THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

NUTRITION RESEARCH INSTITUTE

EATUNIQUELY

Factors affecting Early Neurologic Development in Humans and Animal Models

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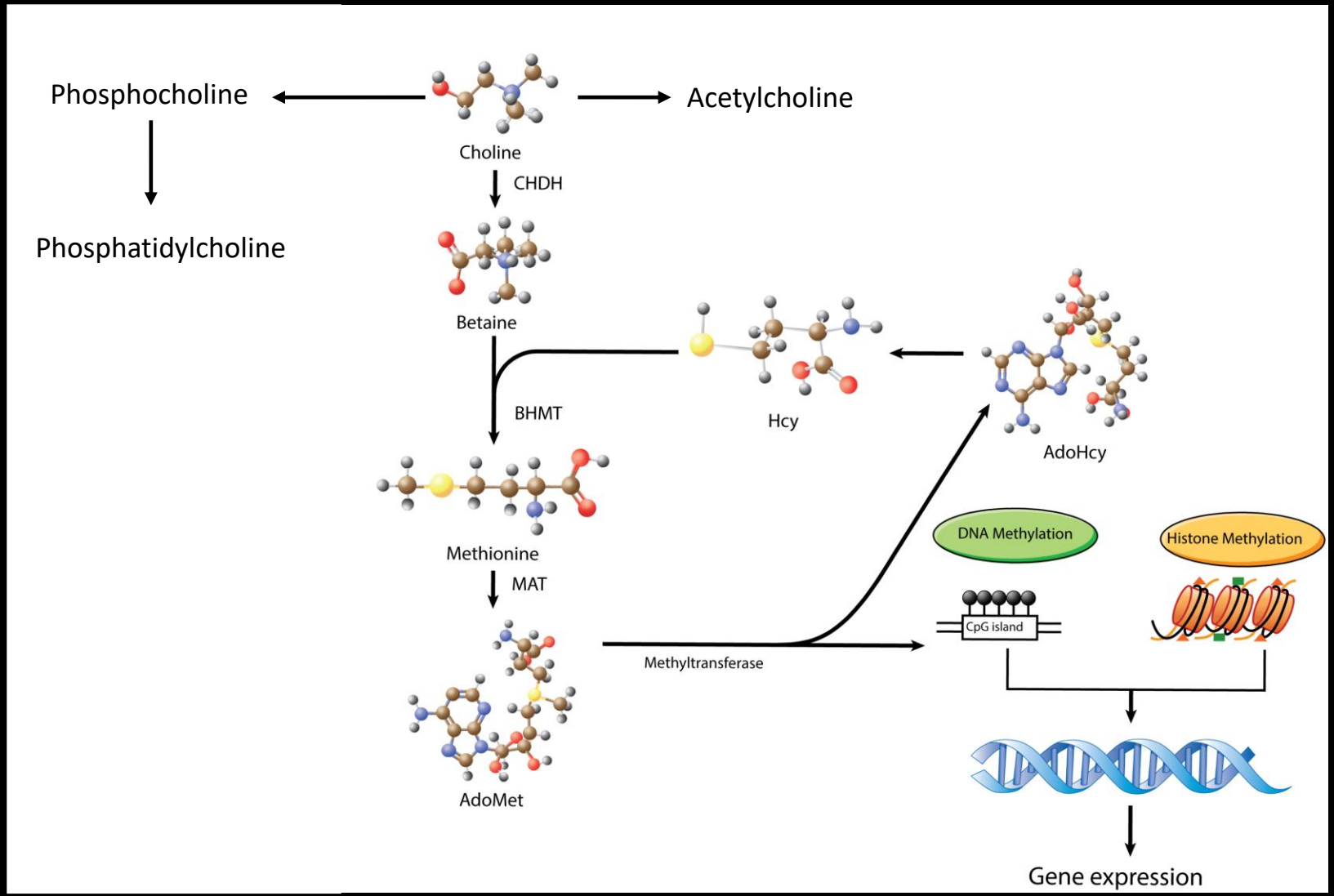
Research Assistant Professor
UNC-Chapel Hill

CHOLINE METABOLISM



Trujillo-Gonzalez & Steven Zeisel. Choline. PKN. 2020. (Modified)

