



Motor system

examination

part II

Reflexes

What ARE Reflexes?



Reflexes are involuntary movement in response to a stimulus.

Reflex arc:

is a neural pathway that controls an action reflex.

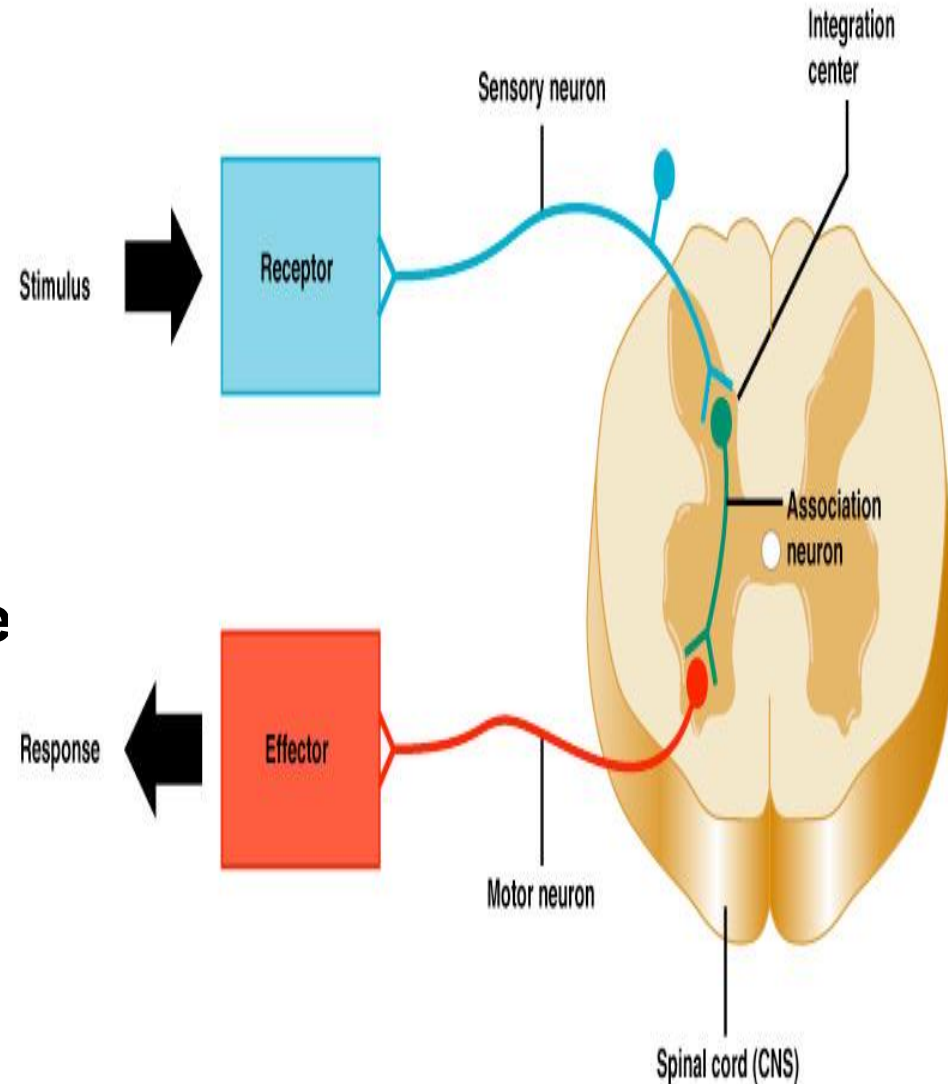
□ A basic reflex arc consists of:

