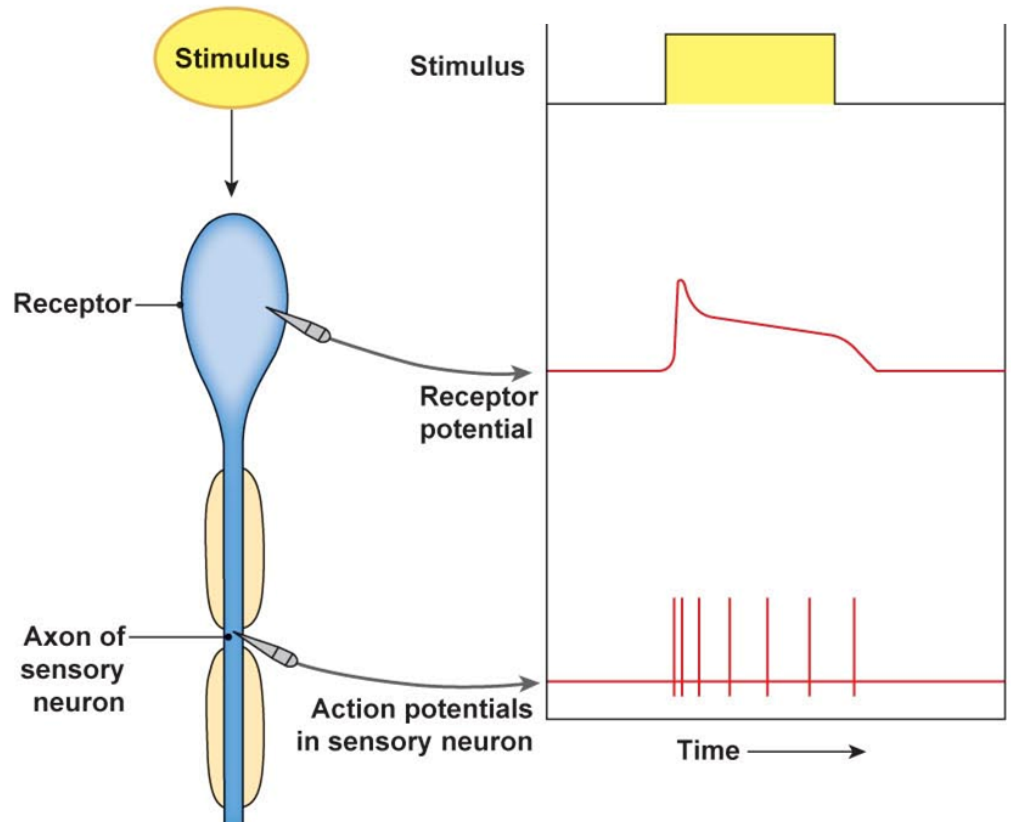
Duration



Intensity coding

How much?

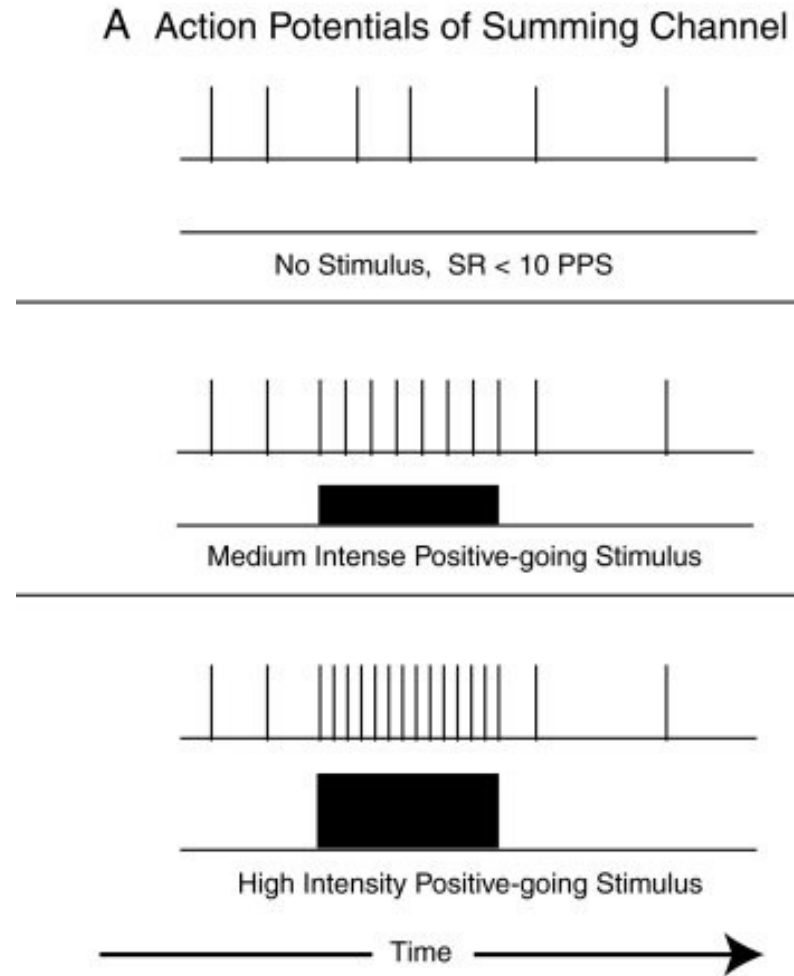
- Amplitude of receptor potential is transduced into the frequency of AP



