Abstract

The touch of a family member, a friend, a lover—touch is a vital interface in both day to day life and interpersonal relationships, of bodily function and emotional regulation. Additionally, it is well established that physical touch is vital for the development of infants. The sense of touch is the first to begin developing in embryos, and studies of orphaned human infants raised in touch-deprived environments reveal that the deprivation of physical touch in infants has potentially devastating psychological effects on their development. However, the neurophysiological mechanisms in which touch-evoked activity plays in the development of the nervous system remains poorly understood. Since its discovery in 2010, the Piezo2 protein (piezo-type mechanosensitive ion channel component 2) has been implicated in translating mechanical stimuli into electrical activity in fully matured touch-sensory neurons, but research into whether and how Piezo2 affects the development of the sense of touch has yet to be conducted. Through experiments genetically deleting Piezo2 in mice and observing changes in the morphology and gene expression of their touch-sensory neurons at two stages—15 days post-conception (embryos) and 10 days after birth (infants)—we found that Piezo2 is essential in regulating the development of touch sensory neurons. Accordingly, tactile experiences in-utero and during infancy may influence the physiological formation of the touch pathway by controlling the maturation of the body's touch receptors.