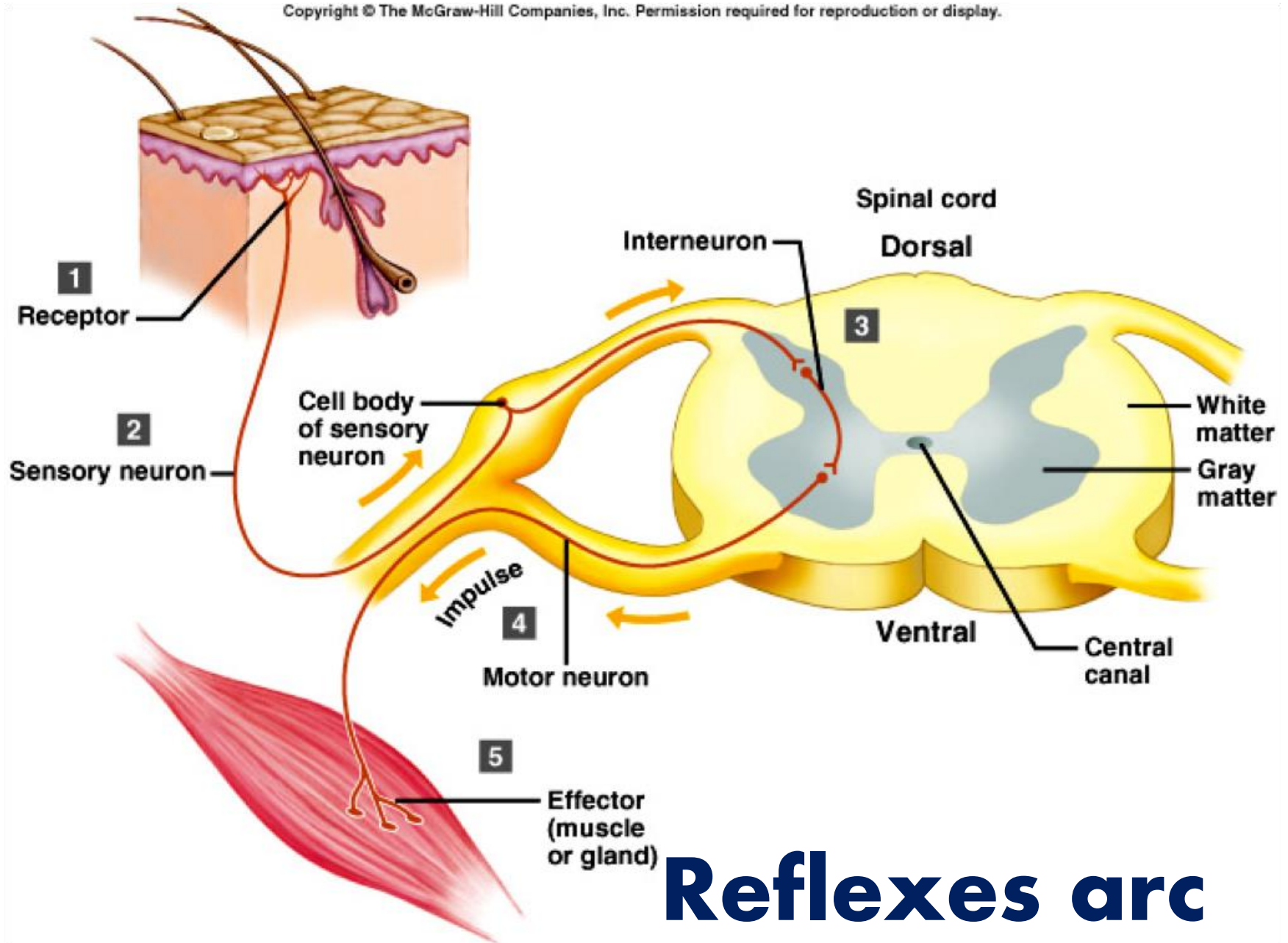
- **The receptor.**
- **Sensory neuron(afferent).**
- **Integration center in CNS.**
- **Motor neuron(efferent).**
- **The effector (muscle or gland) .**



How the Message Travels From the Receptor to the Effector.

- ✓ A **sensory neuron** carries the message from the Receptor to the central nervous system (the spinal cord and brain).
- ✓ A **motor neuron** carries the message from the central nervous system to the effector.





Monosynaptic vs. polysynaptic

- Monosynaptic reflex: When a reflex arc consists of only two neurons one sensory neuron, and one motor neuron and presence of a single chemical synapse. As knee reflex.
- Polysynaptic reflex: when one or more interneurons connect afferent (sensory) and efferent (motor) signals.