Intensity coding

How much?

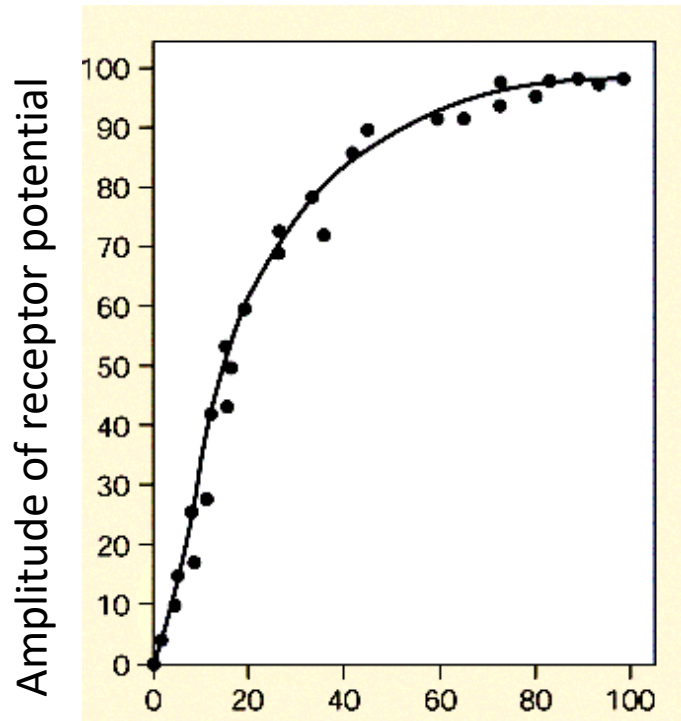
- In other words: an increased intensity is associated with increase in frequency of AP
- A high-intensity stimulus may also activate more receptors



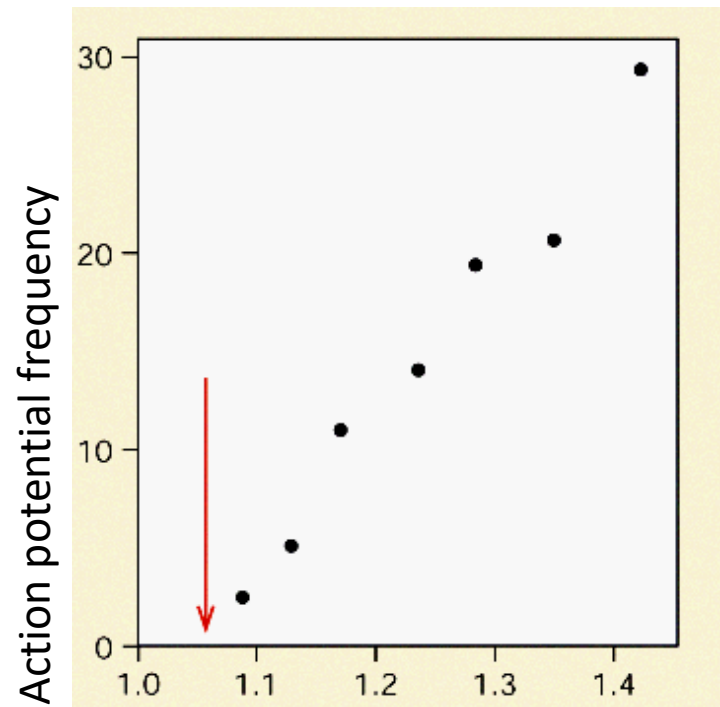
Intensity coding

How much?

