

# Effects of Ethanol (Alcohol) Exposure on the Embryo

Recent Animal Research Data

Compiled by Teresa Kellerman

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**Ethanol induces cell death during the formation of new brain cells.** Effects of gangliosides on ethanol-induced neurodegeneration in the developing mouse brain. Alcohol Clin Exp Res. 2007 Apr;31(4):665-74.  
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**Ethanol disrupts the proliferation and differentiation of brain cells.** Embryonic cerebral cortical progenitors are resistant to apoptosis, but increase expression of suicide receptor DISC-complex genes and suppress autophagy following ethanol exposure. Alcohol Clin Exp Res. 2007 Apr;31(4):694-703  
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**Ethanol suppresses breathing movements during time before birth.** Effects of ethanol exposure on the embryo-fetus: experimental considerations, mechanisms, and the role of prostaglandins. Can J Physiol Pharmacol. 1991 May;69(5):550-69.  
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**Ethanol alters common signaling pathways causing shift in cell motion and metabolism.** Reprogramming of genetic networks during initiation of the Fetal Alcohol Syndrome. Dev Dyn. 2007 Feb;236(2):613-31  
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**Ethanol alters expression of certain genes involved in cell proliferation, differentiation, tissue growth, brain cell growth and survival.** Gene-expression analysis after alcohol exposure in the developing mouse. J Lab Clin Med. 2005 Jan;145(1):47-54.  
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**Ethanol yields ocular and forebrain abnormalities after early exposure.** Maternal oral intake mouse model for fetal alcohol spectrum disorders: ocular defects as a measure of effect. Alcohol Clin Exp Res 2006 Oct;30(10):1791-8  
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**Ethanol alters genetic expression of tissue in craniofacial areas resulting in smaller face, eyes, nose, and jaw, and underdevelopment or cleft in lip or palate.** Differential gene profiles in developing embryo and fetus after in utero exposure to ethanol. J Toxicol Environ Health A. 2004 Dec;67(23-24):2073-84  
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**Ethanol changes the expression of certain genes in the developing neural tube during early stages of development that results in damage to the central nervous system.** Identity and neuroanatomical localization of messenger RNAs that change expression in the neural tube of mouse embryos within 1 h after ethanol exposure. Brain Res Dev Brain Res. 2003 Aug 12;144(1):9-23  
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**Ethanol compromises development of the midline neural tube and forebrain.** Neurotox Res 2002 Jun; 4 (4) 337-42 Developmental Brain Research 144 (2003) 43–55.  
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**Ethanol alters dopamine levels that affect behavior and disrupt the reward cycle in the brain.** Moderate-level prenatal alcohol exposure alters striatal dopamine system function in rhesus monkeys. Alcohol Clin Exp Res. 2005 Sep;29(9):1685-97  
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**Ethanol slows the migration and reduces the development of serotonin neurons by 20%-30%.** Prenatal alcohol exposure retards the migration and development of serotonin neurons in fetal C57BL mice. Developmental Brain Research, Volume 126, Issue 2, 28 February 2001, pp 147-155  
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**Ethanol impacts the limbic system and reduces capacity to adapt to maternal separation and other stress.** Moderate level alcohol during pregnancy, prenatal stress, or both and limbic-hypothalamic-pituitary-adrenocortical axis response to stress in rhesus monkeys. Child Dev. 2004 Jan-Feb;75(1):96-109.  
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**Ethanol oxidizes proteins in the hippocampus resulting in long-lasting behavioral alterations.** Difluoromethylornithine decreases long-lasting protein oxidation induced by neonatal ethanol exposure in the hippocampus of adolescent rats. Alcohol Clin Exp Res. 2007 May;31(5):887-94. Epub 2007 Mar 26  
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**Ethanol may cause alterations in GABA(A) receptor expression in the hippocampus, thus contributing to behavioral disorders and difficulties with spatial learning.** Chronic prenatal ethanol exposure alters hippocampal GABA(A) receptors and impairs spatial learning in the guinea pig. Behav Brain Res. 2004 Apr 2;150(1-2):117-25  
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**Ethanol increases levels of maternal cortisol (stress hormone) that can have negative impact on fetal brain development.** Chronic prenatal ethanol exposure alters glucocorticoid signaling in the hippocampus of the postnatal Guinea pig. J Neuroendocrinol. 2005 Sep;17(9):600-8  
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**Ethanol can disrupt production of oxytocin later in life in females, interfering with bonding and maternal behaviors.** Sexually Dimorphic Effects of Alcohol Exposure during Development on the Processing of Social Cues. Alcohol and Alcoholism. 2009 Nov-Dec;44(6):555-60.  
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