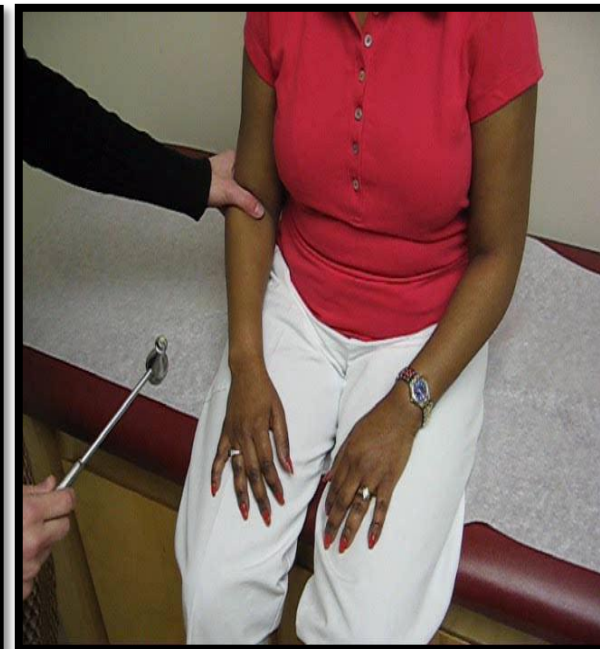
Human reflexes

1. Deep tendon reflexes called Stretch reflex : is a muscle contraction in response to stretching within the muscle.

□ It is a monosynaptic reflex which provides automatic regulation of skeletal muscle length, as knee jerk, ankle jerk, Triceps and biceps jerk .

Biceps jerk C5,6

- **Ask the subject to slight extend elbow and place forearm in semipronated position.**
- **The examiner places his thumb on the biceps tendon and stroke it with tendon hammer, biceps muscle quick contracts.**



Triceps jerk C6,7,8

- Ask subject to slight flex elbow, tap the triceps tendon just above olecranon. Triceps muscle quick contracts.



Knee jerk L2,3,4

- The knee jerk is tested by striking the quadriceps tendon directly with the reflex hammer causing extension of knee. By asking subject to put tested knee upon the opposite knee, OR the lower leg hanging freely off the edge of the bench, Repeat and compare to the other leg. hammer.



Ankle jerk S1,2

- **Ask the subject to slight flex ankle joint (Dorsiflex of foot), tap the Achilles' tendon by tendon hammer, calf muscle quick contracts. A positive result would be the jerking of the foot towards its plantar surface.**



Reinforcement



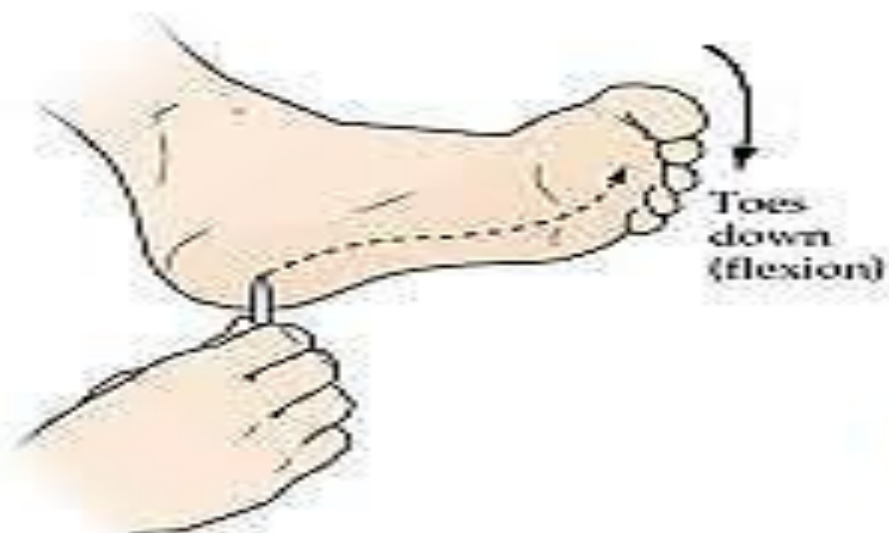
2. **Superficial reflex**

These reflexes are polysynaptic reflexes. They elicited in response to cutaneous stimuli, not depend on muscle stretch receptors.

