



Sensory system

- is a functional system of neurons which enables perception of external or internal environment changes,
- Conduction of impulse to CNS,
- its analyses,
- formation of sensation



3 departments of analyser

- Peripheral (receptors)
- Conducting pathways
- Central (sensory cortex)



Functions of peripheral department

- Coding of information

- Primary analyses



CODING OF INFORMATION

- Perception of sensations or transformation of different stimuli (mechanical, chemical) into nervous impulses (AP)

Sponsored



Medical Lecture Notes – **All Subjects**

USMLE Exam (America) – **Practice**



E_neutron



PRIMARY ANALYSES

- ADEQUATE OR NOT?
- FORCE
- NEWNESS



Functions of conducting department

- Conveys impulse to the cortex
- Performs secondary analysis to form reflex reactions (withdrawal, orientational reflex) & define important information (lateral inhibition in thalamus)



Functions of peripheral & conducting departments

- Defence reflexes (blinking, lacrimation, withdrawal)
- Orientational behaviour
- Homeostasis
- Maintaining state of wakefulness for the brain (activation of RF)

Functions of cortex department

- Higher analyses – transformation of nervous impulse energy into perceptions
- Recognizing
- Decision making
- Adequate behaviour (+ associative cortex)



Classifications of receptors

- By the mechanism of excitation (primary & secondary sensitive)
- By the location in the body (external, internal, proprio-)
- By the nature of the stimulus (mechanical, chemical, baro-, thermo-)
- By the nature of caused sensations (visual, olfactory, gustatory, auditory)



Classifications of receptors

- By the distance from the stimulus (distant, contact)
- By the velocity of adaptation (slow adaptive, quickly adaptive, non-adaptive)

Pacinian Vibration Detector

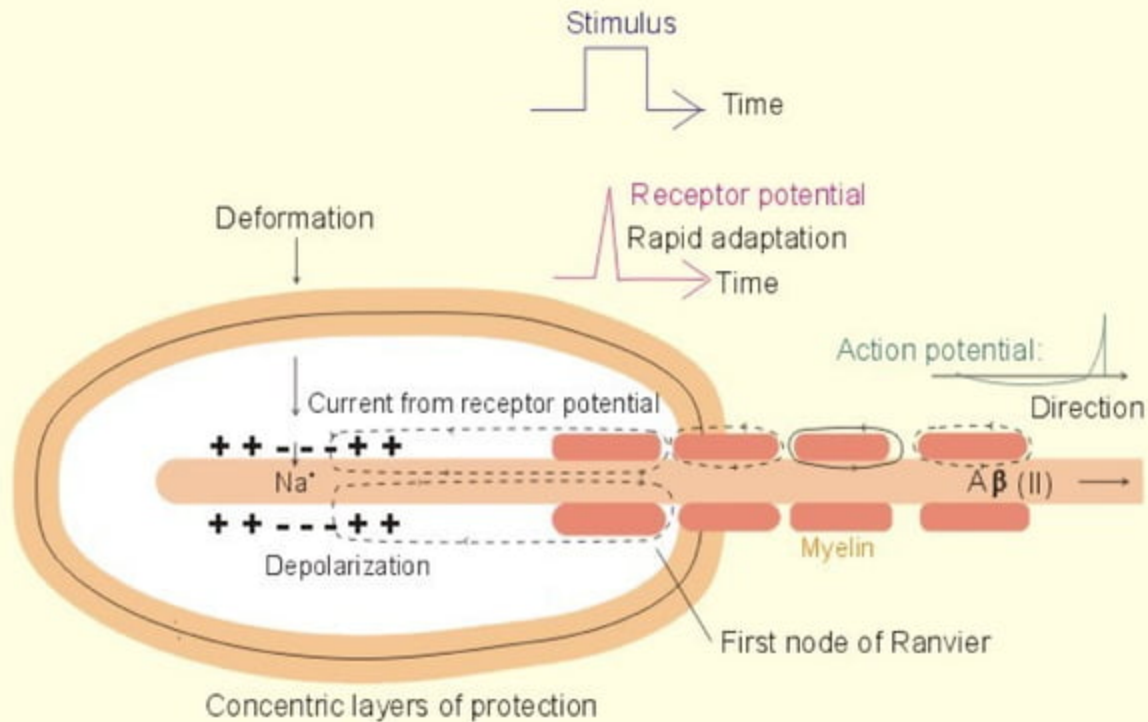


Fig. 3-1



Coding of information in the receptors

- Binar code
- Coded parameters:

FORCE OF THE STIMULUS
(frequency & spacial

coding)

DURATION OF THE STIMULUS



THRESHOLDS OF RECEPTORS SENSITIVITY

- ABSOLUTE
- DIFFERENTIATIONAL
(differentiation threshold of force,
spacial & temporal differentiation
thresholds)