Relation between receptor and action potential is logarithmic



Stimulus intensity

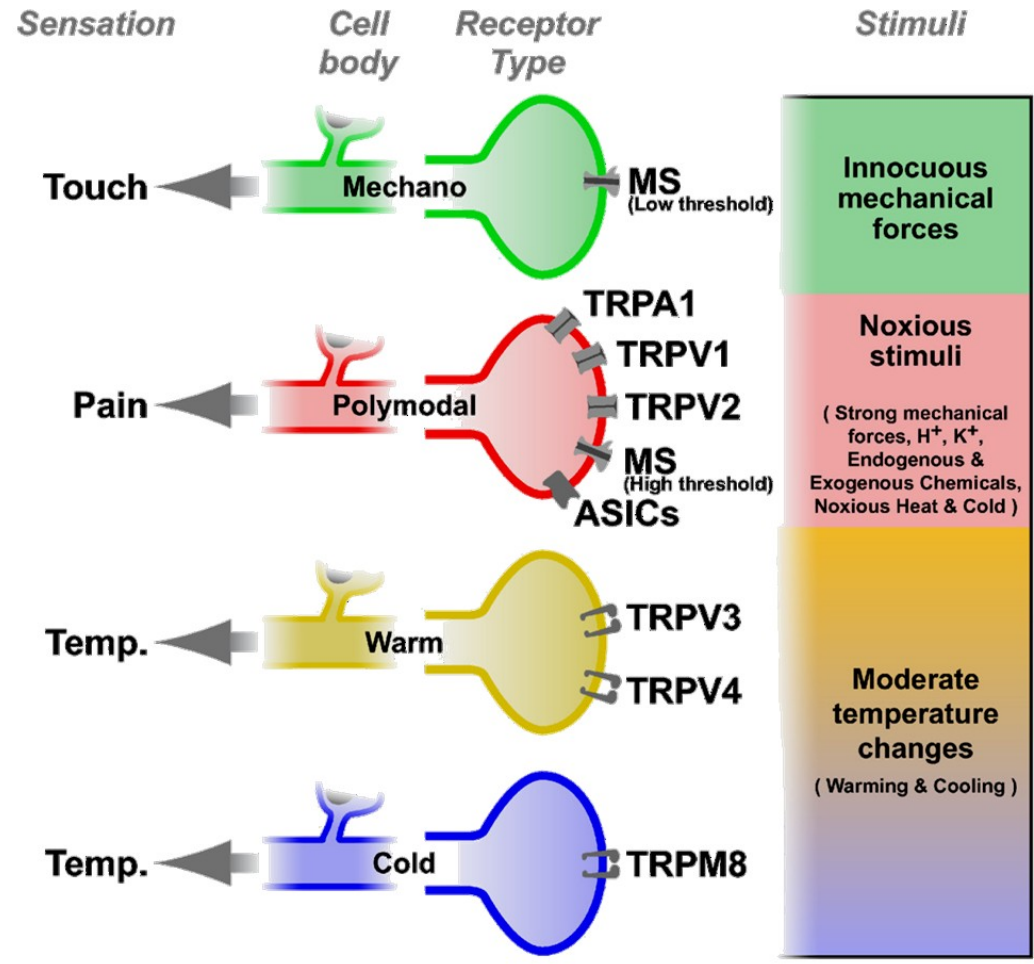


Stimulus intensity

Qualitative information

What?
Where?

