

PROTECTIVE MECHANISM.



PROPRIOCEPTION/MECHANORECEPTER.

Mechanoreceptors are sensory neurons or peripheral afferents located within joint capsular tissues, ligaments, tendons, muscle, and skin. Deformation or stimulation of the tissues in which the mechanoreceptors lie produces gated release of sodium, which elicits an action potential.

Four primary types of afferent mechanoreceptors have been classified and are commonly present in noncontractile capsular and ligamentous structures in human joints.[1]

Type I: Superficial layers in joint capsules in limb and spinal apophysial joints. Low-threshold, slowly adapting.

A proportion of type I receptors are always active in every joint position. The resting discharge of type I receptors allows the body to know where the limb is placed and receive constant input on limb position in virtually any joint position.

Type II: Type II corpuscles are located in the deeper layers of the fibrous joint capsule. Low-threshold, rapidly adapting receptors and are reported to be entirely inactive in immobile joints. Monitors joint acceleration and deceleration during both active and passive joint movements.

Type III: Are found predominantly in the superficial surfaces of the joint ligaments, near their bony attachments.

Similar in nature to the Golgi tendon organs, found in tendons. Stimulated only toward the extreme ranges of joint motion where the ligamentous structures become taut. When considerable stress is generated in the joint ligaments, the type III receptor will become actively stimulated.

Type IV: Plexuses of small unmyelinated nerve fibers or free nerve endings. Type IV receptors are typically distributed throughout the fibrous joint capsule, adjacent periosteum, and articular fat pads. Only stimulated when marked mechanical deformation or chemical irritation such as exposure of the nerve endings to agents such as histamine, bradykinin, and other inflammatory exudates produced by damaged or necrosing tissues can stimulate activation of the type IV receptor.

Golgi tendon organ: Found at the origins and insertion^[1] of skeletal muscle fibers into the tendons of skeletal muscle. As excessive tension is applied to a tendon, the Golgi tendon organ is stimulated, causing inhibition of concomitant muscle.