SOURCES OF CHOLINE

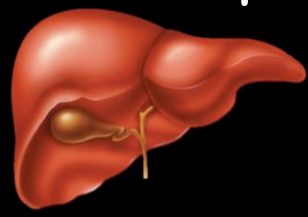
DIET

ENDOGENOUS SYNTHESIS

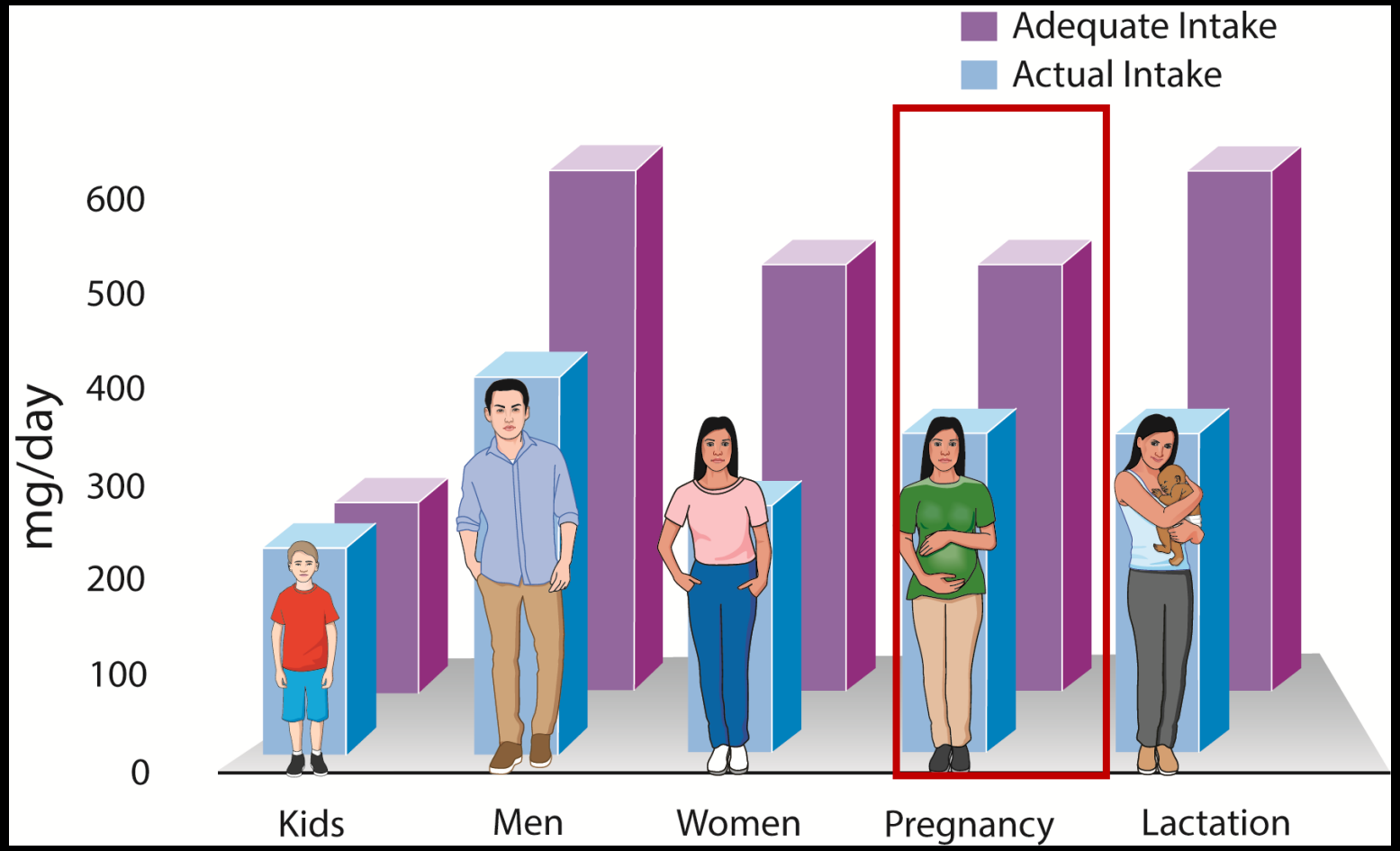
Phosphatidylethanolamine – *N*- methyltransferase (PEMT)

3 *S*-adenosylmethionine + phosphatidylethanolamine

phosphatidylcholine



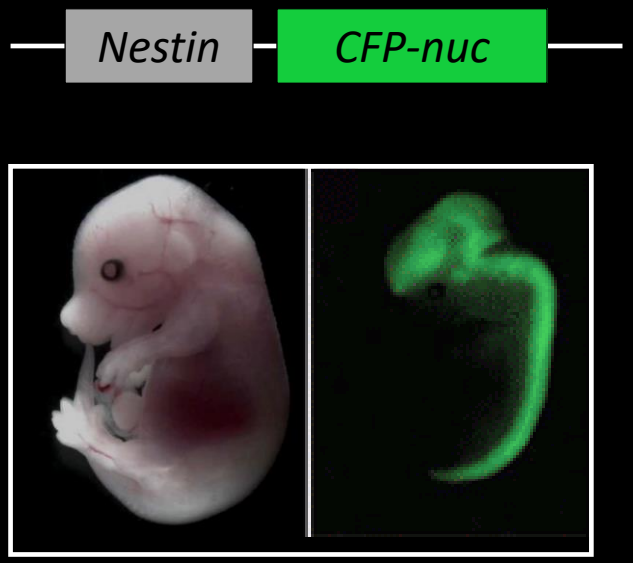
MOST AMERICANS DO NOT ACHIEVE ADEQUATE INTAKE FOR CHOLINE



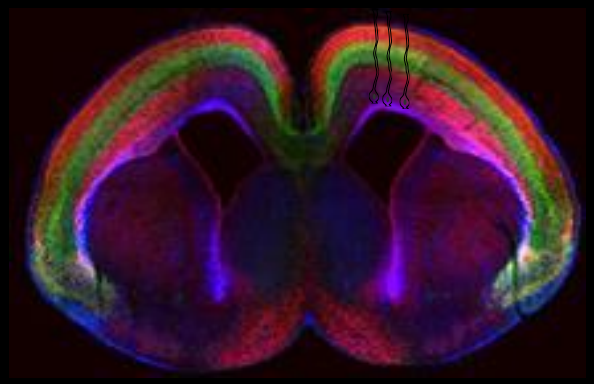
Trujillo-Gonzalez & Steven Zeisel. Choline. PKN. 2020.