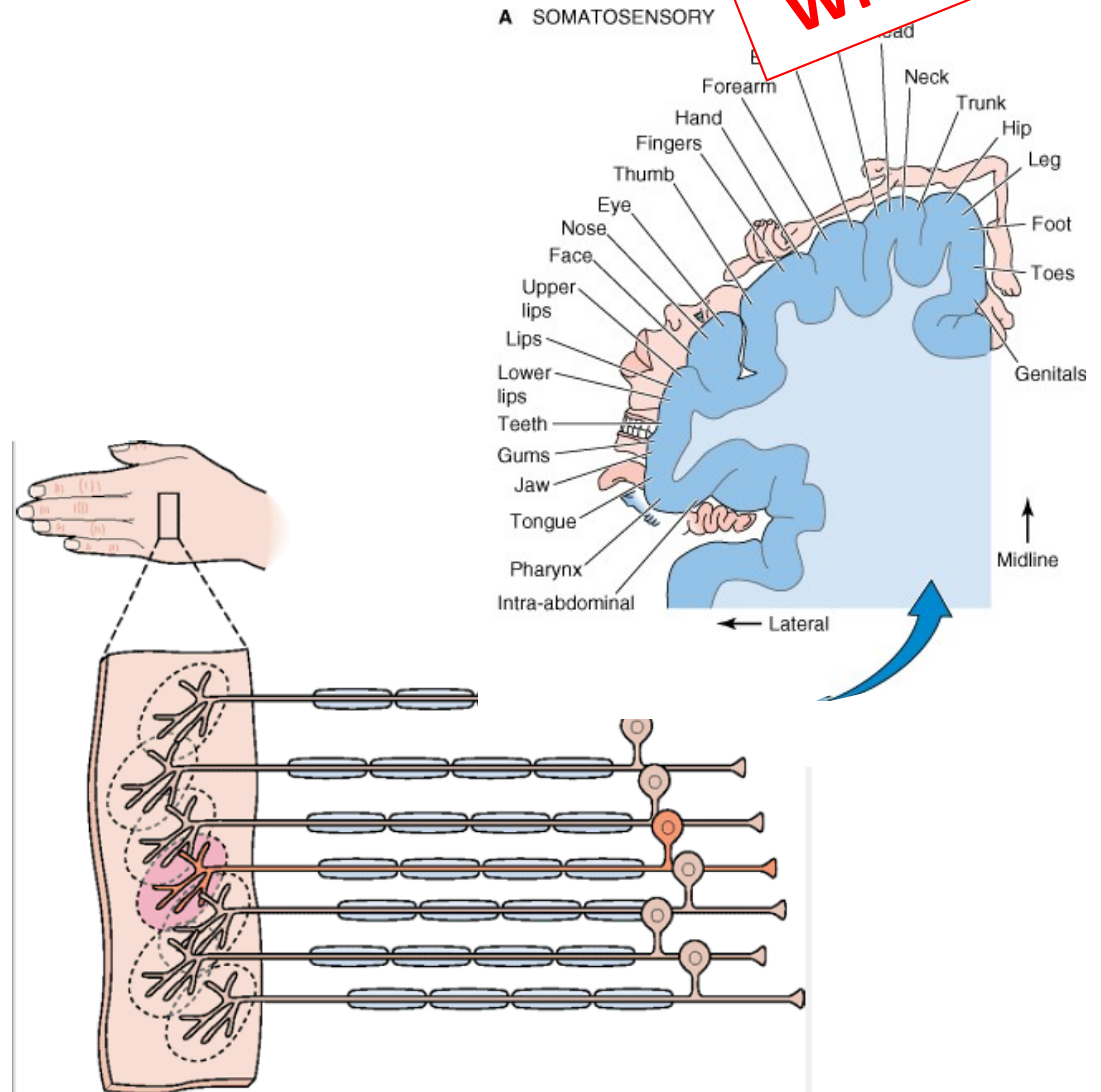
- **The law of specific nerve energies:**
The nature of perception is defined by the pathway over which the sensory information is carried
- Labeled line coding define the information about quality