ABSOLUTE THRESHOLD

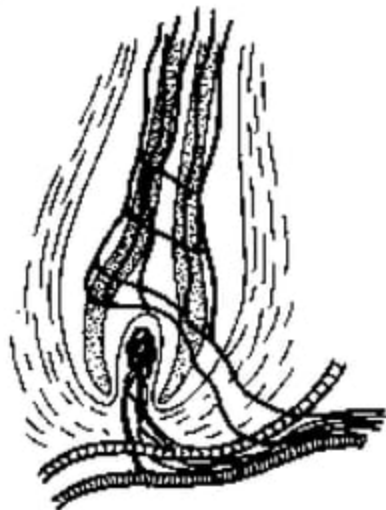
- MINIMUM FORCE OF STIMULUS CAUSING SENSATIONS

Differentiation threshold of force



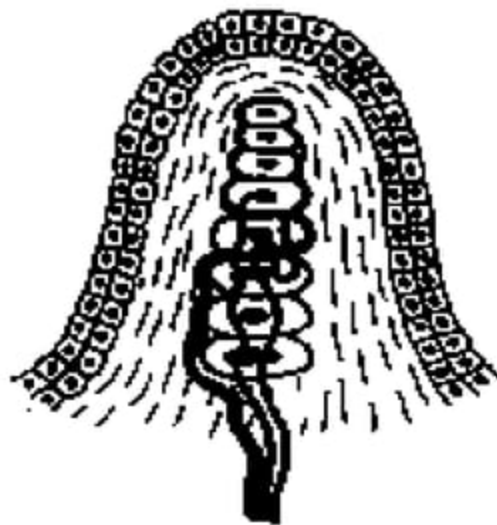
- Weber-Fexner law – the increase of stimulus to be perceptible must exceed the acting stimulus by a definite proportion.
- $\Delta I/I=K$

Touch receptors - Hair Follicle Ending



Responds to hair displacement. Wraps around hair follicle in hairy skin.

Touch receptors - Meissner corpuscle



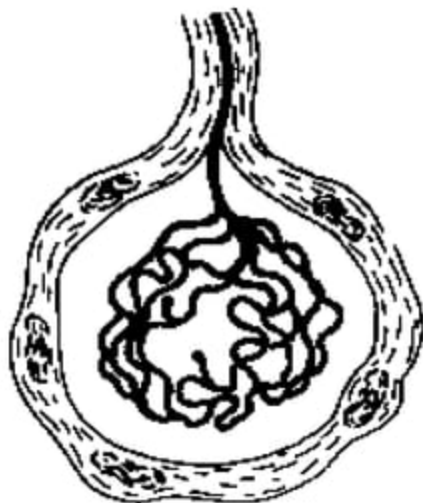
Responds to vibration.
Most sensitive in 20-40
Hz range
Dermis of
glabrous skin.

Receptors of pressure -Ruffini Endings



Dermis of both
hairy and glabrous
skin

Receptors of pressure -Krause corpuscle



Lips, tongue, and
genitals.

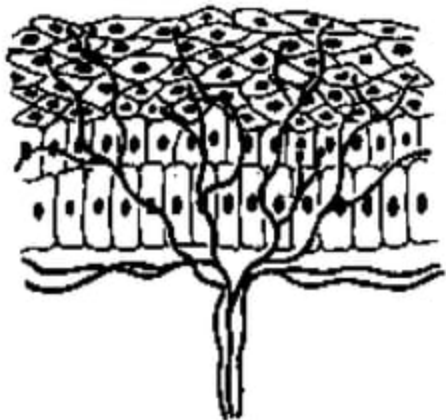
Vibration receptors -Pacinian corpuscle



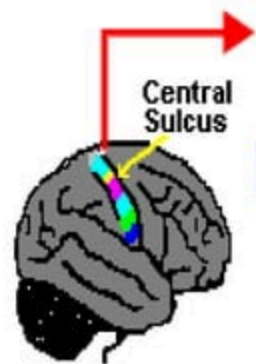
Responds to vibration.
Most sensitive in 150-300 Hz range
Deep layers of dermis in both hairy and glabrous skin. Deep layers of dermis in both hairy and glabrous skin.



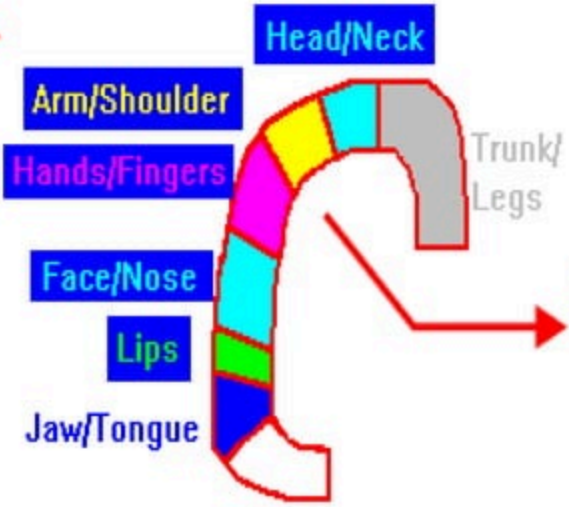
Free nerve endings



Different types of free nerve endings that respond to mechanical, thermal or noxious stimulation.



Central
Sulcus



Head/Neck

Arm/Shoulder

Hands/Fingers

Face/Nose

Lips

Jaw/Tongue

Trunk/
Legs

Homunculus

