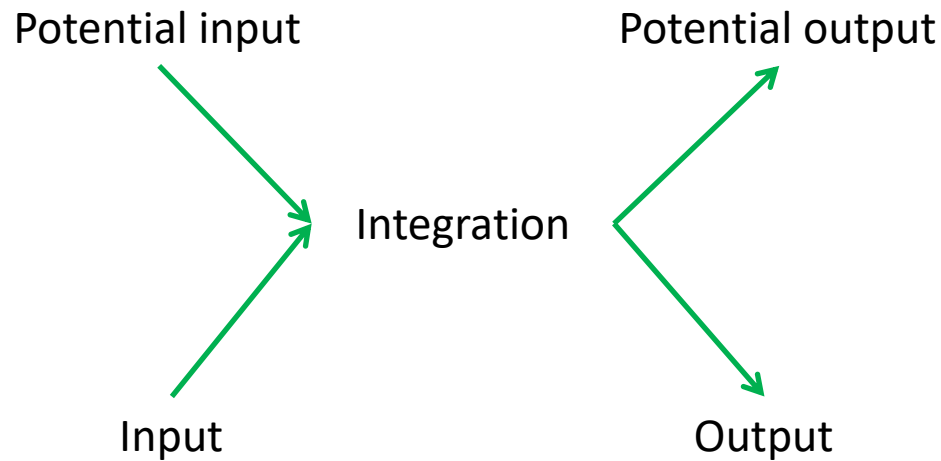


5

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

The role of nervous system

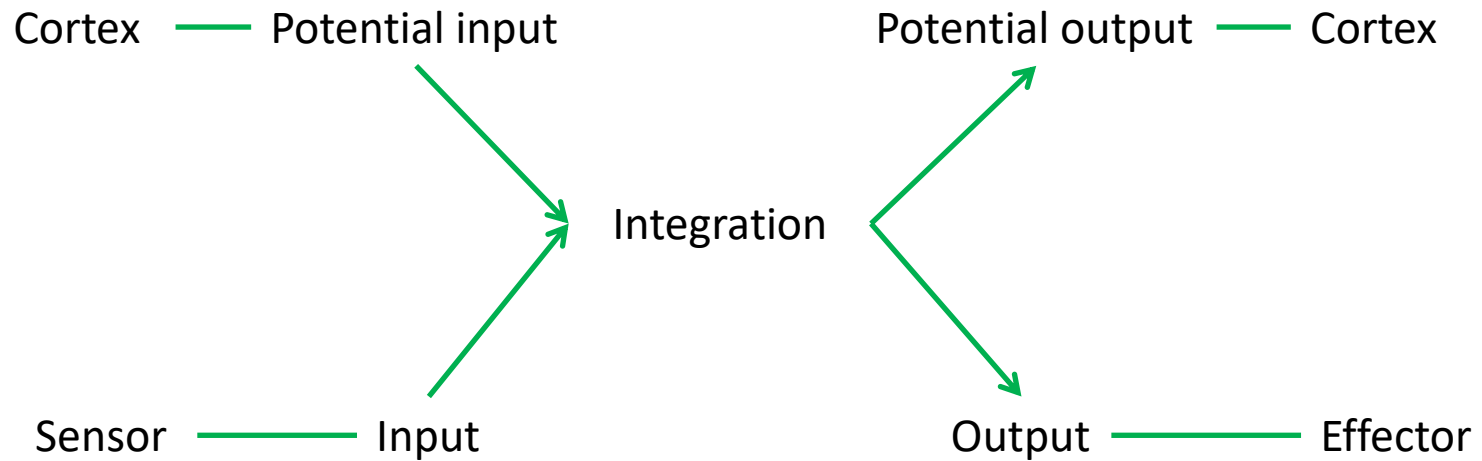
ANTICIPATION



REGULATION

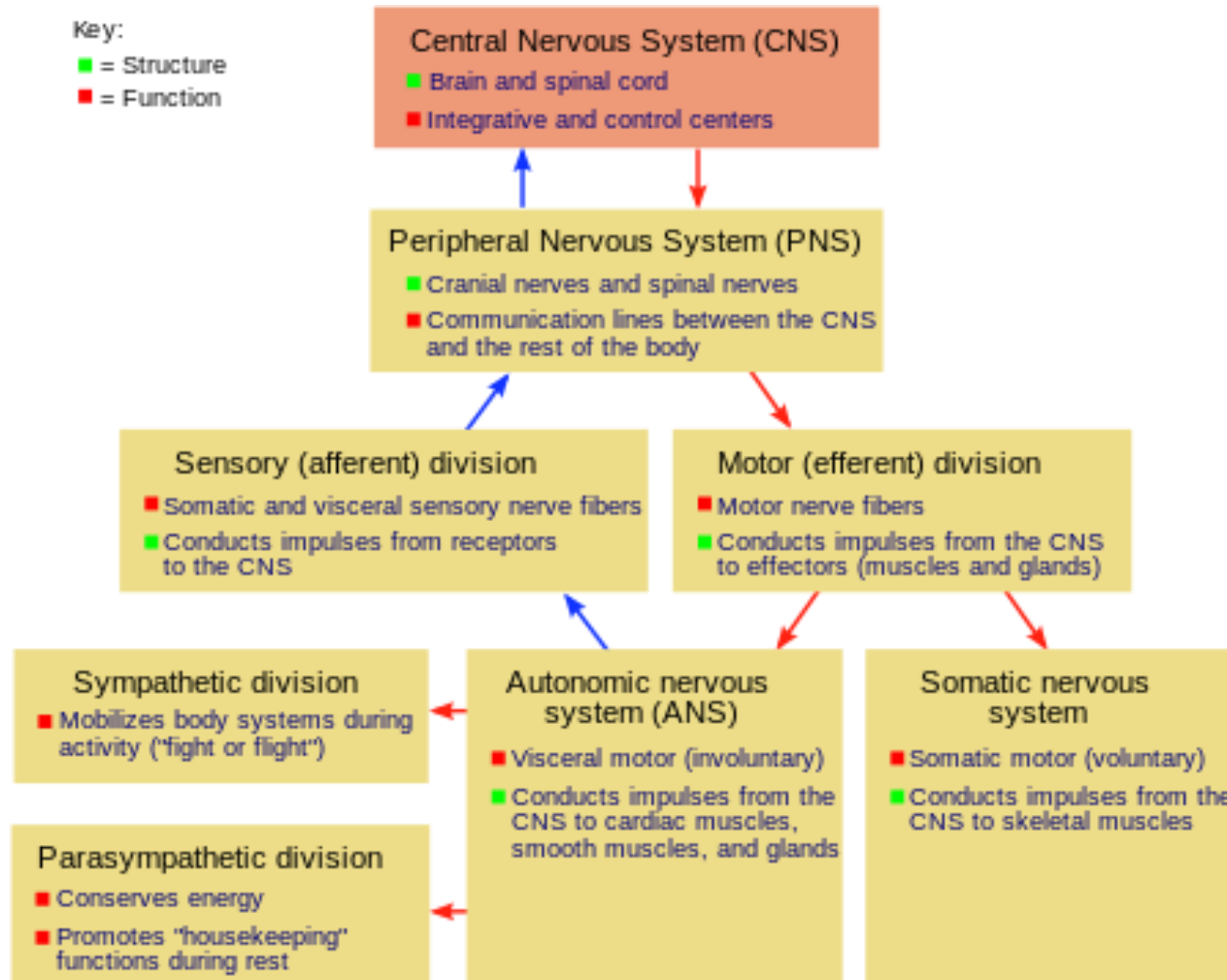
The role of nervous system

ANTICIPATION

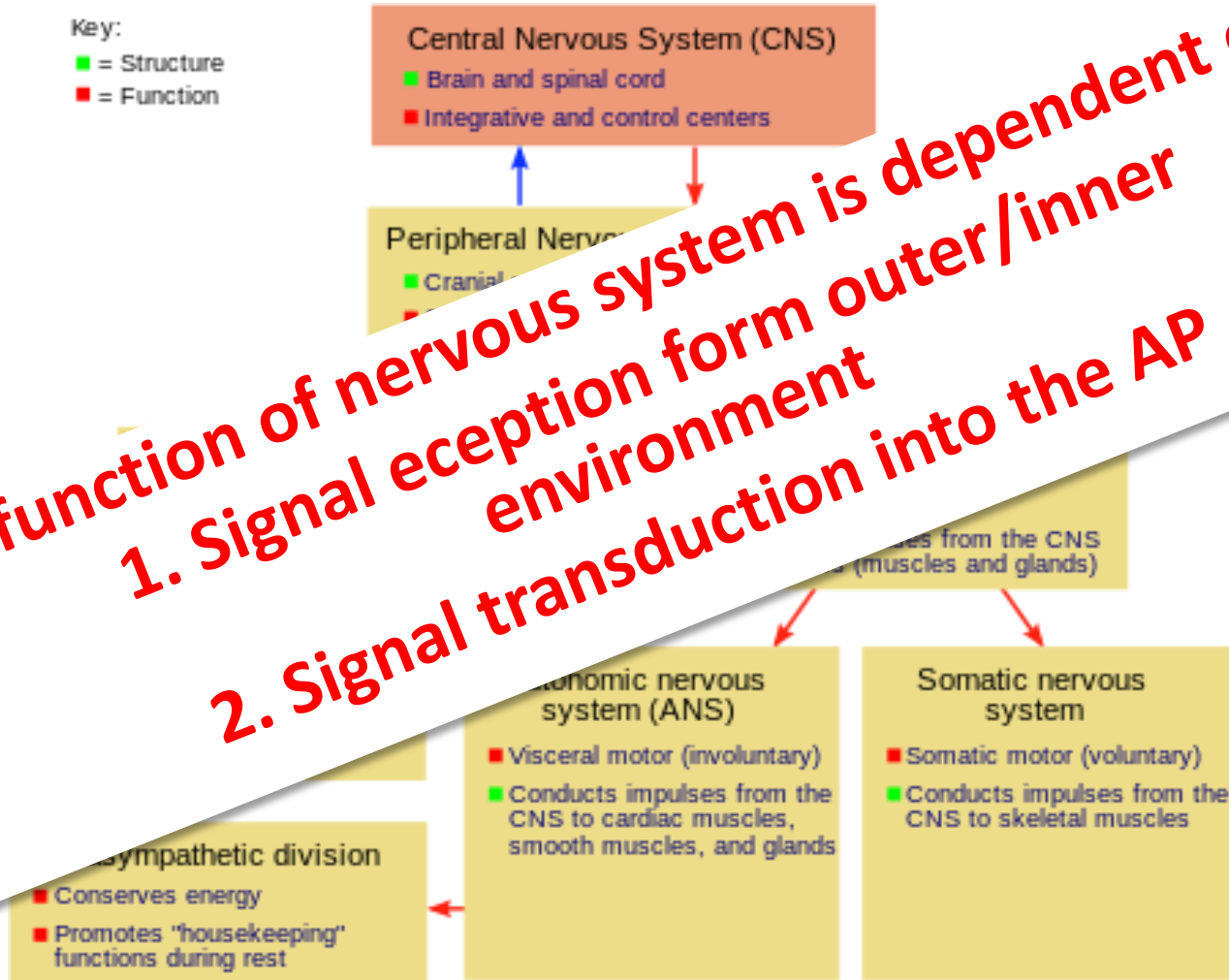


REGULATION

The division of nervous system



The division of nervous system

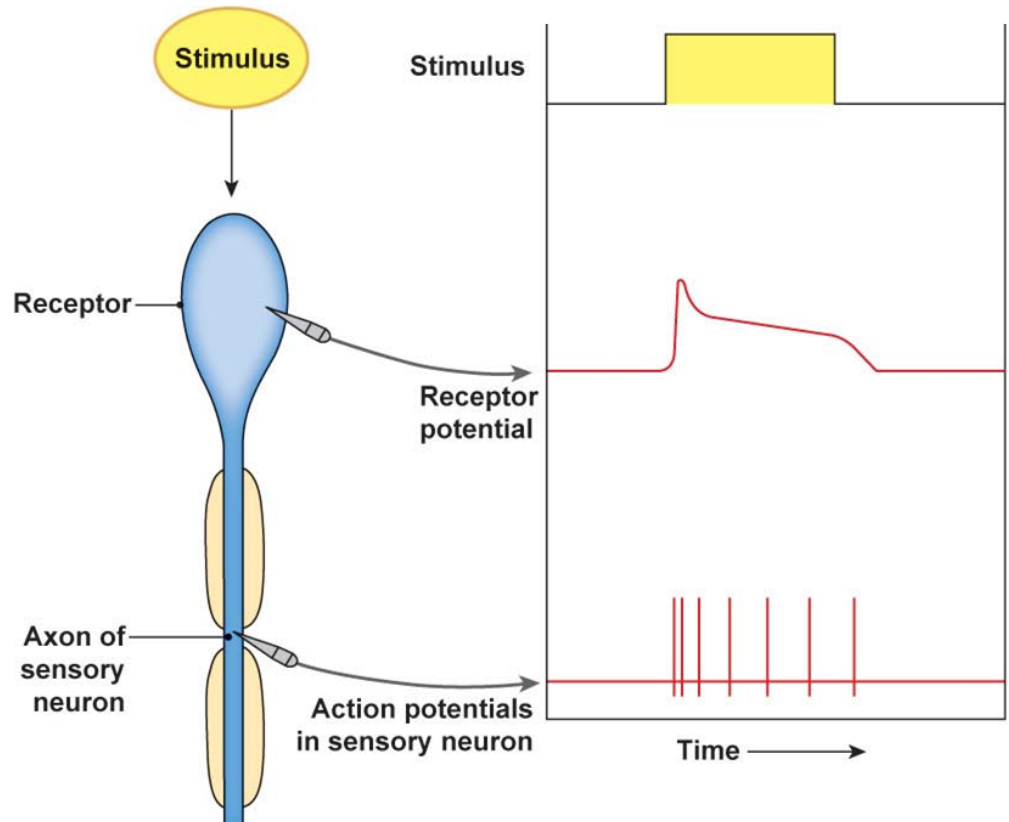