Qualitative information

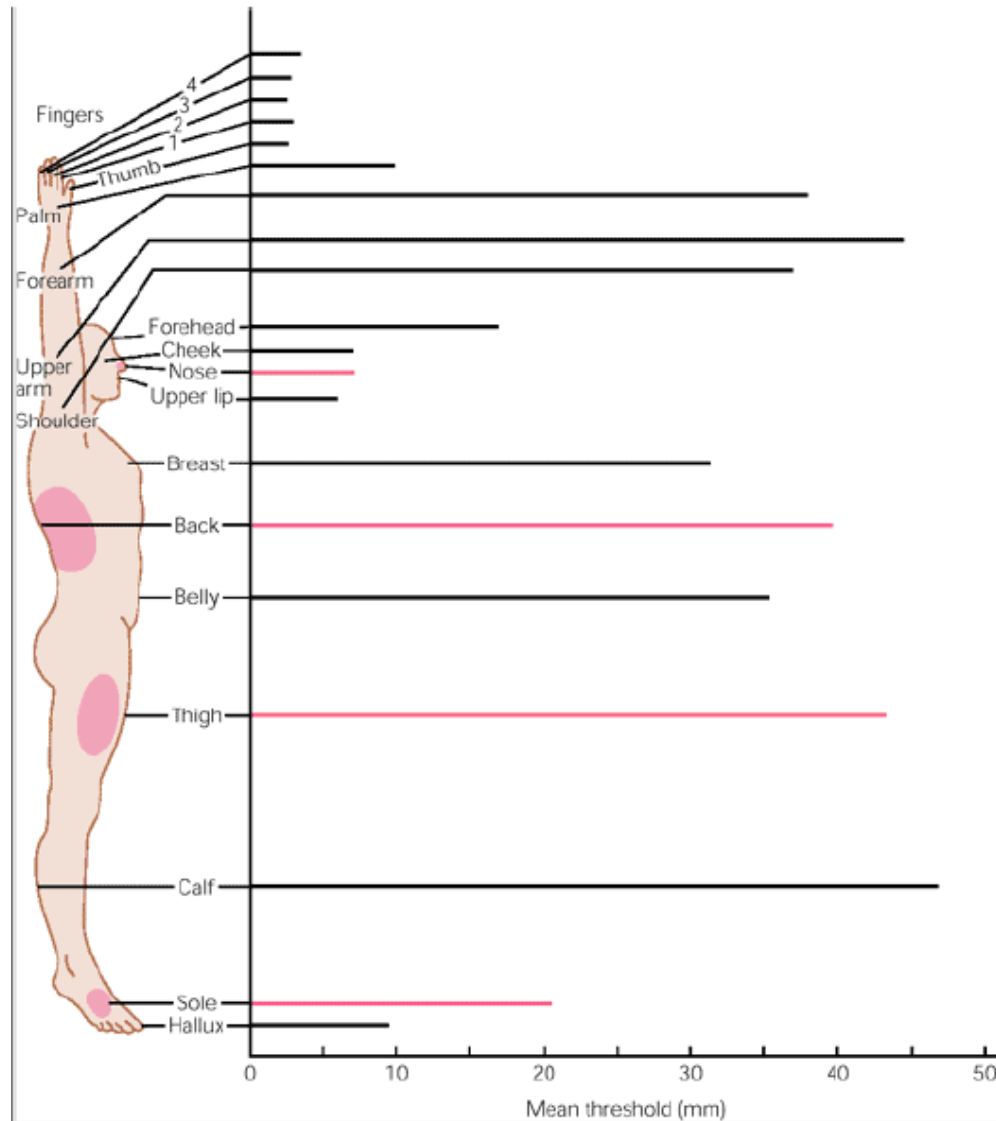
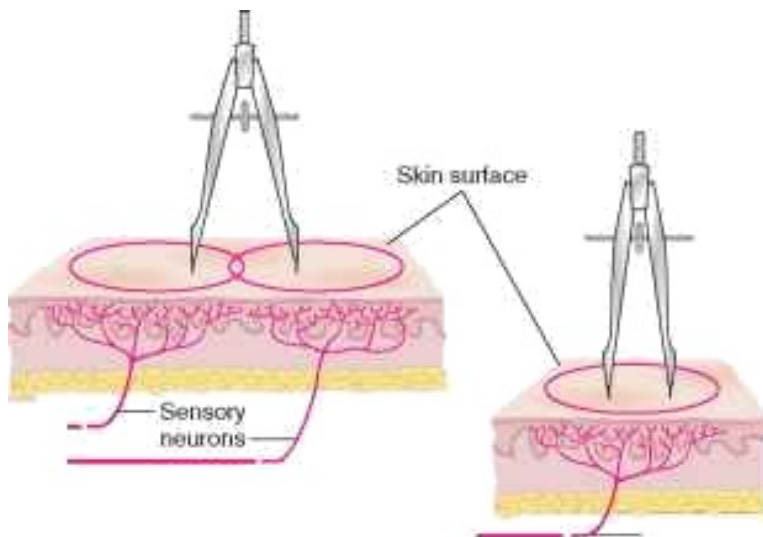
What?
Where?

