

NEWS

Cesarean sections may leave young brains vulnerable to injury

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Delivery by cesarean section causes subtle brain and behavioral alterations in mice, and premature pups appear to be particularly affected, researchers have found¹.

The results suggest that mice born by C-section, especially those delivered prematurely, have brains that are especially vulnerable to environmental insults. The findings may help explain epidemiological studies that have suggested that **children born via C-section** have increased odds of autism and ADHD.

“These animals are fragile,” says **Diana Ferrari**, a researcher at Neurochlore, a French biotech company. “Any other insult that [happens] around birth could lead to the problems that we have seen in epidemiological studies.”

Ferrari presented the findings today at the **2019 Society for Neuroscience annual meeting** in Chicago, Illinois.

In a paper published last year, the researchers reported that C-sections do not seem to lead to long-term problems in mice in terms of social or **repetitive behavior**.

However, the team found some early neurological differences in the mice, including delayed development of neurons in the hippocampus.

At birth, pups delivered by C-section have neurons that are smaller and less complex than those of mice delivered vaginally, the team found. These differences are especially pronounced in mice delivered prematurely, although they don’t last; by the following day, the neurons of all the C-section pups start to resemble those of pups delivered vaginally.

“These neurons catch up and recover really quickly,” Ferrari says.

Communication problems:

Preterm C-section mice display differences in communication, however. When the researchers separated 9-day-old pups from their mothers, preterm C-section mice emitted more calls than full-term mice delivered by either method.

In the new study, the researchers added another group of mice to the analysis: those that had been delivered vaginally, preterm. These mice show no communication problems, suggesting that it's some combination of prematurity and C-section delivery that leads to the altered behavior.

All mice delivered by C-section have smaller brains than full-term vaginally delivered mice, the researchers found. And certain brain regions are unusually small in preterm C-section mice.

The reason for these differences is unclear. Pups delivered vaginally may be exposed to different microbes, hormones, medications and stresses — any one of which could alter brain development — than those delivered by C-section.

“Delivery is such a complicated process and such a multifactorial process,” Ferrari says.

This, combined with the fact that some of the differences are subtle and transient, may explain why studies have **turned up conflicting results**, Ferrari says.

For more reports from the 2019 Society for Neuroscience annual meeting, please [click here](#).

REFERENCES:

1. Chiesa M. *et al. Cereb. Cortex* **29**, 2424-2436 (2019) [PubMed](#)