

Effects of Ethanol (Alcohol) Exposure on the Embryo

Recent Animal Research Data

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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.
<http://anatomy.iupui.edu/anatfaculty/zhoupub/2003-FAS-Midline.pdf>

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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Ethanol causes long-term disruption in regulation of vasopressin, a neurotransmitter associated with social behaviors, bonding and mating, as well as recognition of facial cues. Arginine vasopressin and body fluid homeostasis in the fetal alcohol exposed rat. Alcohol. 1989 May-Jun;6(3):193-8
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