How magnesium sulfate benefits preterm babies

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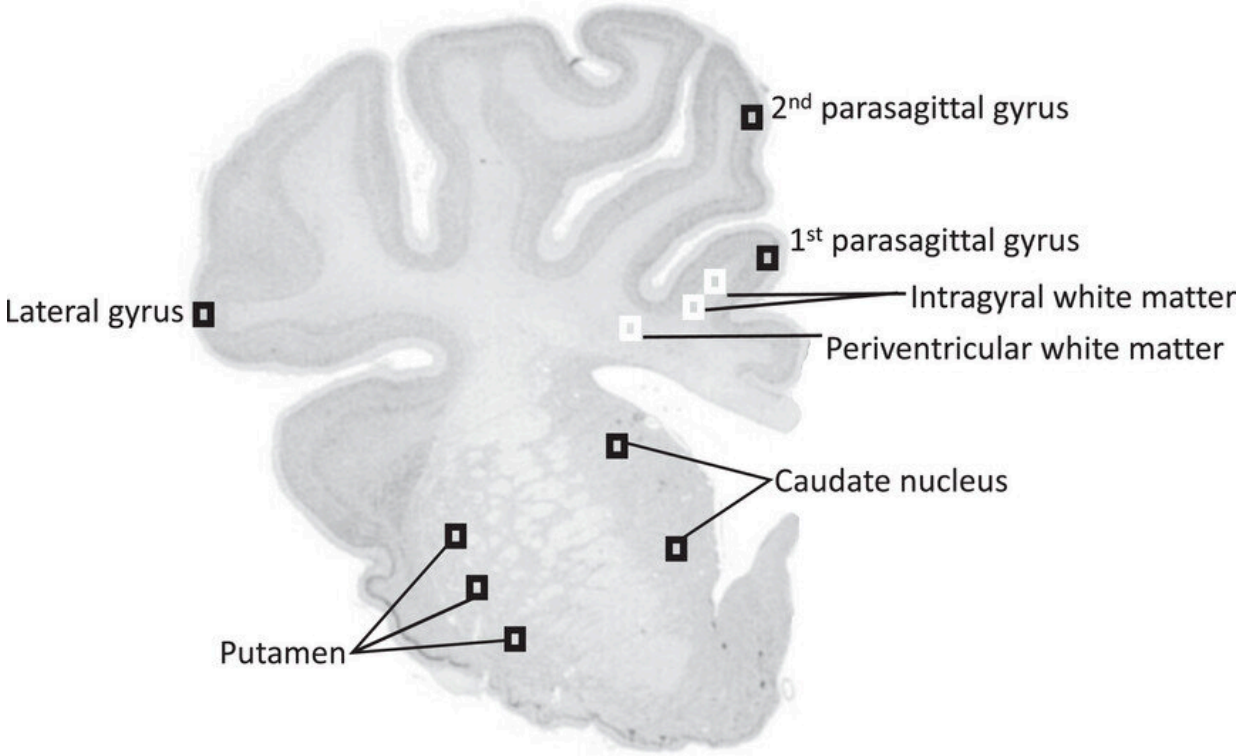

Schematic diagram indicating fields sampled (regions of interest) for histological assessment. Areas of the forebrain used for analysis included the premotor cortex, caudate nucleus, putamen and periventricular and intragyral white matter from sections taken 23 mm anterior to stereotaxic zero. Black squares were sampled for assessment of neuronal survival, astrocytes and microglia within the parasagittal and lateral gyri, caudate nucleus and putamen. White squares were sampled for assessment of astrocytes, microglia and oligodendrocytes within the intragyral (IGWM) and periventricular white matter (PvWM). Credit: *The Journal of Physiology* (2023). DOI: 10.1113/JP284381

Being born too soon exposes babies to many dangerous health conditions, and researchers are tackling one of them by finding out how magnesium sulfate can protect the health of the preterm brain.

Dr. Robert Galinsky and his team at Hudson Institute work on understanding how inflammation impacts development of the immature brain, and how to prevent or treat the many problems that can arise in babies exposed to infection/inflammation around the time of birth.

"These problems can manifest in conditions such as cerebral palsy, bronchopulmonary dysplasia (BPD), necrotizing enterocolitis (NEC) and more," Dr. Galinsky said.

"So we are identifying drug targets that can help improve brain development and function in these babies."

Protecting babies with magnesium sulfate

Magnesium sulfate is a drug that is often administered to pregnant women to slow premature labor, prevent seizures and protecting the brain of the preterm fetus, but little is known about exactly how it works, and recent studies have identified gaps in knowledge about which babies should receive this treatment.

In their latest study, published in the *Journal of Physiology*, the team discovered that the beneficial effects of magnesium sulfate are limited to babies deprived of oxygen in the womb.

They showed that magnesium sulfate reduces brain inflammation and excitotoxicity (an excess of certain neurotransmitters that causes damage to nerve cells)—two key mechanisms that lead to protection of the white

matter (myelin sheath) in the preterm brain.

Promotes long-term improvement

"Ours is the first large study to show magnesium sulfate promotes a long-term improvement in brain inflammation and myelination," Dr. Galinsky said.

"We know that magnesium sulfate is recommend for fetal neuroprotection globally but until now there was a lack of knowledge around which babies would benefit."

"The evidence from this study supports the use of magnesium sulfate for reducing brain inflammation and improving myelination in preterm infants deprived of oxygen," he said.

More information: Robert Galinsky et al, Magnesium sulphate reduces tertiary gliosis but does not improve EEG recovery or white or grey matter cell survival after asphyxia in preterm fetal sheep, *The Journal of Physiology* (2023). DOI: 10.1113/JP284381

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