

The sensory innervation of the human nipple

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Nipples represent a highly specialized skin with capital importance in mammals for breastfeeding and additionally in humans due to sexuality. The histological studies regarding this region are scarce, so 42 human nipples were studied to describe the morphology of the nipple innervation. Our results exclude the presence of a rich innervation on nipple's skin or superficial dermis, thus definitely excluding nipple skin from the concept glabrous skin. The presence of mechanoreceptors is limited to scarce Merkel cells on the epidermis and some corpuscular capsulated and non-capsulated structures in the dermis; Merkel cells progressively decrease with ageing. No Meissner corpuscles were found and the rare Pacinian corpuscles identified were close to vascular structures and embroidered in the mammary fatty tissue. The great sensitivity observed functionally on the breast and especially in the nipple can be morphologically explained by two elements; on the one hand there is a rich smooth muscle innervation present in the deep dermis; on the other hand the mammary gland demonstrate Piezo2 expression in many glandular cells, with two differentiated patterns in the ductal and in the acinar tissue of the breast. The role of Piezo2 in the normal mammary gland is discussed. © 2019 Elsevier GmbH

Breast

Human

Immunohistochemistry

Innervation

Nipple

Piezo2 mechanoprotein

Sensory corpuscles

ion channel

Piezo2 protein

unclassified drug

adolescent

adult

aged

Article

child

dermis

epidermis

female

human

human cell

human tissue

immunohistochemistry

immunoreactivity

major clinical study

mechanoreceptor

Merkel cell

muscle innervation

nipple

Pacini corpuscle

protein expression

Ruffini like corpuscle

sensory nerve

smooth muscle innervation