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Study shows sense of touch arises in the brain before birth

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A team of researchers at the Institute of Neurosciences of Alicante of the ISIC in Spain has found that the sense of touch arises in the brain before birth—at least in mice. In their paper published in the journal *Science*, the group outlines their study of the embryonic stages of the

development of the brain in mice and what they learned from it.

The development of a sense of touch has been studied by scientists for many years, but how it develops is still unclear. Prior research has shown that once it has developed, it exists as a sort of map imprinted on the cerebral cortex. Some have suggested that a basic map is created in the brain before birth and data points for it are added as newborns develop—sensory input from various body parts is simply added to the map. But now, that view might have to change, as the team in Spain reports evidence that suggests the map is already in place by the time a baby is born.

In their efforts, the researchers used mice to better understand how the sense of touch might develop because mice have what are known as cortical barrels—regions within the cortical layer that are visibly darker when stained. Prior research has shown that the map outlining the sense of touch in mice can actually be seen under a microscope by studying the cortical barrels. Prior research has also shown that brain function such as recognizing and responding to sensory information arises due to electrical signals that stimulate growth of neurons. Thus, to learn more about the development of the sense of touch in mice (at least concerning its whiskers) the researchers studied brain slices at various stages of development to monitor cortical barrel development, and also studied brain waves that have previously been identified as those associated with sensory processing.

In looking at their results, the researchers found that the sensory map created to process the sense of touch was built while the mice were still embryos. And it developed due to signals sent to the cerebral cortex by the thalamus, which also plays a major role in relaying synaptic information throughout the life of the mouse. The researchers suggest that it is likely the same process occurs in humans because "the organization of the cortex is conserved evolutionarily between species."

More information: Noelia Antón-Bolaños et al. Prenatal activity from thalamic neurons governs the emergence of functional cortical maps in mice, *Science* (2019). DOI: 10.1126/science.aav7617