CHOLINE AND BRAIN DEVELOPMENT

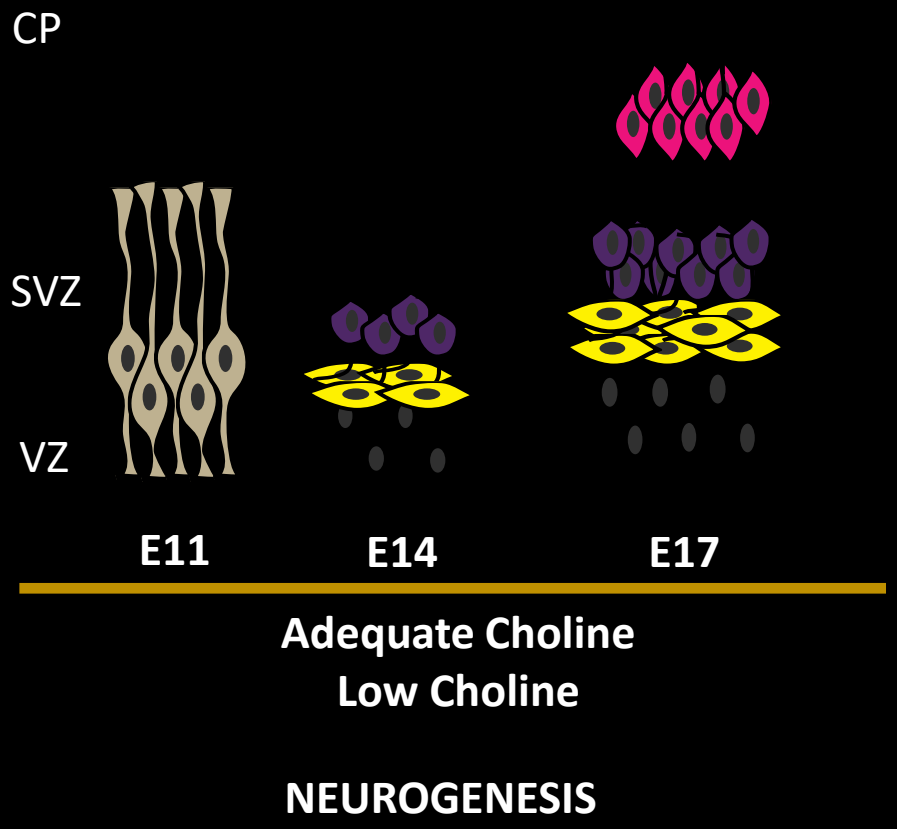
Nestin-CFPnuc transgene



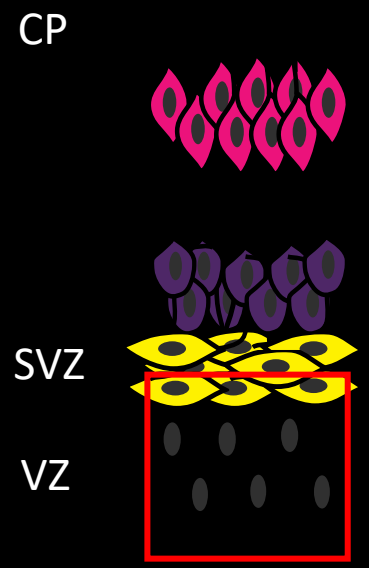
Cerebral Cortex

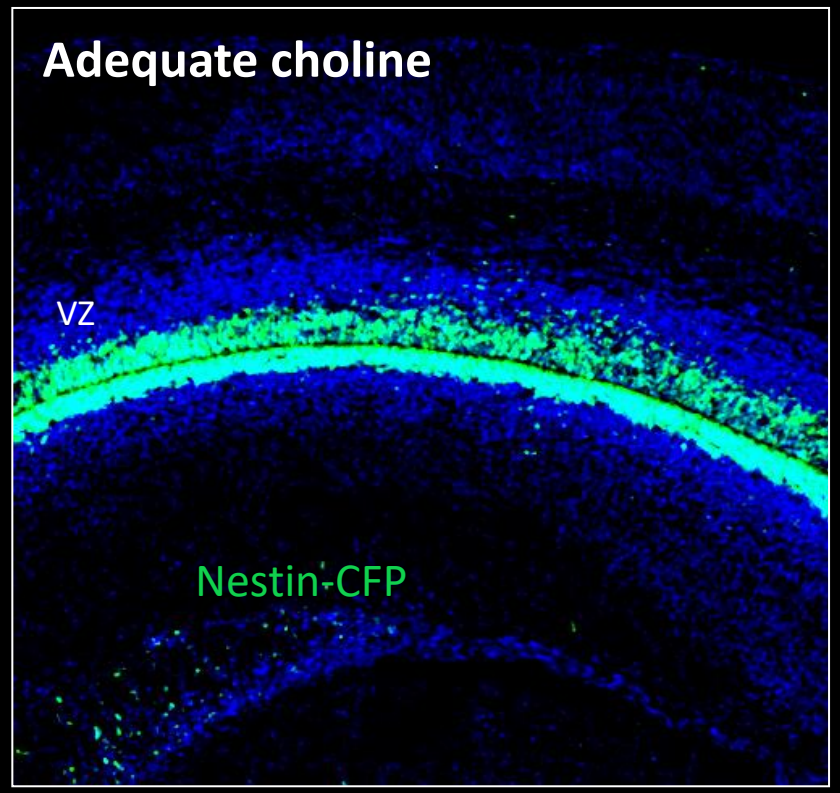


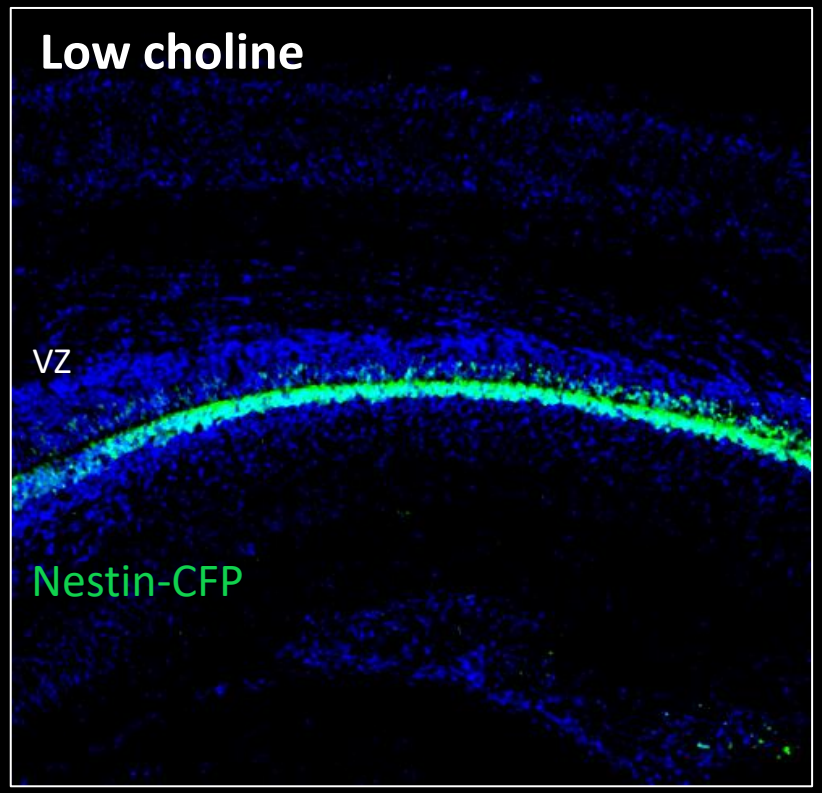
Cerebral Cortex Development