The function of nervous system is dependent on

1. Signal reception from outer/inner environment
2. Signal transduction into the AP

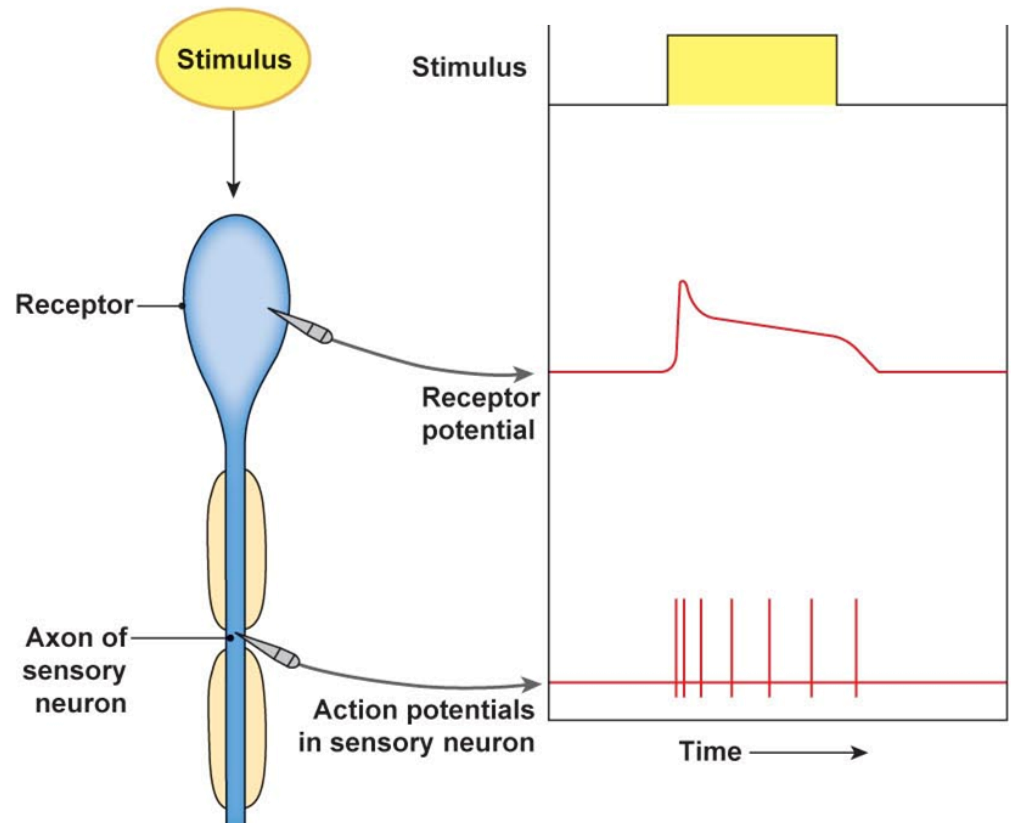
Receptors/sensors

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



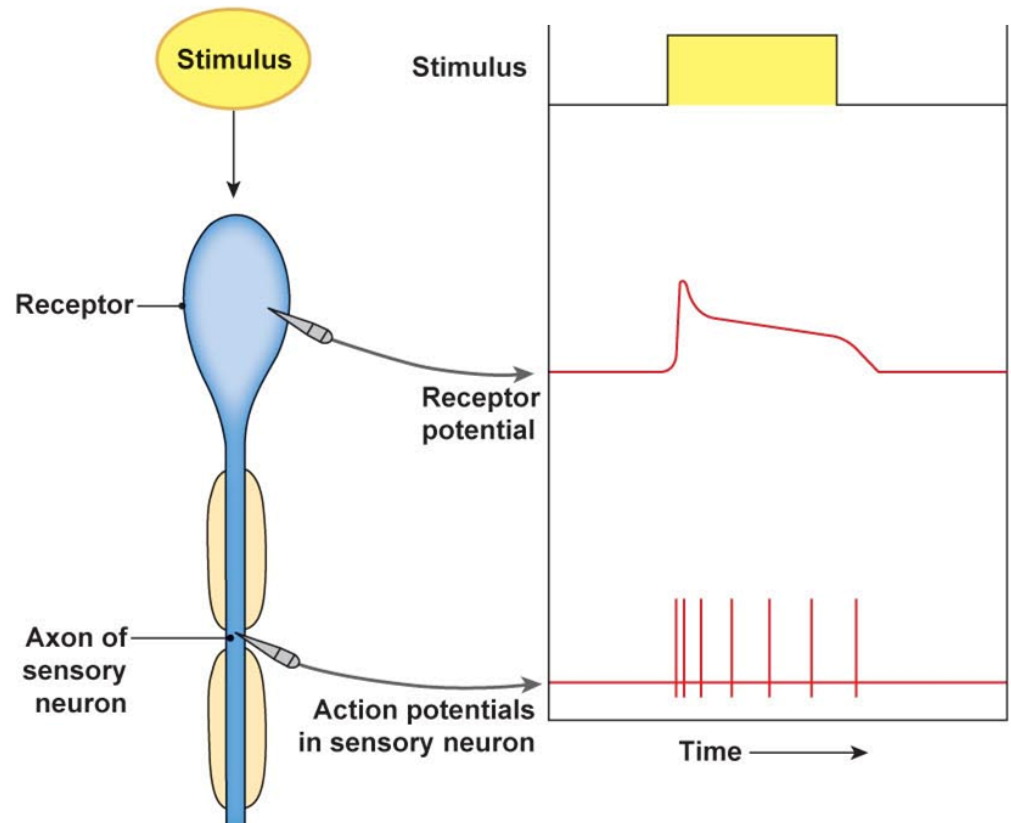
Receptors/sensors

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



Receptors/sensors

