

The development of human digital Meissner's and Pacinian corpuscles

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Meissner's and Pacinian corpuscles are cutaneous mechanoreceptors responsible for different modalities of touch. The development of these sensory formations in humans is poorly known, especially regarding the acquisition of the typical immunohistochemical profile related to their full functional maturity. Here we used a panel of antibodies (to specifically label the main corpuscular components: axon, Schwann-related cells and endoneurial-perineurial-related cells) to investigate the development of digital Meissner's and Pacinian corpuscles in a representative sample covering from 11 weeks of estimated gestational age (wega) to adulthood. Development of Pacinian corpuscles starts at 13 wega, and it is completed at 4 months of life, although their basic structure and immunohistochemical characteristics are reached at 36 wega. During development, around the axon, a complex network of S100 positive Schwann-related processes is progressively compacted to form the inner core, while the surrounding mesenchyme is organized and forms the outer core and the capsule. Meissner's corpuscles start to develop at 22 wega and complete their typical morphology and immunohistochemical profile at 8 months of life. In developing Meissner's corpuscles, the axons establish complex relationships with the epidermis and are progressively covered by Schwann-like cells until they complete the mature arrangement late in postnatal life. The

present results demonstrate an asynchronous development of the Meissner's and Pacini's corpuscles and show that there is not a total correlation between morphological and immunohistochemical maturation. The correlation of the present results with touch-induced cortical activity in developing humans is discussed. © 2018 Elsevier GmbH

Development

Glabrous skin

Human

Meissner's corpuscles

Pacinian corpuscles

Sensory corpuscles

adult

adulthood

article

axon

endoneurium

epidermis

gestational age

glabrous skin

human

human tissue

immunohistochemistry

maturation

mesenchyme

morphology

Pacini corpuscle

touch

adolescent

aged

anatomy and histology

animal

cytology

embryology

female

finger

fluorescent antibody technique

growth, development and aging

immunology

infant

Leporidae

male

mechanoreceptor

middle aged

mouse

newborn

Pacini corpuscle

physiology

pregnancy

skin

antibody

collagen type 4

Adolescent

Adult

Aged

Animals

Antibodies

Axons

Collagen Type IV

Female

Fingers

Fluorescent Antibody Technique

Gestational Age

Humans

Immunohistochemistry

Infant

Infant, Newborn

Male

Mechanoreceptors

Mice

Middle Aged

Pacinian Corpuscles

Pregnancy

Rabbits

Skin