LOW CHOLINE REDUCES THE NUMBER OF NEURAL PROGENITOR CELLS

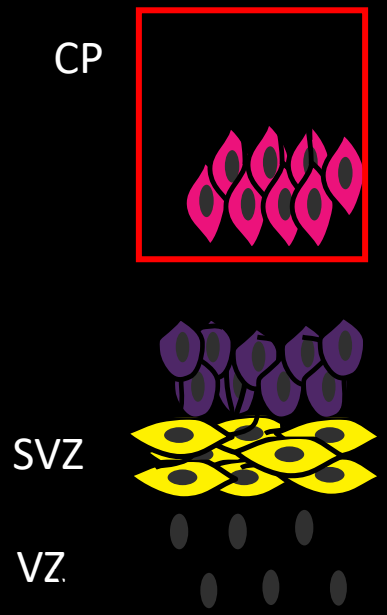


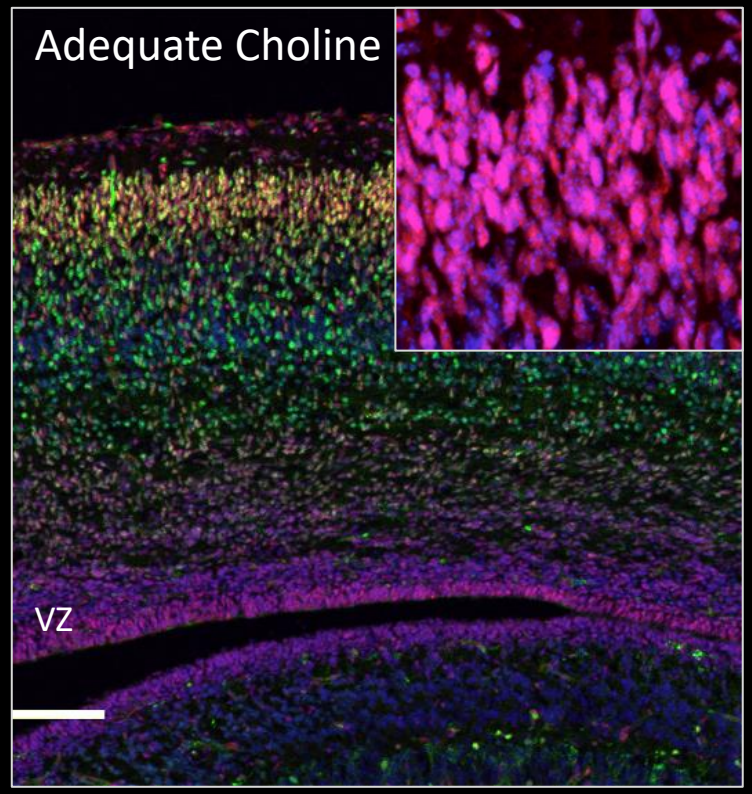




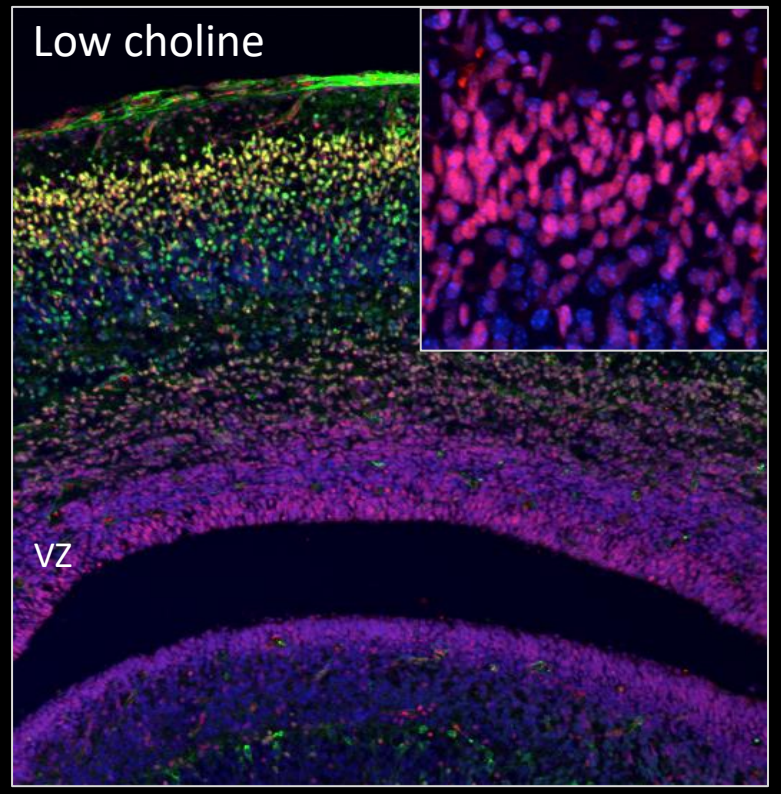
Wang Y, *et al*. (2015). Maternal dietary intake of choline in mice regulates development of the cortex in the offspring FASEB J.