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



Receptory/senzory

- Měníč energie
 - Zachycení signálu
 - Receptory

Basic attributes of stimulus

Qualitative
Modality - What?
Localization - Where?

- A
- Ne
- Mec
- Term
- Chem
- Fotore



Receptory/senzory

- Měníč energie
 - Zachycení signálu
 - Receptory

Basic attributes of stimulus

Qualitative

Modality - What?

Localization - Where?

Quantitative

Intensity - How much?

- A
- Ne
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- Term
- Chem
- Fotorece



Receptory/senzory

- Měníč energie
 - Zachycení signálu
 - Receptory

Basic attributes of stimulus

Qualitative

Modality - What?

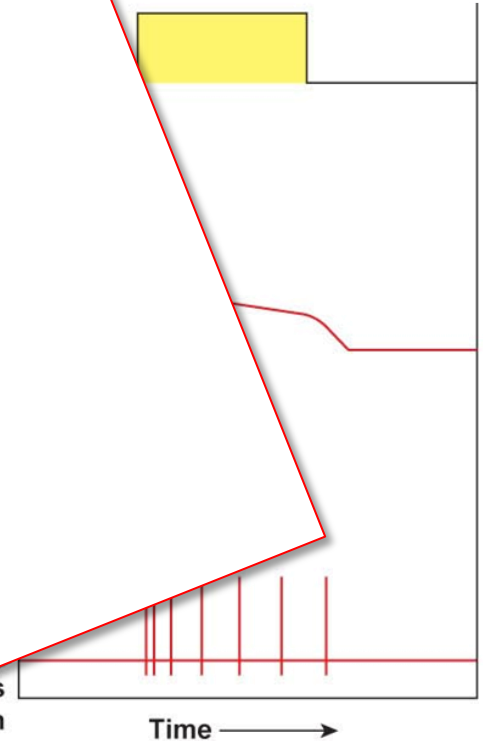
Localization - Where?

Quantitative

Intensity - How much?

Duration

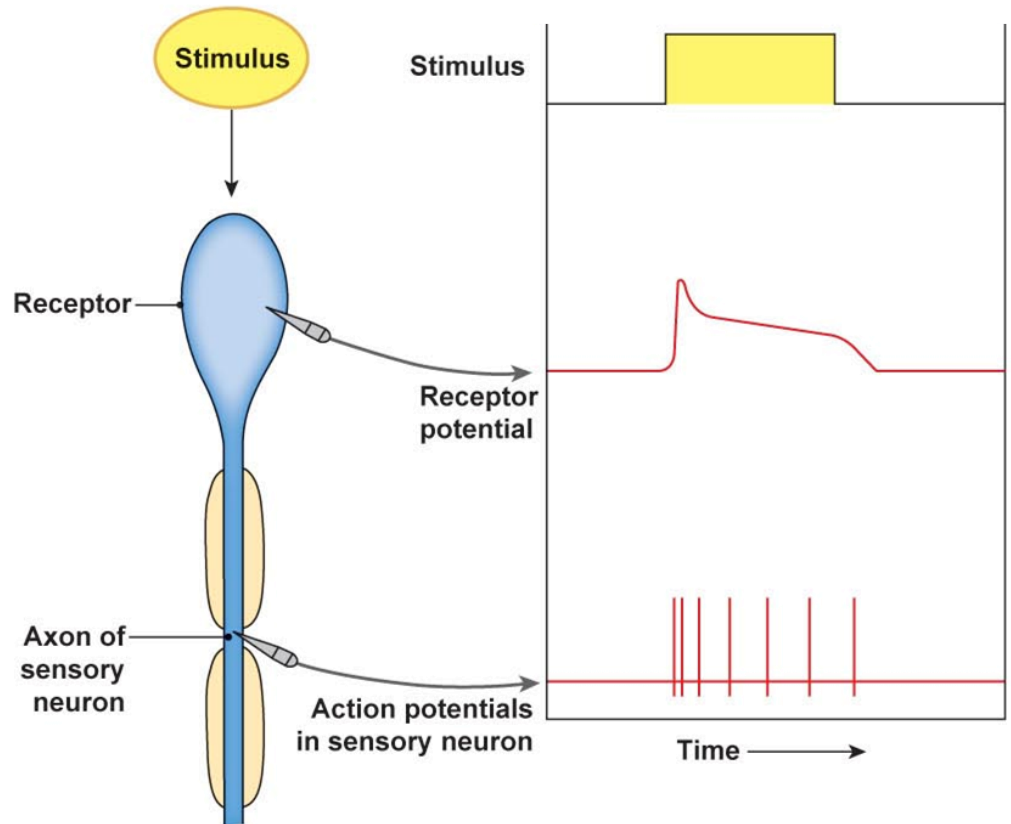
- A
- Ne
- Mec
- Term
- Chem
- Fotorece



Intensity coding

How much?