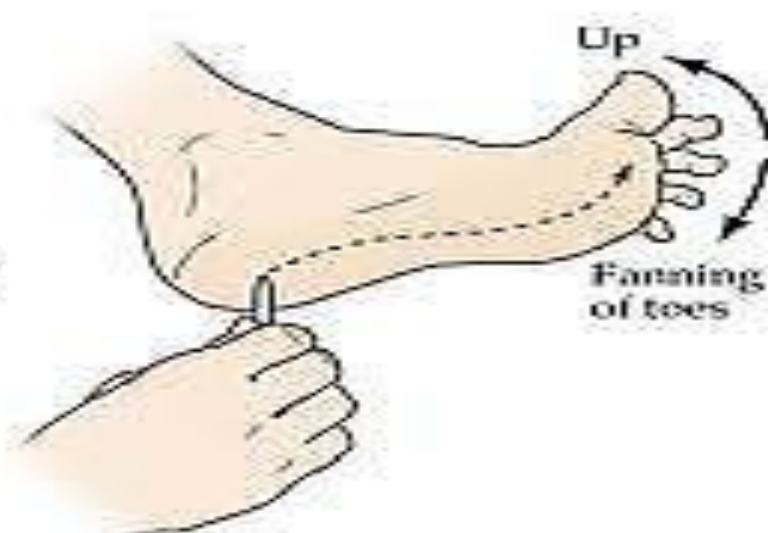
such as planter reflex, abdominal reflex, Cremasteric reflex etc.

Planter reflex

- In healthy adult the response is planter flexion and adduction of toes particularly the big toe. Abnormal response (dorsiflexion of the big toe and fanning the other toes) called **Babiniski sign**.
- Children under one and half years of age exhibit this sign because of an incomplete development of the nervous system. Presence of this sign after this age refer to UMN lesion



Normal plantar response

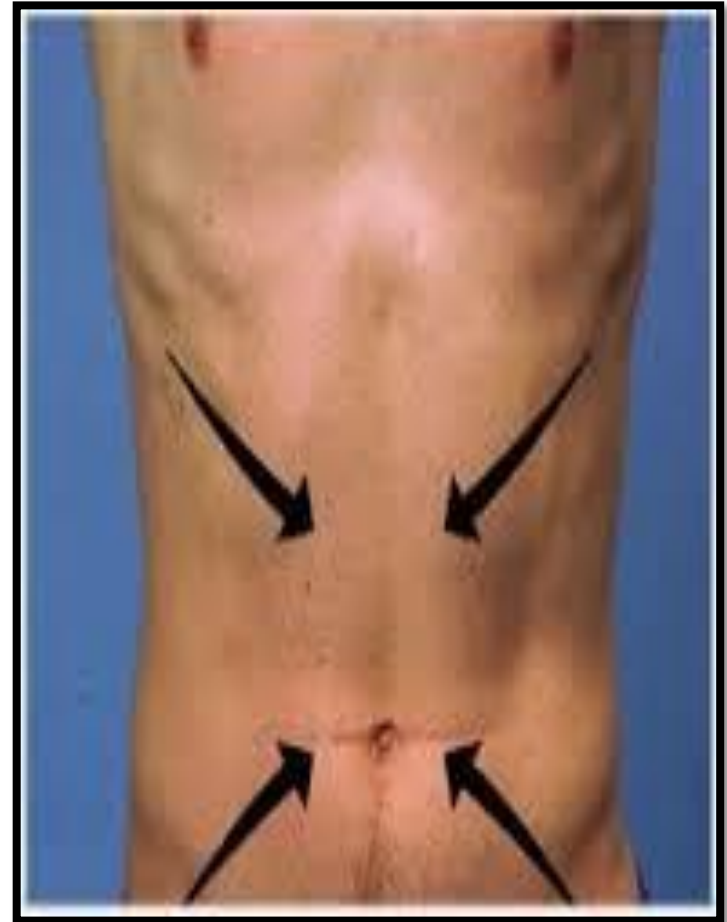


Extensor plantar response (Babinski sign)



Abdominal reflex T7-12

- is stimulated by stroking of the abdomen around the umbilicus
 - A normal positive response usually involves a contraction of the abdominal muscles, and the umbilicus moving towards the source of the stimulation.
- ❑ Physiological absent response can be due to obesity, children, multiparous lax abdominal wall or pathological absent as UMN lesion.



Cremasteric reflex L1,2

- **This reflex is elicited by lightly stroking the superior and medial (inner) part of the thigh.**
- **The normal response is an immediate contraction of the cremaster muscle that pulls up the testis on the side stroked (and only on that side)**
- **Absent in UMN lesion.**

Reflex Graded from 0-5

<u>Grades</u>	<u>Description</u>
0	Absent
1+	trace, or seen only with reinforcement
2+	"Normal"
3+	Brisk (Hyperactive)
4+	Hyperactive without clonus
5+	Hyperactive with clonus