LOW CHOLINE REDUCES THE GENESIS OF CORTICAL NEURONS





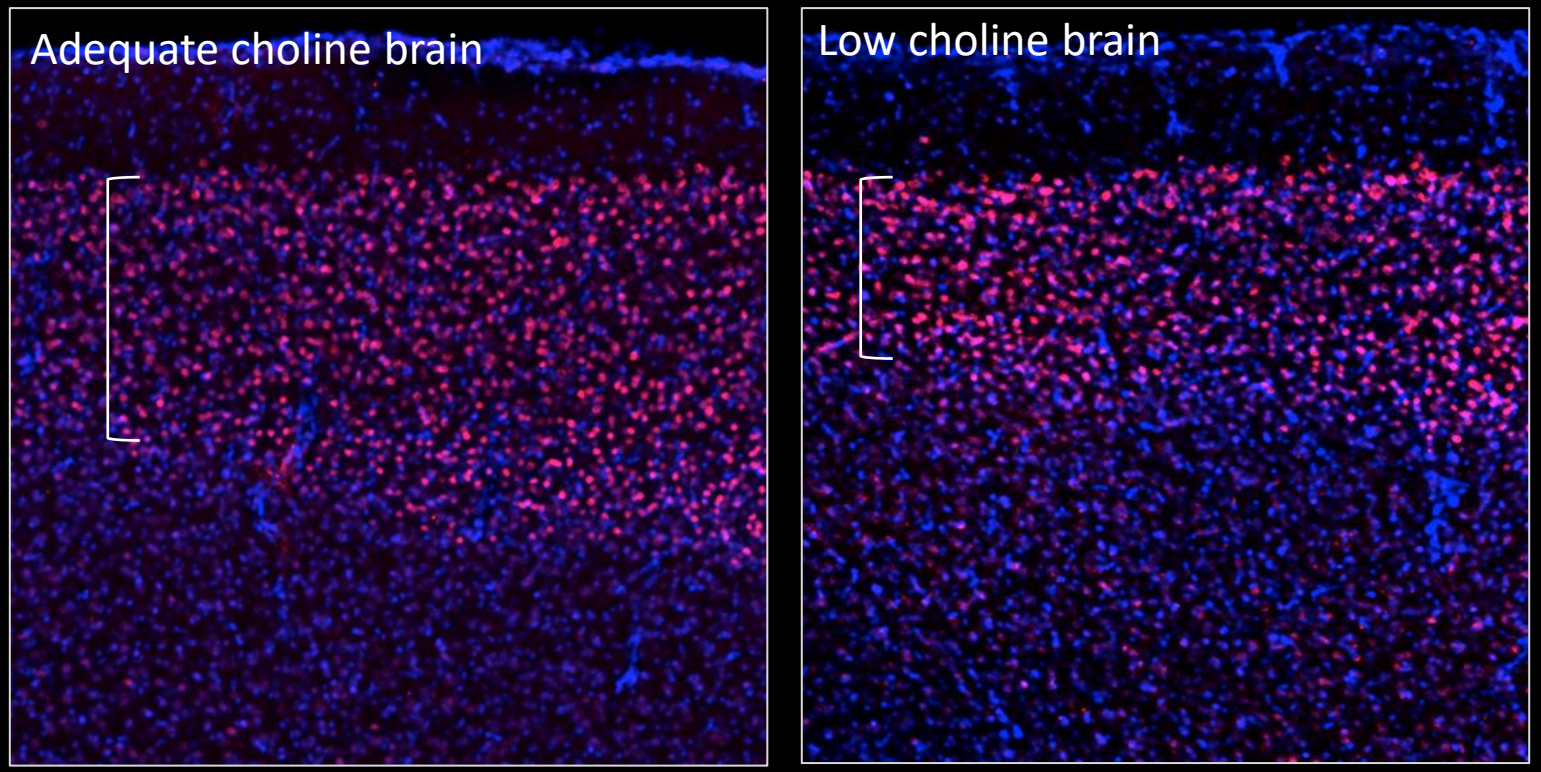
DAPI Satb2 Cux1



DAPI Satb2 Cux1

Wang Y, *et al*. (2015). Maternal dietary intake of choline in mice regulates development of the cortex in the offspring FASEB J.