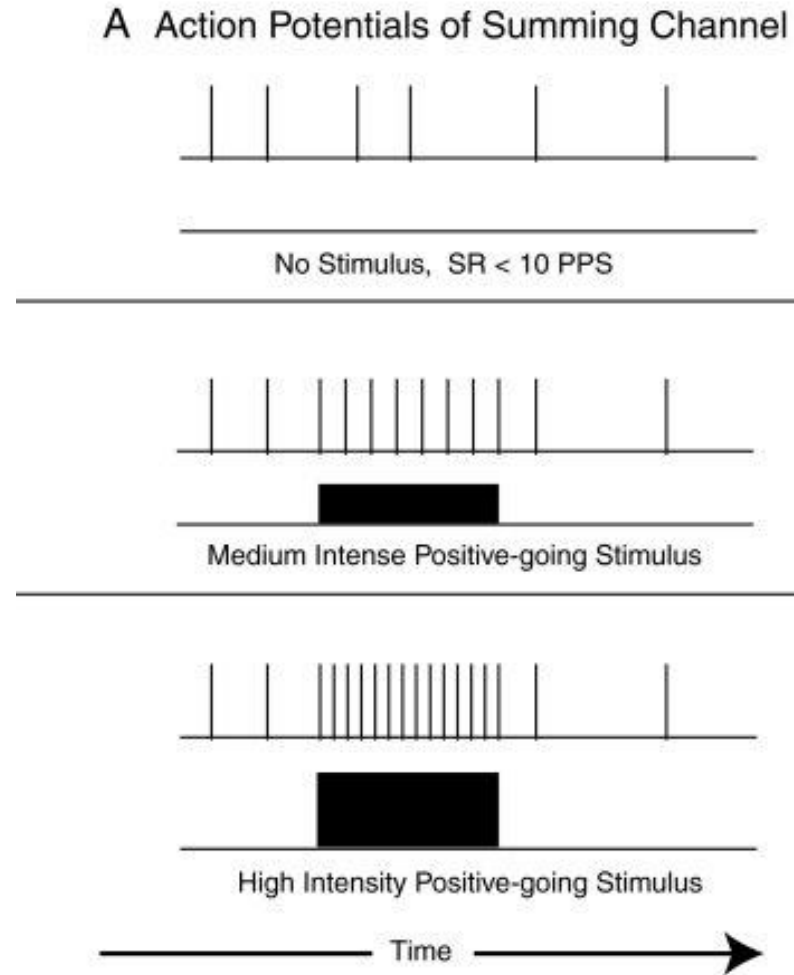
- Amplitude of receptor potential is transduced into the frequency of AP



Intensity coding

How much?

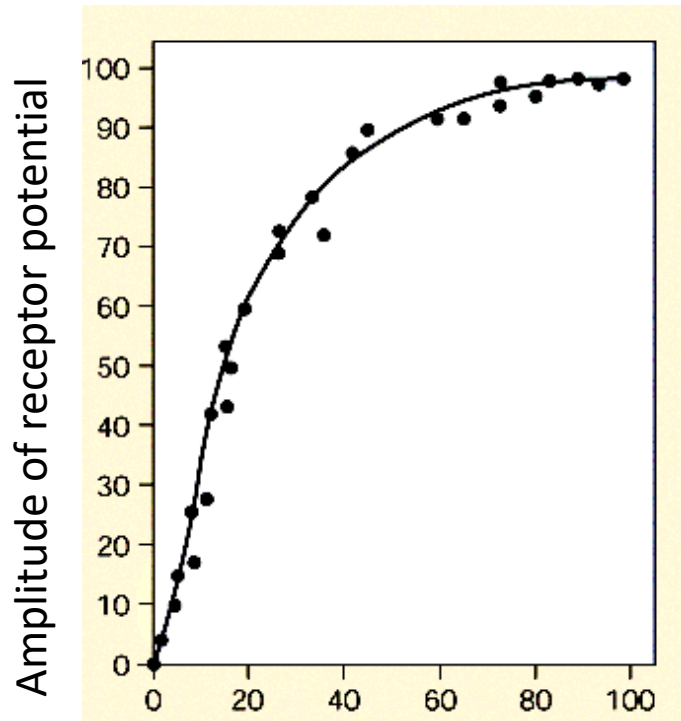
- In other words: an increased intensity is associated with increase in frequency of AP
- A high-intensity stimulus may also activate more receptors



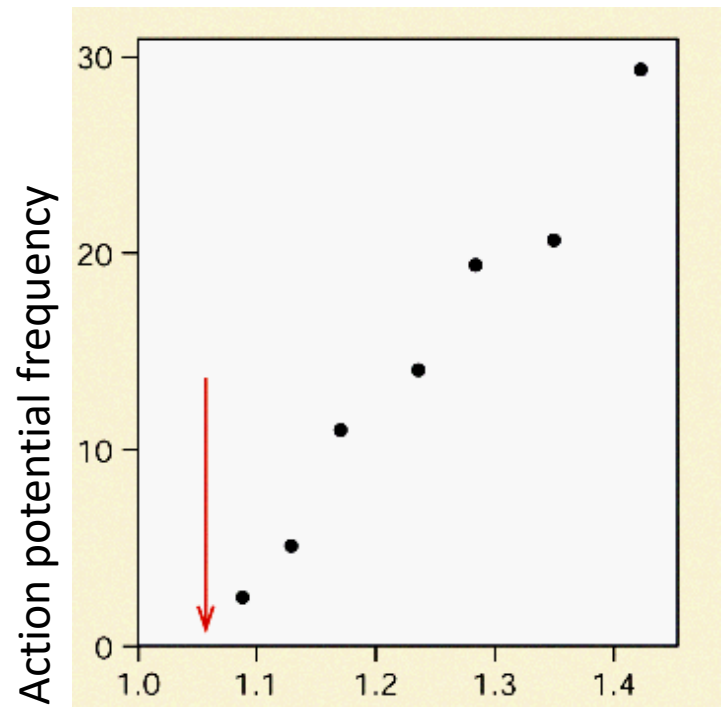
Intensity coding

How much?

