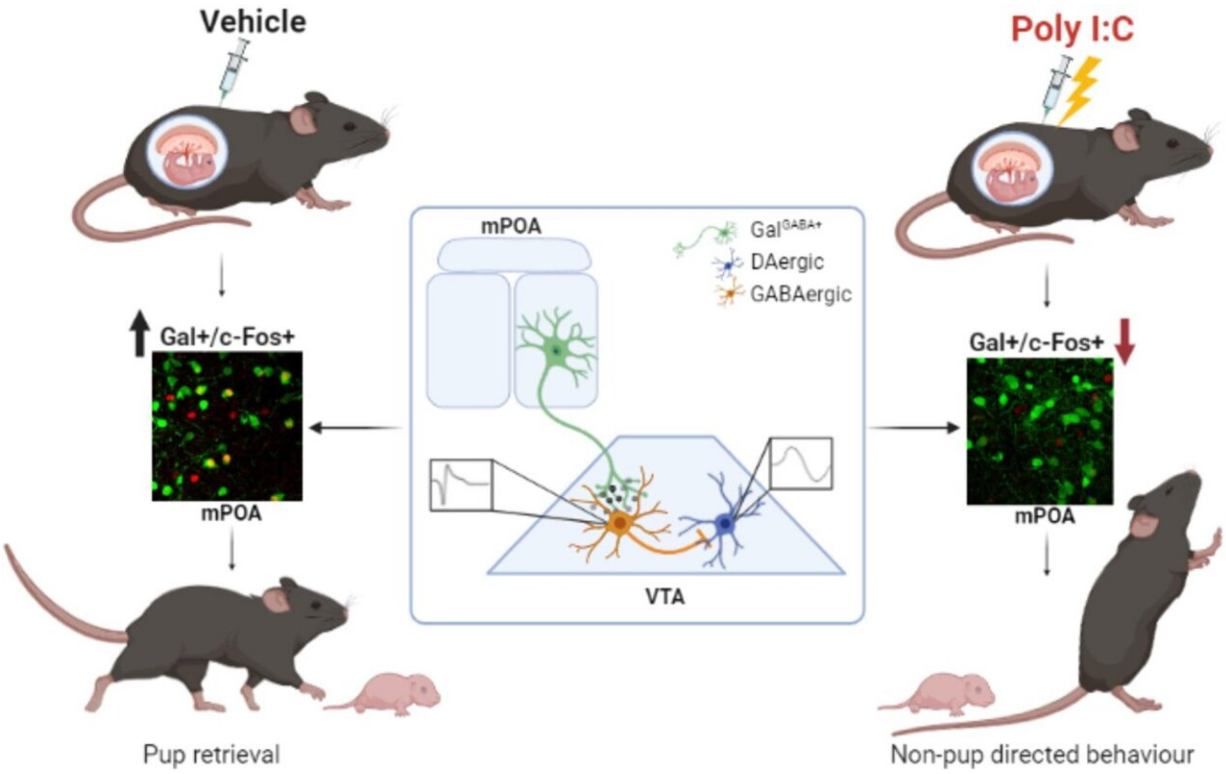
Viral infections during pregnancy affect maternal care behavior

May 18 2022



Reduced activation of mPOA Gal+ neurons upon pup retrieval in dams after gestational Poly I:C treatment. mPOA Gal+ → VTA projections are inhibitory; reduced activation of mPOA Gal+ in MIA dams could result in disinhibition of trigger GABAergic neurons in the VTA and subsequent bias in the engagement of non-pup-related over pup-related (retrieval) behavior (made with Biorender.com). Credit: *Molecular Psychiatry* (2022). DOI: 10.1038/s41380-022-01602-x

Viral infections during pregnancy affect the mother's brain and her postpartum care behavior. These are the findings of a research study in a mouse model conducted at MedUni Vienna. The results were published in the leading journal *Molecular Psychiatry*.

There is ample data from studies in mouse models demonstrating that viral infections during pregnancy can affect the developing brain of the young in utero (in the womb) with lifelong consequences for brain function and behavior.

A preclinical study has now shown, for the first time, that a viral-like immune activation during pregnancy also affects the maternal brain and significantly disrupts maternal care behavior after the birth. These results are published by a research group led by behavioral biologist Daniela D. Pollak from the Division of Neurophysiology and Pharmacology at MedUni Vienna's Center for Physiology and Pharmacology, working together with colleagues from the Division of Molecular Neurosciences at MedUni Vienna's Center for Brain Research and from Columbia University (U.S.).

In this preclinical study the researchers used a chemical substance that activates the same receptor pathways as viruses, to trigger the immune system of the mother during pregnancy in a manner that is comparable to the typical course of a viral infection. Once the young had been born, the maternal care behavior of the female mice (dams) was behaviorally tested. "Dams who had experienced a viral-like immune activation were less caring towards their young than animals in the control group," says Daniela D. Pollak, describing the results. "The naturally strong drive to take care of one's own offspring and to keep them safe from harm was much less pronounced corresponding to a significant decline in attachment behavior."

The researchers not only observed changes in the behavior of the dams

but also identified structural, molecular and functional changes in their brains and were able to discover some of the underlying mechanisms.

Even though animal-model results cannot be directly translated to humans, the study team says it is an indication that viral infections during pregnancy can change mothers' behavior toward their babies. "Women who have had systemic viral illnesses during pregnancy may be at increased risk of impaired mother-infant bonding," Pollak explains. The researcher hopes that this will raise awareness so that women with a history of infection during pregnancy may be more prompted to seek medical or psychotherapeutic treatment if they experience indications of impaired bonding after birth, which may affect the well-being of mother and child.

More information: Alice Zambon et al, Gestational immune activation disrupts hypothalamic neurocircuits of maternal care behavior, *Molecular Psychiatry* (2022). DOI: 10.1038/s41380-022-01602-x

Provided by Medical University of Vienna