

[Birth Defects Res A Clin Mol Teratol.](#) 2010 Aug 12. [Epub ahead of print]

## Prenatal choline supplementation mitigates behavioral alterations associated with prenatal alcohol exposure in rats.

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### Abstract

**BACKGROUND:** Prenatal alcohol exposure can alter physical and behavioral development, leading to a range of fetal alcohol spectrum disorders. Despite warning labels, pregnant women continue to drink alcohol, creating a need to identify effective interventions to reduce the severity of alcohol's teratogenic effects. Choline is an essential nutrient that influences brain and behavioral development. Recent studies indicate that choline supplementation can reduce the teratogenic effects of developmental alcohol exposure. The present study examined whether choline supplementation during prenatal ethanol treatment could mitigate the adverse effects of ethanol on behavioral development.

**METHODS:** Pregnant Sprague-Dawley rats were intubated with 6 g/kg/day ethanol in a binge-like manner from gestational days 5-20; pair-fed and ad libitum chow controls were included. During treatment, subjects from each group were intubated with either 250 mg/kg/day choline chloride or vehicle. Spontaneous alternation, parallel bar motor coordination, Morris water maze, and spatial working memory were assessed in male and female offspring.

**RESULTS:** Subjects prenatally exposed to alcohol exhibited delayed development of spontaneous alternation behavior and deficits on the working memory version of the Morris water maze during adulthood, effects that were mitigated with prenatal choline supplementation. Neither alcohol nor choline influenced performance on the motor coordination task.

**CONCLUSIONS:** These data indicate that choline supplementation during prenatal alcohol exposure may reduce the severity of fetal alcohol effects, particularly on alterations in tasks that require behavioral flexibility. These findings have important implications for children of women who drink alcohol during pregnancy. Birth Defects Research (Part A), 2010. (c) 2010 Wiley-Liss, Inc.

PMID: 20706995 [PubMed - as supplied by publisher]

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