Relation between receptor and action potential is logarithmic



Stimulus intensity

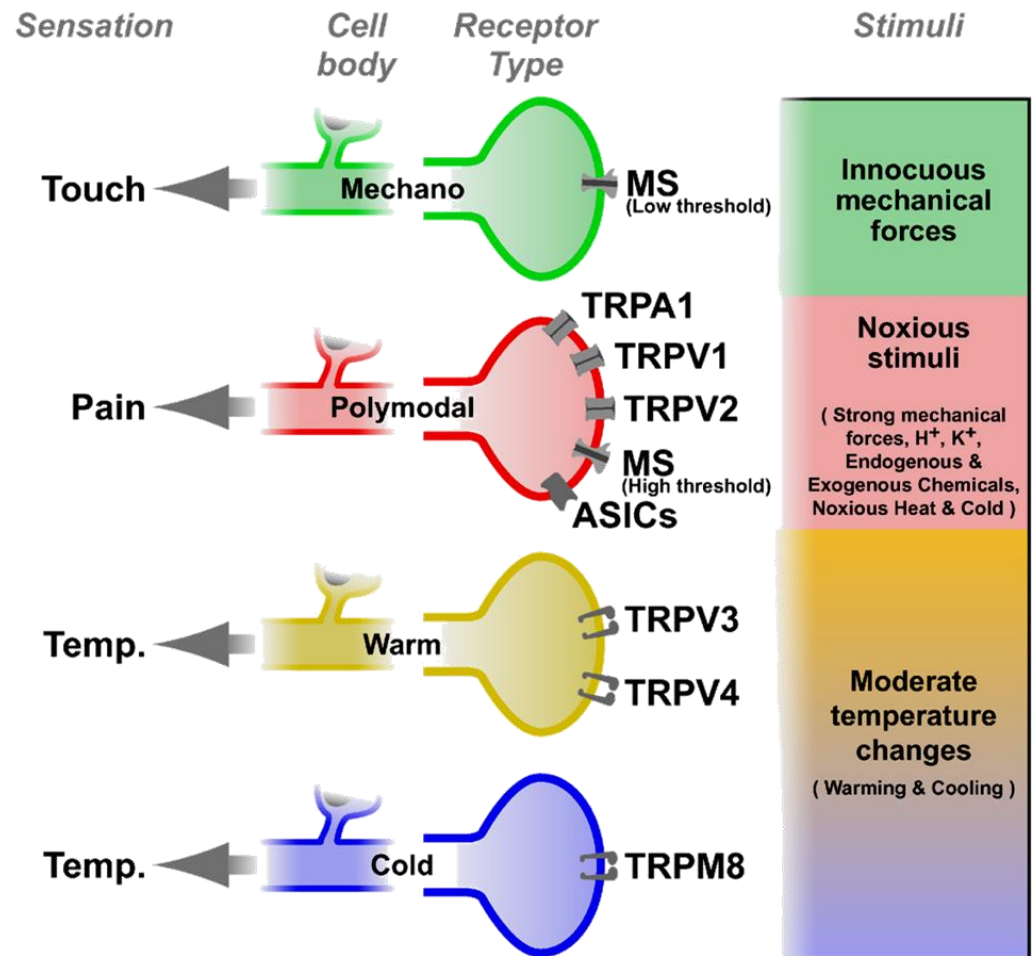


Stimulus intensity

Qualitative information

**What?
Where?**

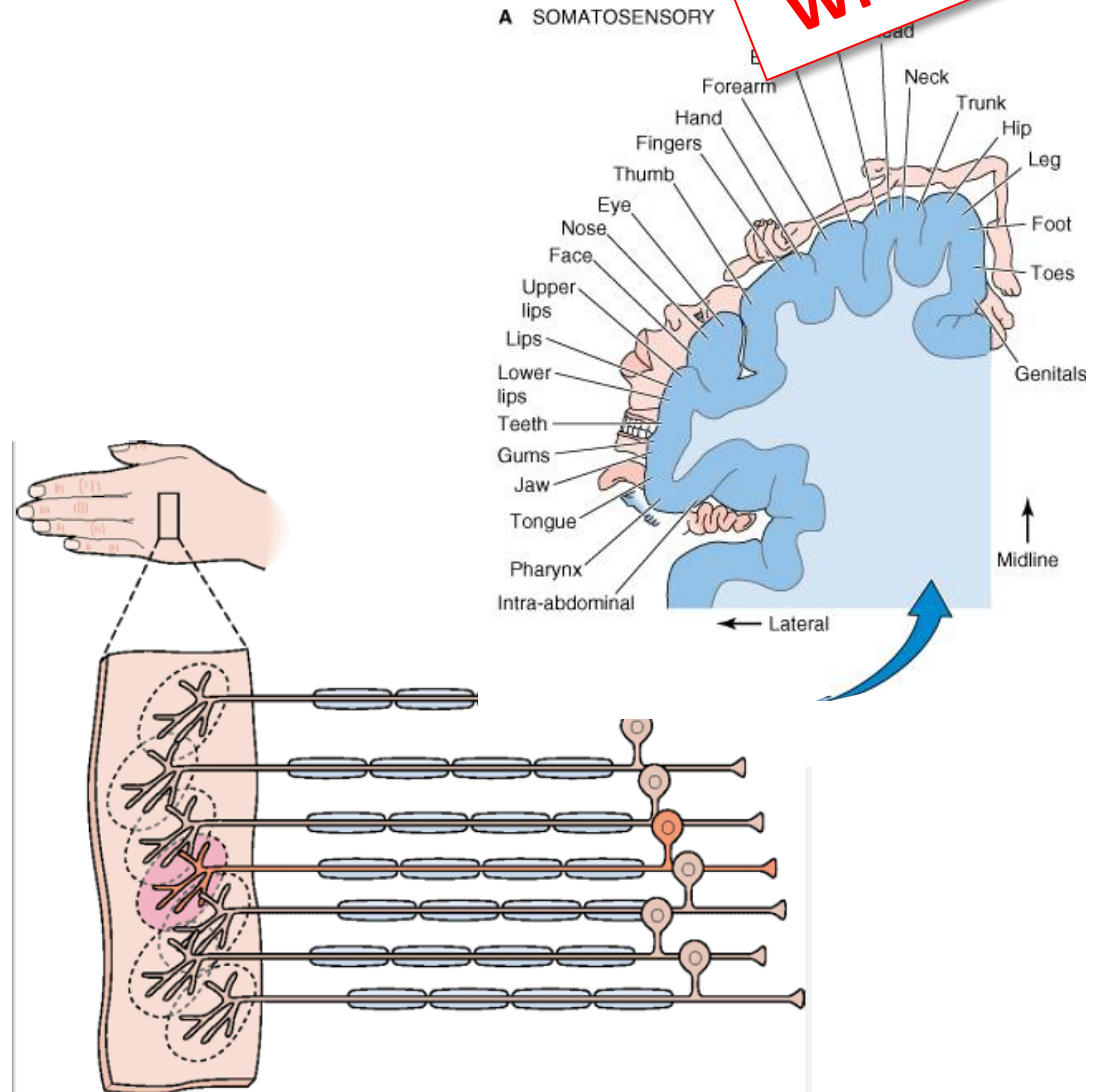
- **The law of specific nerve energies:**
The nature of perception is defined by the pathway over which the sensory information is carried
- Labeled line coding define the information about quality