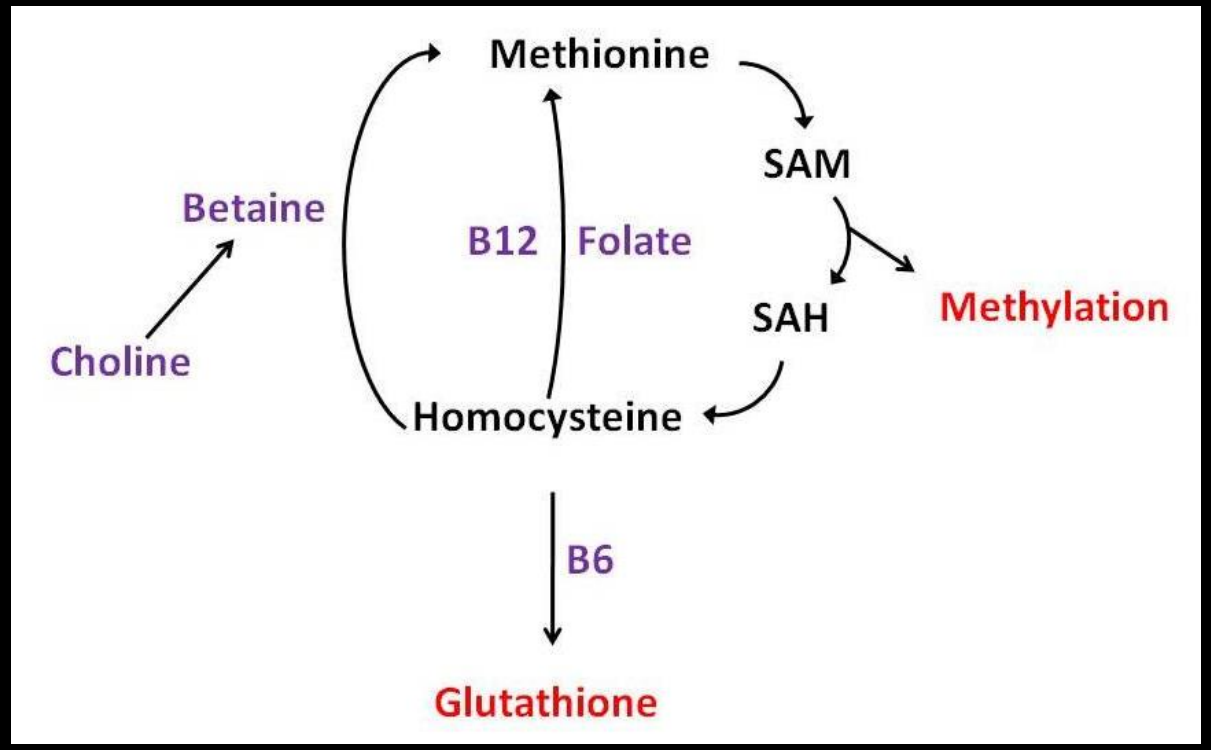
THE DEFECT IN CORTICAL LAYER FORMATION IN PERMANENT

