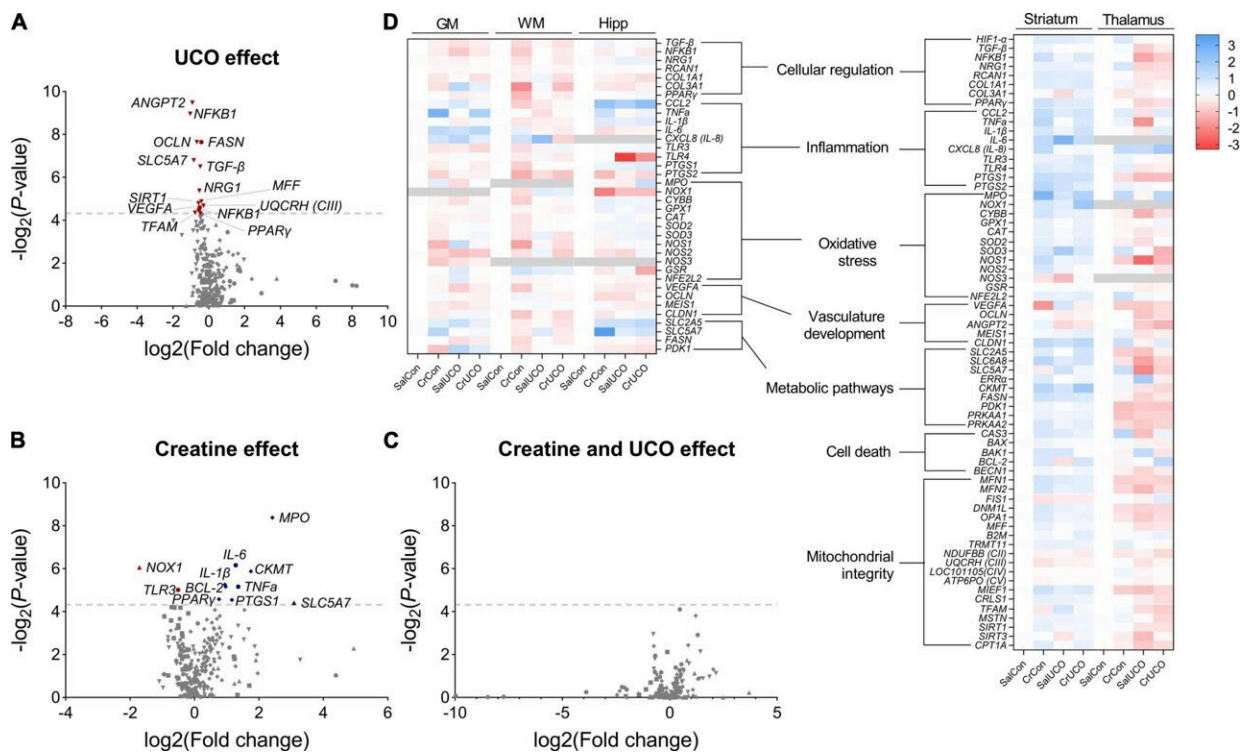


# Examining the benefits of creatine for mothers and babies

May 30 2023



Volcano plot visualizations of (A) umbilical cord occlusion (UCO) and (B) creatine main effects, and (C) SalUCO vs. CrUCO post-hoc comparisons. Volcano plots show fold change [ $\log_2(\text{fold change})$ ; i.e.,  $\log_2(\text{fold change} = 2) = 1$ ; x-axis] and all gene expression changes [ $-\log_2(\text{adjusted } P\text{-value})$ ; y axis] in all brain regions: GM (●), WM (■), hippocampus (▲), striatum (◆) and thalamus (▼). Gray dashed line represents a  $P$ -value of 0.05 [ $-\log_{10}(0.05) \approx 4.139$ ]. Names of genes with  $P$  (D) Heat map representation of gene expression determined by reverse transcription-quantitative polymerase chain reaction (RT-qPCR) within saline control (SalCon;  $n = 5$ ), creatine control (CrCon;  $n = 7$ ), saline UCO (SalUCO;  $n = 7$ ) and creatine UCO (CrUCO;  $n = 6$ ) fetuses. Brain regions

analyzed include cortical gray matter (GM); white matter (WM); hippocampus (Hipp); striatum; and thalamus. Red indicates downregulation of mRNA expression; blue indicates upregulation relative to saline controls. Data are average  $\log_2$  transformed fold change. Credit: *Frontiers in Cellular Neuroscience* (2023). DOI: 10.3389/fncel.2023.1154772

The benefits of creatine are well known for helping with muscle performance, and now attention has turned to whether it can help mothers and babies have a safer birth.

Restricted [oxygen delivery](#) to the baby at birth can have severe, long-term impacts including organ damage, [developmental delay](#), [cerebral palsy](#), autism, neurological and mental health disorders, seizures, behavioral issues, ADHD or hearing impairment.

This latest research from a team led by Dr. Stacey Ellery and Dr. Nhi Tran at Hudson Institute of Medical Research, and published in the journal *Frontiers in Cellular Neuroscience*, tested dietary creatine as a supplement during pregnancy to prevent these problems.

## **Creatine benefits energy production**

Dr. Ellery, who chose to use creatine during her own pregnancy, said there is growing evidence that creatine may be essential for [energy production](#) in many facets of conception and maternal health, as well as for the growing and developing baby.

"Creatine is the fuel for the 'backup energy battery' of many vital cells in the brain, so we have been studying its use in cases of energy failure in the fetal brain when oxygen levels drop, and whether this simple supplement can prevent injury," she said.

"The theory is that by providing more charge for this battery through [dietary supplements](#), cells have a greater capacity to maintain energy turnover when oxygen levels drop. This ultimately reduces the build-up of nasty by-products, including [reactive oxygen species](#) and inflammatory molecules, reducing [cell death](#) and maintaining brain health."

This is the most comprehensive assessment of the health of multiple cell populations, across several key regions of the fetal brain, following long-term exposure to high creatine in utero and birth asphyxia.

## **Protective benefits of creatine**

And the results suggest that there are protective benefits of creatine to be had, though more research is required.

"Together with the extensive data already produced by our group, it provides evidence to support a clinical trial of dietary creatine in pregnancy, something we are working towards undertaking in the next two-three years once pre-clinical studies and provisional work to ensure an effective dose and safety are finalized," Dr. Ellery said.

"Much like the introduction of folate to reduce neural tube deficits, creatine could become a standard pregnancy supplement to safeguard against poor neurological outcomes in babies. Importantly, this is a treatment that could be accessible for all babies, regardless of their geography or economic circumstances."

**More information:** Nhi T. Tran et al, Creatine in the fetal brain: A regional investigation of acute global hypoxia and creatine supplementation in a translational fetal sheep model, *Frontiers in Cellular Neuroscience* (2023). [DOI: 10.3389/fncel.2023.1154772](https://doi.org/10.3389/fncel.2023.1154772)

Provided by Hudson Institute of Medical Research

Citation: Examining the benefits of creatine for mothers and babies (2023, May 30) retrieved 20 June 2024 from <https://medicalxpress.com/news/2023-05-benefits-creatine-mothers-babies.html>

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