Qualitative information

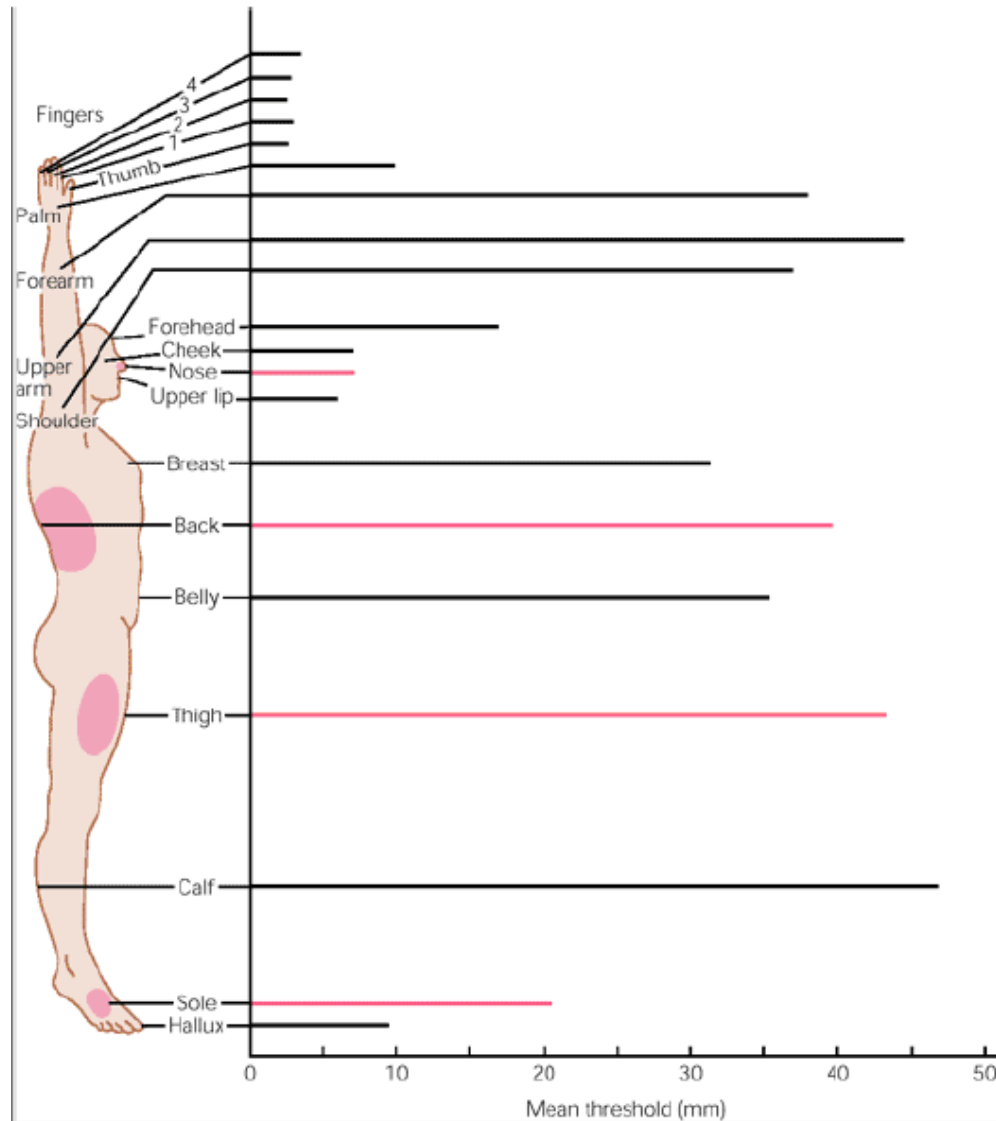
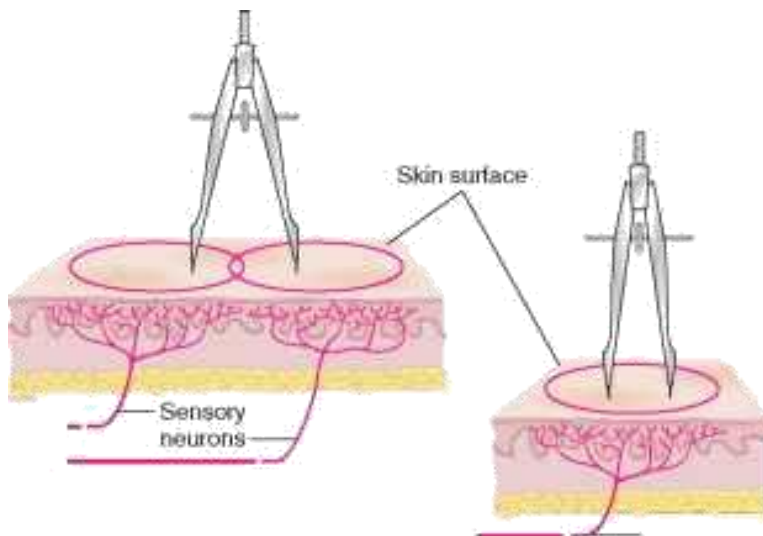
What?
Where?

