



## Corpuscles Histology

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Meissner corpuscles were first described in 1852 by Professor Georg Meissner and Professor Rudolf Wagner. Wagner-Meissner corpuscles or tactile corpuscles are other names for them. The dermal papillae of glabrous skin contain these unique encapsulated nerve terminals, which transmit delicate touch and low-frequency vibration sensations to the central nervous system (CNS). Meissner corpuscles are vital for somatosensory acuity, especially in the digital extremities and palmar skin, and have clinical implications for peripheral and diabetic neuropathy, as well as age-related dermatological tactile sensibility degradation. Meissner corpuscles are ellipsoid mechanoreceptors located superficially inside the dermal papillae at a depth of roughly 150 micrometres. The corpuscles are 20–40 micrometres in diameter and 80–150 micrometres in length, with their long axis parallel to the skin surface. One corpuscle can be found in every two to four dermal papillae if there are less than three corpuscles per papilla. The genesis location determines the size and density of receptors. Each corpuscle is made up of three basic components: elongated Schwann cells, a connective tissue capsule, and a central axon. The flattened Schwann cells are stacked on a background of collagen and microfilaments-based interlamellar matrix. A capsule comprised of endoneurial-perineural fibroblastic connective tissue surrounds Meissner corpuscles. The deepest region of the corpuscle is surrounded by two to four layers of fibroblasts and fibrillary matrix. The apex of the capsule is unfinished. In this location, interlamellar matrix collagen fibrils extend into the dermis, attaching the receptor to the epidermis' basal surface.

Each corpuscle is supplied by a nerve terminal made from an intermediate-large amyloid-beta myelinated afferent fibre. Unmyelinated C fibres have been seen innervating the epidermis as well; however, these fibres may simply pass through the corpuscle. Corpuscles are normally supplied by a single axon, although corpuscles containing two to seven auxiliary branches from the main axon have been described. The nerve fibre retains its myelin coating as it enters the corpuscle, but after a short distance, it becomes amyelinic. The nerve fibre forks multiple times as it travels tortuously through the lamellae, resulting in bulbous expansions.

### Working

The brain receives subtle, discriminative touch and vibration sensations through Meissner corpuscles, which are cutaneous nerve endings. Meissner corpuscles are sensitive to low-frequency vibrations between 10 and 50 Hertz and respond to skin indentations of less than 10 micrometres. Grip control is also provided by these corpuscles, which detect the sensation of slide between an item and the skin. Meissner corpuscles have been postulated to have a function in pain sensation transmission because specific axons may express substance P and other nociceptive peptides. Further research into the involvement of these corpuscles in human nociception is required. The external force applied to a Meissner corpuscle is transmitted through collagen fibres attached to the lamellae. The axon terminals of the nerves bend as a result of the physical distortion, causing an action potential to be formed. The corpuscle's shape returns to normal when the stimulus is removed, resulting in a second sequence of action potentials. Meissner corpuscles are phasic receptors with a low threshold, which means they respond quickly to stimuli. After sustained stimulation, the responsiveness of Meissner corpuscles decreases dramatically. Such sensors are unable to provide information regarding the duration of the stimulation.

Cutaneous Meissner corpuscles are found in glabrous skin, particularly in the fingers, palms, and soles, where they increase sensitivity to light touch. More Meissner corpuscles can be seen on the lips, palate, tongue, and genitalia. The density of Meissner corpuscles fluctuates a lot from study to study, and no one knows how many there are. Corpuscular densities in the fifth digit and the thenar eminence were reported to be 12 and 5.1 corpuscles per mm, respectively.