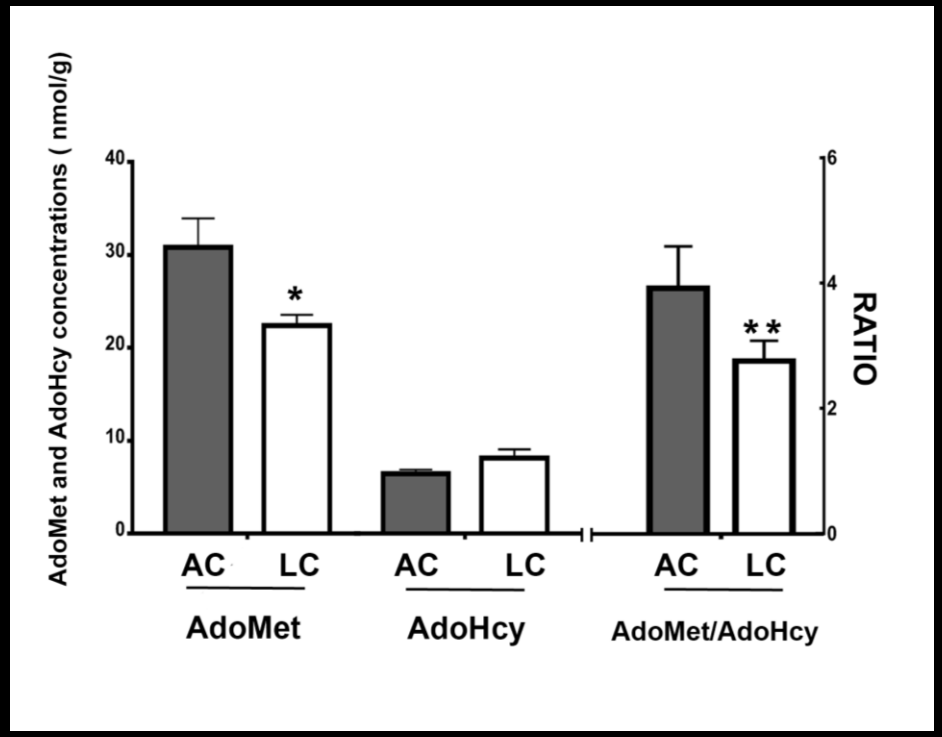


Adult

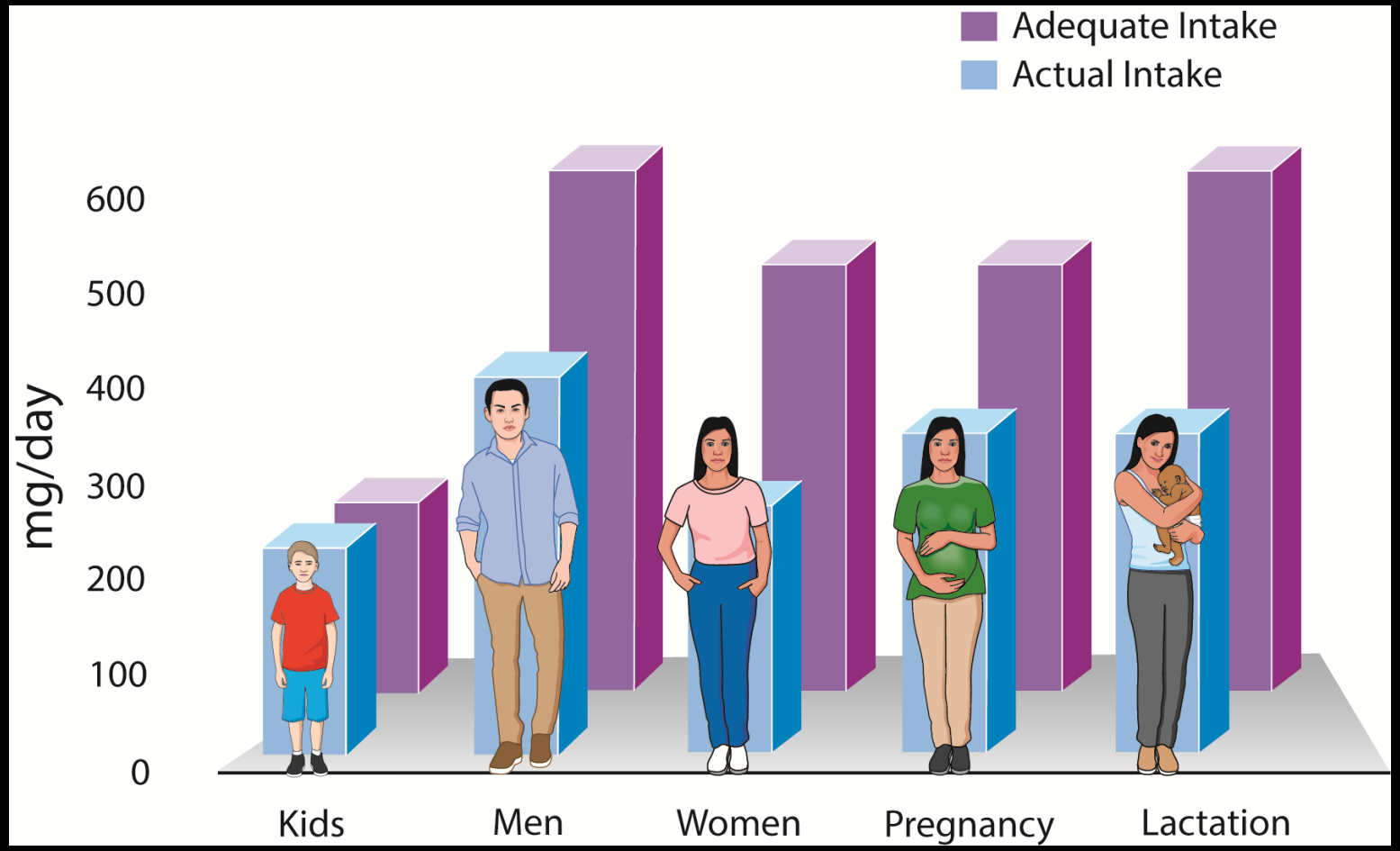
By what mechanism does choline mediate these effects?

LOW CHOLINE REDUCES METHYLATION POTENTIAL IN NEURAL PROGENITOR CELS





MOST AMERICANS DO NOT ACHIEVE ADEQUATE INTAKE FOR CHOLINE



Trujillo-Gonzalez & Steven Zeisel. Choline. PKN. 2020.

CHOLINE INTAKE DURING PREGNANCY IN HUMANS.

Original Contribution

Choline Intake During Pregnancy and Child Cognition at Age 7 Years

Caroline E. Boeke*, Matthew W. Gillman, Michael D. Hughes, Sheryl L. Rifas-Shiman, Eduardo Villamor, and Emily Oken

