New fundamental knowledge of the 'abdominal brain'

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Researchers at Karolinska Institutet have now mapped the neurons that make up the mouse ENS. Roughly speaking, neuron function can be broken down into sensory, motor or interneuronal; now, the researchers have succeeded in describing subgroups of such nerve cells—in total, they have identified and classified twelve different kinds of ENS neuron, including subgroups of sensory neurons, some of which are activated by substances in the intestines and affect the immune system, while others are stimulated more mechanically.

The researchers also studied how GI tract neurons form during gestation, and found that the maturation process follows different principles to that of the central nervous system (CNS). In the CNS, the neurons mature from stem cells that are "pre-programmed" to form a certain type of neuron depending on their location, as different types of neuron are needed at different sites of the CNS. In the ENS, on the other hand, the same composition of neurons is needed along the entire length of the intestine. It is therefore unclear how the cells of the ENS "know" what to mature into. In this study, the researchers show that different neuronal types in the ENS are formed after the cells have matured into neurons and identify a transcription factor, Pbx3, that plays an important part in this transformational process.

"What we'll be doing next is systematically activating the different neurons in the ENS in mice to study how the gastrointestinal functions are affected," says the study's last author Ulrika Marklund, researcher at the Department of Medical Biochemistry and Biophysics at Karolinska Institutet. "This will enable us to produce detailed functional knowledge about the different neurons. So, in the future, we'll be able to figure out the part played by the neurons in different intestinal diseases and identify targets for new drugs."

She continues: "Our new findings on the formation of the ENS will also pave the way for better..."
methods of 'producing' specific enteric neurons. It's conceivable that we might eventually have stem-cell therapies for curing or alleviating different intestinal diseases that involve the re-creation of ENS neurons. But we're not there yet."


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Provided by Karolinska Institutet

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