- Labeled line coding
- Receptive field
- Nerve stimulation mimics receptor stimulation

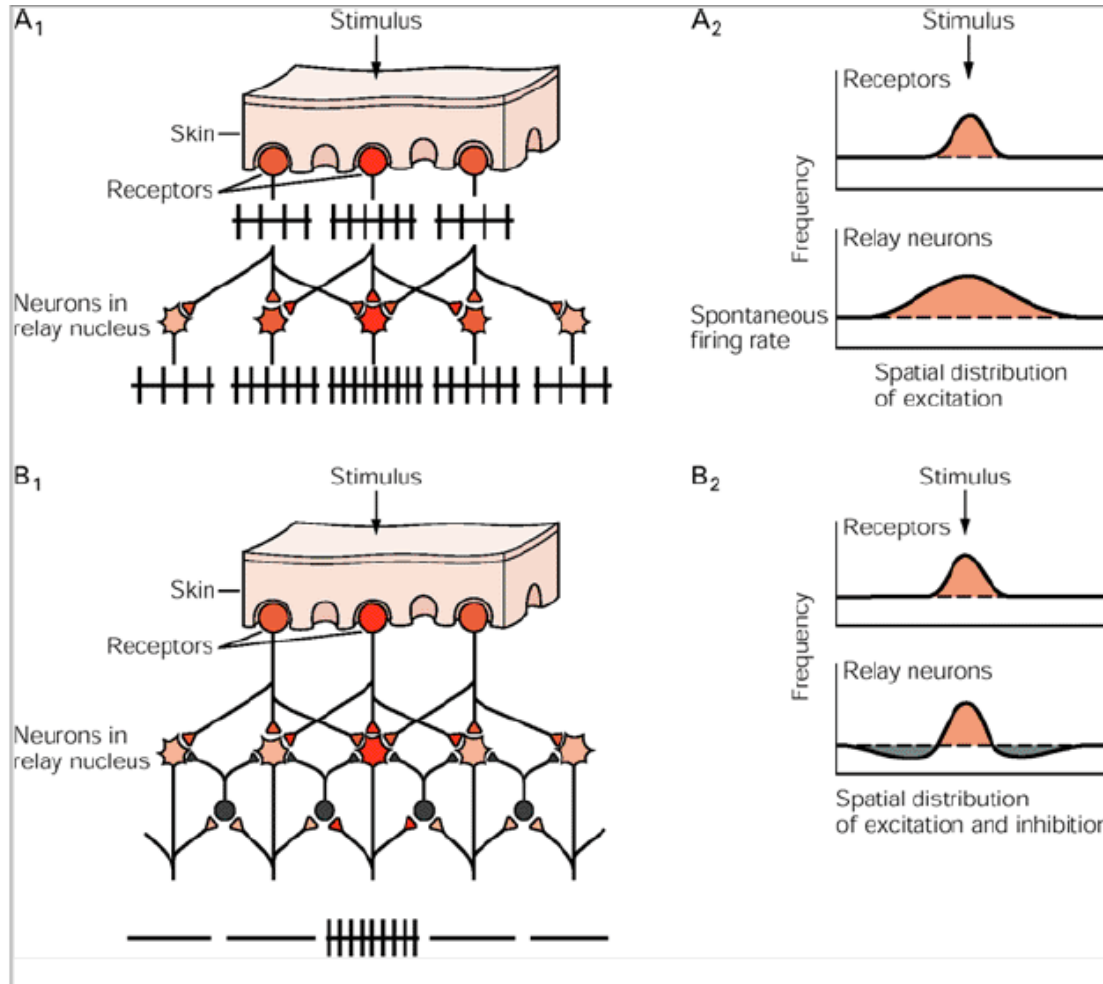


Receptive fields

- Various size and overlay
- Small receptive field – high resolution
- Spatial resolving power increased by lateral inhibition