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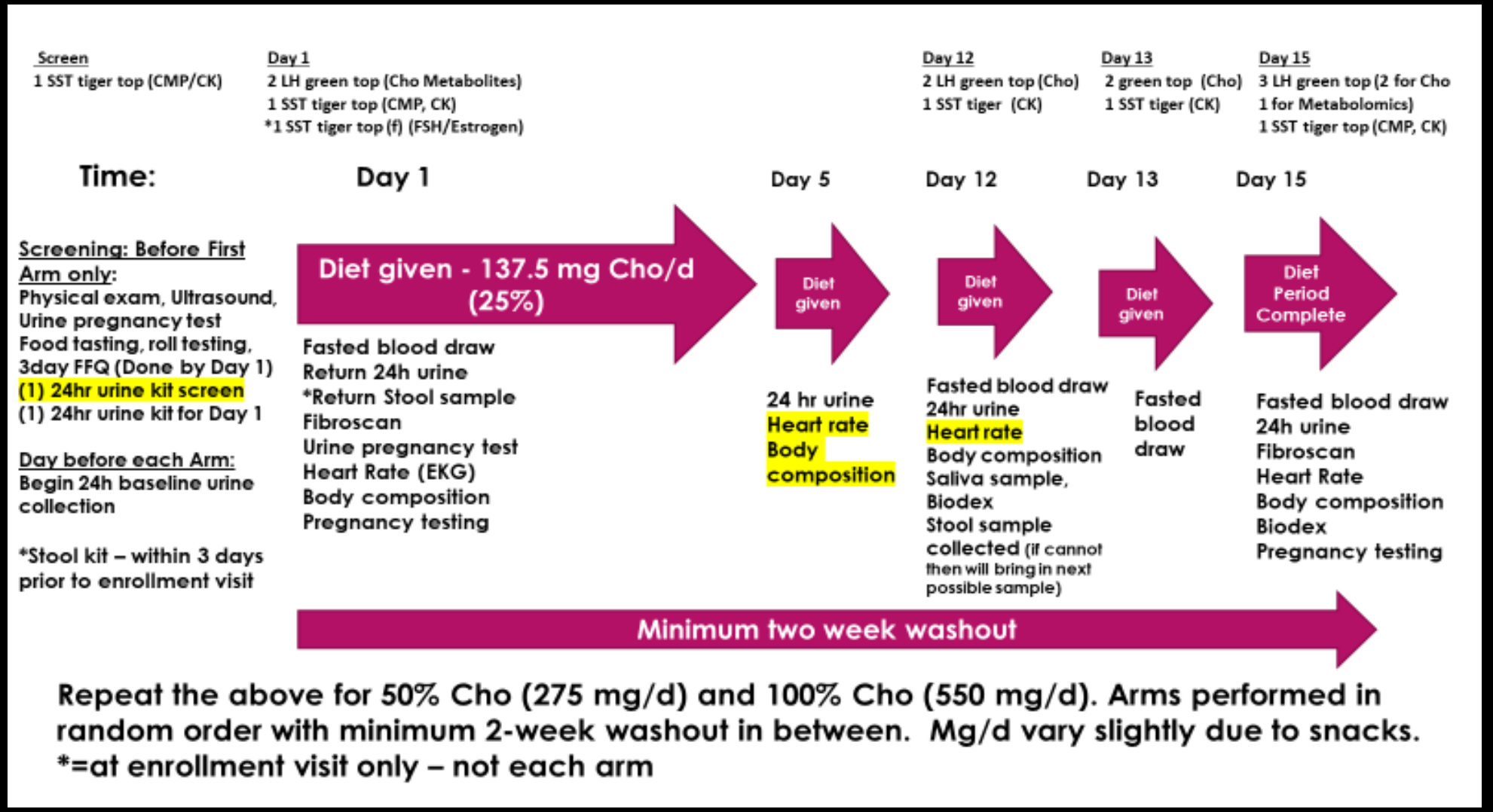
How do know if I am having enough choline?

CHOLINE BIOMARKER STUDY



FUTURE DIRECTIONS

- **Predisposition to neurodevelopmental disorders.**
- **Onset and progression of neurodegenerative disorders.**

High maternal choline consumption during pregnancy and nursing alleviates deficits in social interaction and improves anxiety-like behaviors in the BTBR T + Itpr3tf/J mouse model of autism

Erika A. Langley [1], Marina Krykbaeva [1], Jan Krzysztof Blusztajn, Tiffany J. Mellott

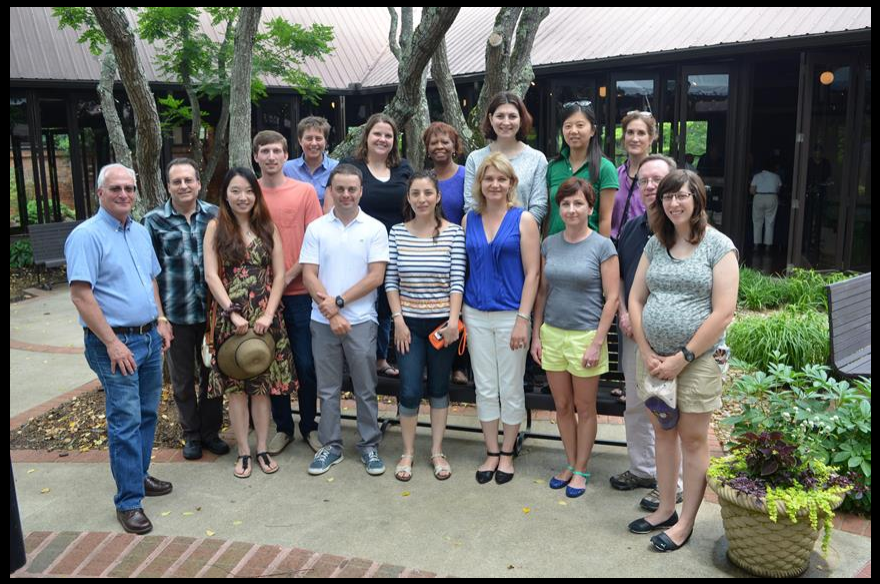
Research Article

Choline Supplementation Ameliorates Behavioral Deficits and Alzheimer's Disease-Like Pathology in Transgenic *APP/PS1* Mice

Yanyan Wang, Xingying Guan, Xuedan Chen, Yulong Cai, Yuanyuan Ma, Jiming Ma, Qiming Zhang, Limeng Dai, Xiaotang Fan, Yun Bai

Thank you!

Choline group



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- **Natalia Surzenko, PhD**
- Yanyan Wang, PhD
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