

events of sensation

① Stimulation of sensory receptor

(must be within receptive field and appropriate)

smaller receptor field \Rightarrow more precise sensation

② transduction: converting energy of stimulus to graded potential

Comparison of Graded Potentials and Action Potentials in Neurons

CHARACTERISTIC	GRADED POTENTIALS	ACTION POTENTIALS
Origin	Arise mainly in dendrites and cell body.	Arise at trigger zones and propagate along axon.
Types of channels	Ligand-gated or mechanically-gated ion channels.	Voltage-gated channels for Na^+ and K^+ .
Conduction	Decremental (not propagated); permit communication over short distances.	Propagate and thus permit communication over longer distances.
Amplitude (size)	Depending on strength of stimulus, varies from less than 1 mV to more than 50 mV.	All or none; typically about 100 mV.
Duration	Typically longer, ranging from several milliseconds to several minutes.	Shorter, ranging from 0.5 to 2 msec.
Polarity	May be hyperpolarizing (inhibitory to generation of action potential) or depolarizing (excitatory to generation of action potential).	Always consist of depolarizing phase followed by repolarizing phase and return to resting membrane potential.
Refractory period	Not present; summation can occur.	Present; summation cannot occur.

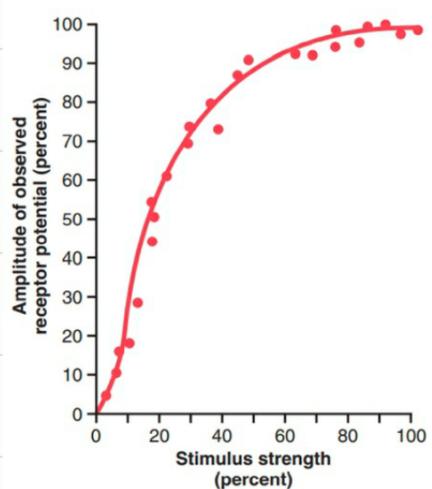
the amplitude increase rapidly at first but then it will increase less rapidly (with more stimulus force)

③ generation nerve impulses

* more receptor potential



more Action potential frequency



different gradations of intensity

increasing number of parallel fibers
(spatial summation)

sending more action potential
along a single fiber
(temporal summation)

Adaptation \Rightarrow constant stimuli \Rightarrow decreased Action potential
 \hookrightarrow cause first order neuron frequency AP to decrease

Sensor Adaptation depend on

rate of adaptation

if it adapt completely
or partially

Pacinian Corpuscle \Rightarrow rapidly adaptation
(pressure)

* also touch and
smell is rapidly
adaptive

more adaptation Rate Receptors

Receptor specialized to signaling changes
in stimuli (make sense)

However, the pain or body position and chemical composition
of the blood is less adaptation.

Adaptation Rate receptors

Slow

(tonic receptor)

Such as muscle spindle or golgi organ

Fast

(movement or phasic or Rate receptors)

slow adaptation receptors

① receptors in vestibular apparatus
(inner ear)

② pain Receptor ③ baroreceptor in Atrial tree

④ chemoreceptors in Carotid and aortic bodies

⑤ proprioceptors (muscle spindle and golgi organ)

* Can not use to transmit a continuous signal

* they give predictive movement

The Adaptation mechanism is different from receptors type to another

So the eye Adopt by changing conc. of their light-sensitive chemicals

Pacinian Corpuscle Adaptation mechanism

①

this receptor is viscoelastic so when distorting force suddenly applied it transmit to the central nerve fiber but with few hundreds of second the fluid redistributes and receptor potential no longer elicited.

② the second is much slower mechanism which is **Accommodation** that happen in fiber it self.
(closing Na^+ channels)

* And this two mechanism may happen in other type of mechano receptors

* CNS can distinguish stimuli properties