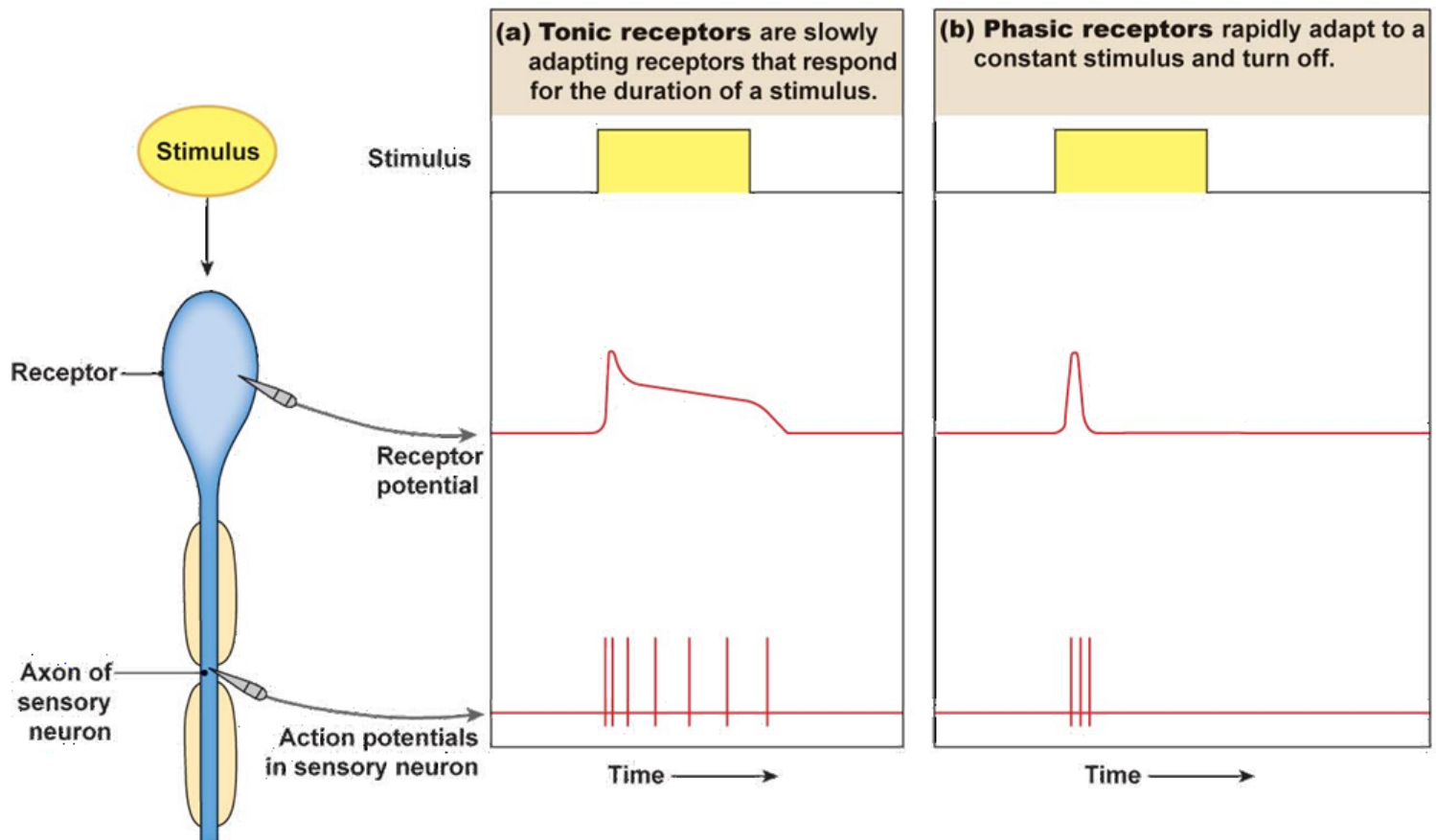


Lateral inhibition



Receptor adaptation

- The decline of receptor responses in spite of stimulus presence
- Tonic receptors – slow adaptation – presence of stimulus, position
- Phasic receptors – rapid adaptation – change of stimulus



Receptors

- General
 - Superficial – somatosensors
 - Deep – viscerosensors
 - Muscles, tendons, joints – proprioceptors
- Special
 - Part of sensory organs

Receptors

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 - Superficial – somatosensors
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 - Part of sensory organs
- Mechanoreceptors
- Thermoreceptors
- Chemoreceptors
- Photoreceptors

Receptors

- Simple
- Complex
- General
 - Superficial – somatosensor
 - Deep – viscerosensors
 - Muscles, tendons, joints – proprioceptors
- Special
 - Part of sensory organs
- Mechanoreceptors
- Thermoreceptors
- Chemoreceptors
- Photoreceptors