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

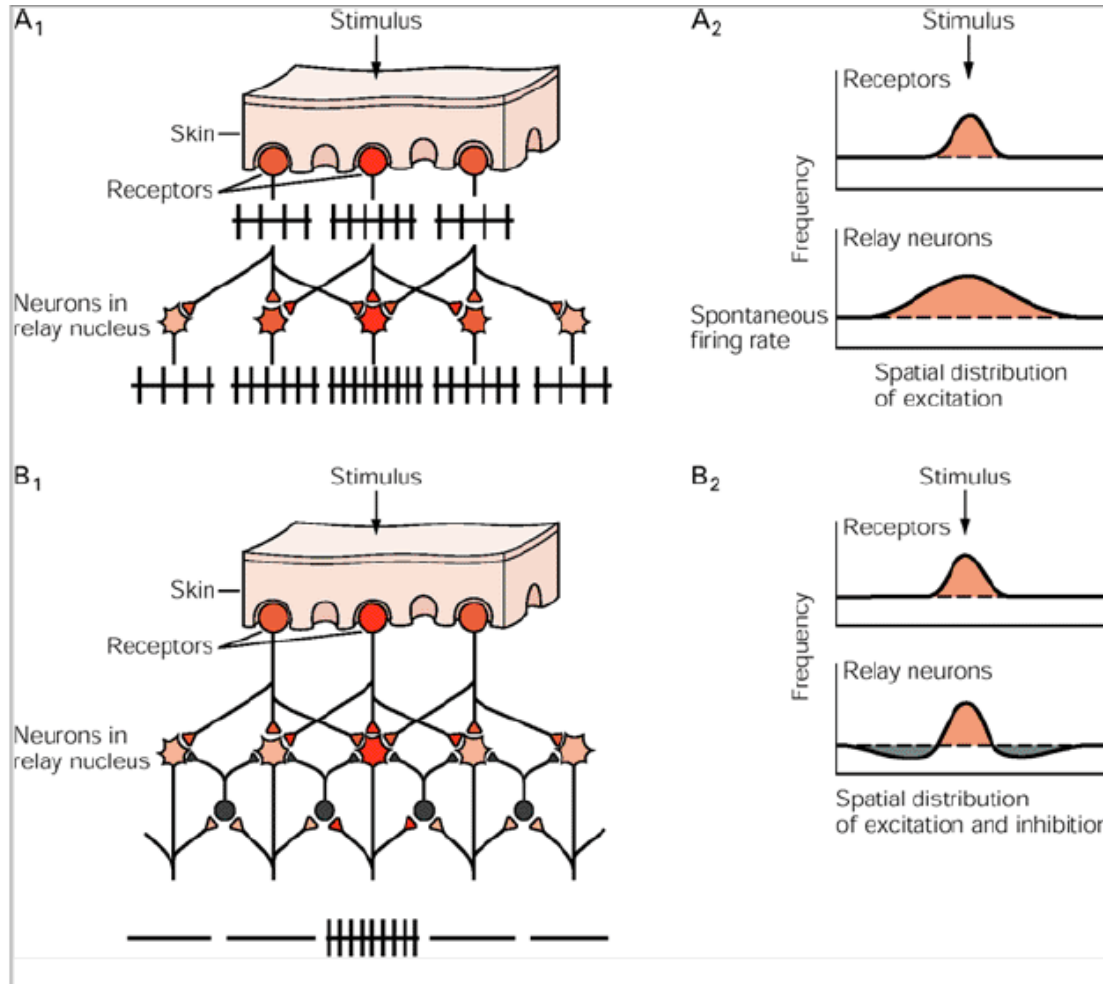


Receptive fields

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

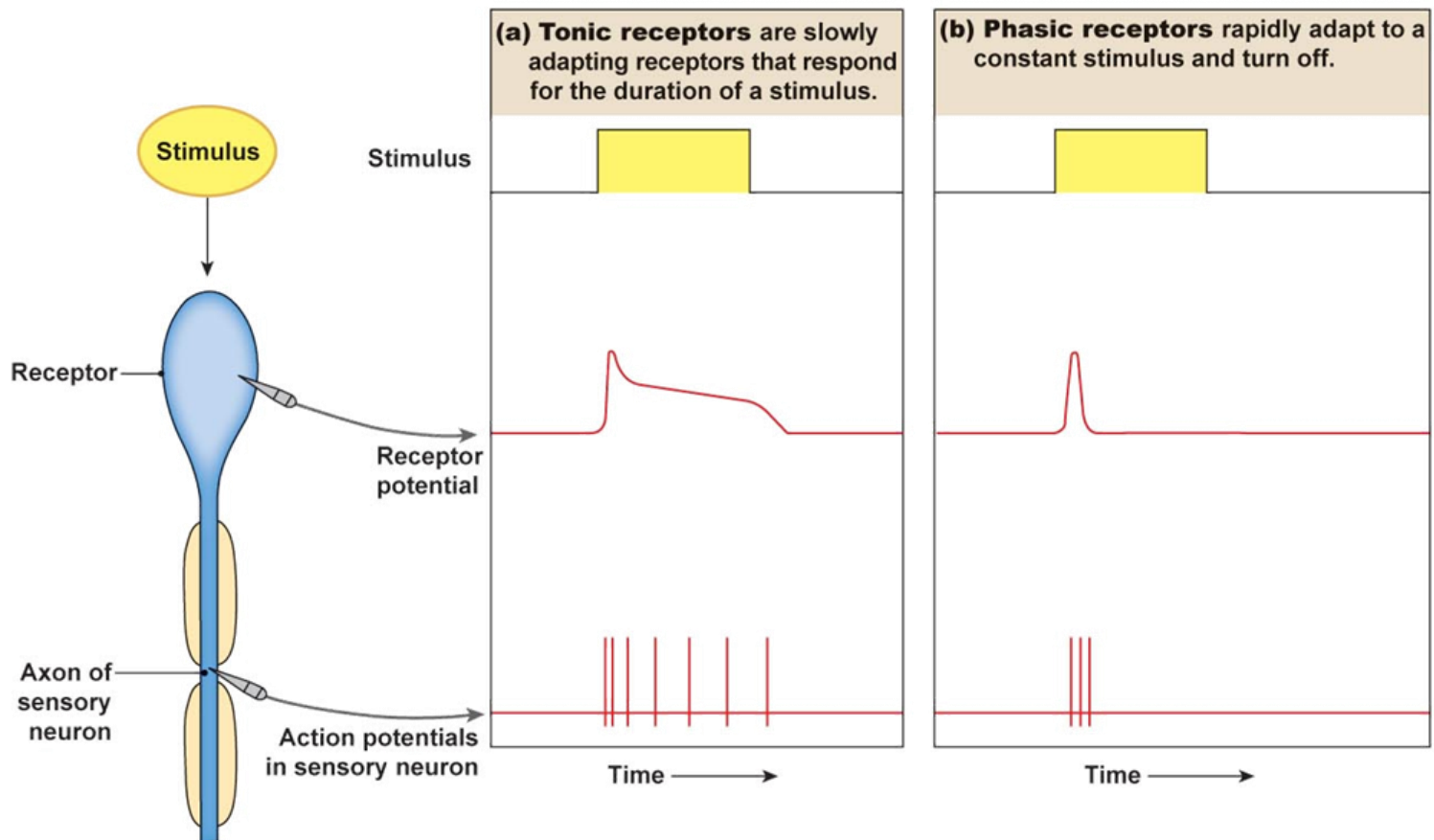


Lateral inhibition



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

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

Receptors

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

