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Authors: Ewa Jakubowska-Dogru, Birsen Elibol, Ilknur Dursun, Sinan Y*ürü*ker

PII: S0736-5748(17)30095-3
DOI: http://dx.doi.org/doi:10.1016/j.ijdevneu.2017.06.002
Reference: DN 2193

To appear in: *Int. J. Devl Neuroscience*

Received date: 13-3-2017
Revised date: 17-5-2017
Accepted date: 16-6-2017

Please cite this article as: Jakubowska-Dogru, Ewa, Elibol, Birsen, Dursun, Ilknur, Y*ürü*ker, Sinan, Effects of prenatal binge-like ethanol exposure and maternal stress on postnatal morphological development of hippocampal neurons in rats.International Journal of Developmental Neuroscience http://dx.doi.org/10.1016/j.ijdevneu.2017.06.002

Effects of prenatal binge-like ethanol exposure and maternal stress on postnatal morphological development of hippocampal neurons in rats.

Ewa Jakubowska-Dogru[a]*, PhD, Birsen Elibol[b], PhD; Ilknur Dursun[c], PhD; Sinan Yürüker[d], MD;

[a]Middle East Technical University, Faculty of Science and Arts, Department of Biological Sciences, Ankara, Turkey

[b]Bezmialem Vakif University, Faculty of Medicine, Department of Medical Biology, Istanbul, Turkey

[c]Istanbul Kemerburgaz University, Faculty of Medicine, Department of Physiology, Istanbul, Turkey

[d]Hacettepe University, Faculty of Medicine, Department of Histology and Embryology, Ankara, Turkey

***Correspondance to:** Ewa Jakubowska-Dogru, Department of Biological Sciences, Middle East Technical Universty, 06530 Ankara Turkey, Tel.: ± 90-312-210-51-86; Fax: ± 90-312-210-79-76; E-mail address: bioewa@metu.edu.tr

Highlights

- Postnatal development of hippocampal neurons lasted until weaning and was region-dependent.
- Prenatal ethanol and maternal intubation stress showed similar effects manifested as a small delay in the development of some morphological features.
- Dendritic arbor and spine development appeared to be most affected.

Abstract

BACKGROUND: Alcohol is one of the most commonly used drugs of abuse negatively affecting human health and it is known as a potent teratogen responsible for fetal alcohol syndrome (FAS), which is characterized by cognitive deficits especially pronounced in juveniles but ameliorating in adults. Searching for the potential morphological correlates of these effects, in this study, we compared the course of developmental changes in the morphology of principal hippocampal neurons in fetal-alcohol (A group), intubated control (IC group), and intact control male rats (C group) over a protracted period of the first two postnatal months.

METHODS: Ethanol was administered to the pregnant Wistar dams intragastrically, throughout gestation days (GD) 7–20, at a total dose of 6 g/kg/day resulting in the mean blood alcohol concentration (BAC) of 246.6±40.9 mg/dl. Ten morphometric parameters of Golgi-stained hippocampal neurons (pyramidal and granule) from CA1, CA3, and DG areas were examined at