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La temprana exposición al ruido puede afectar el comportamiento ansioso durante la adolescencia. Interacciones entre el tiempo de exposicion y la crianza en un ambiente enriquecido.

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LA TEMPRANA EXPOSICIÓN AL RUIDO PUEDE AFECTAR EL COMPORTAMIENTO ANSIOSO DURANTE LA ADOLESCENCIA. INTERACCIONES ENTRE EL TIEMPO DE EXPOSICIÓN Y LA CRIANZA EN UN AMBIENTE ENRIQUECIDO

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RESUMEN

Estudios previos mostraron que la exposición aguda al ruido (RA) de ratas inmaduras puede provocar alteraciones en comportamientos ansiosos (CA). Sin embargo, no se han evaluado aun los efectos de una exposición sub-aguda (RS). Por otra parte, la crianza en un ambiente enriquecido (AE) ha mostrado ser neuroprotectora ante diferentes injurias. El objetivo del presente trabajo fue evaluar posibles alteraciones en CA en ratas expuestas a RA y RS, y si la crianza en un AE es capaz de revertirlas. Ratas de 15 días fueron expuestas a ruido (95-97 dB, 2h) durante uno o cinco días consecutivos. Luego del destete, grupos de 3-4 ratas fueron transferidos a jaulas estándar o de AE. Una semana después, se realizó la prueba conductual del Laberinto en Cruz Elevado (EPM). El grupo de RA mostró un incremento de CA, mientras que el grupo RS presentó una disminución. Por otra parte, el AE fue capaz de prevenir las alteraciones provocadas por el RS, pero esto no fue posible para las ratas expuestas a RA. Estos resultados sugieren que diferentes tipos de exposición a una edad temprana pueden afectar de manera distinta el CA. Por otra parte, la crianza en un AE puede modificar algunos de los cambios producidos por una previa exposición al ruido.

Palabras clave
Ruido, Ansiedad, Comportamiento, Ambiente enriquecido

ABSTRACT

EARLY NOISE EXPOSURE INDUCES ANXIETY-LIKE BEHAVIORAL CHANGES DURING ADOLESCENSE. INTERACTIONS BETWEEN DIFFERENT NOISE SCHEDULES AND REARING IN AN ENRICHED ENVIRONMENT

Previous studies showed that acute exposure (AN) of immature rats can induce behavioral alterations, including changes in anxiety-like behaviors (AB). Nevertheless, no data on the behavioral effects induced in rats by a sub-acute (SN) exposure have been obtained yet. Moreover, rearing these animals in an enriched environment (EE) has shown to be an effective protective tool against different central nervous system injuries. Therefore, the aim of the present work w as to test the AB effects induced in rats after noise exposure using different schedules, and if EE can prevent them. Rats of 15 days were exposed to noise (95-97 dB, 2h) for one day or five consecutive days. After weaning, groups of 3-4 rats were transferred to EE or standard cages. One week later, Elevated Plus Maze (EPM) test was performed. While rats exposed to RA had an increase in AB, a decrease was found in SN exposed rats. Interestingly, EE rearing was fully effective in reverting AB changes in AN rats, but, it was unable to prevent the behavioral changes in SN rats. These findings suggest that different noise exposure schedules at an early developmental age might differentially affect AB. Moreover, rearing rats in EE might modify some of the changes induced by a previous exposure to noise.

Key words
Noise, Anxiety, Behavior, Enriched environment

BIBLIOGRAFÍA

Baldini, S., Restani, L., Baroncelli, L., Coltelli, M., Franco, R., Cenni, M.C., Maffei, L., Berardi, N., 2013. Enriched early life experi- ences reduce adult anxiety-like behavior in rats: a role for insulin-like growth factor 1. J. Neurosci. 33 (28), 11715–11723.

Cheng, L.,Wang, S.H., Chen, Q.C., Liao, X.M., 2011. Moderate noise induced cognition impairment of mice and its underlying mechanisms. Physiol. Behav. 104 (5), 981–988.

Cui, B., Wu, M., She, X., 2009. Effects of chronic noise exposure on spatial learning and memory of rats in relation to neuro- transmitters and NMDAR2B alteration in the hippocampus. J. Occup. Health 51 (2), 152–158.

Cui, B., Wu, M.Q., Zhu, L.X., She, X.J., Ma, Q., Liu, H.T., 2013. Effect of chronic noise exposure on expression of N-methyl-D aspartic acid receptor 2B and Tau phosphorylation in hippo- campus of rats. Biomed. Environ. Sci. 26 (3), 163–168.

Gannouni, N., Mhamdi, A., Tebourbi, O., El May, M., Sakly, M., Rhouma, K.B., 2013. Qualitative and quantitative assessment of noise at moderate intensities on extra-auditory system in adult rats. Noise Health 15 (67), 406–411.

Goble, T.J., Møller, A.R., Thompson, L.T., 2009. Acute high- intensity sound exposure alters responses of place cells in hippocampus. Hear. Res. 253 (1-2), 52–59.

Jáuregui-Huerta, F., García-Estrada, J., Ruvalcaba-Delgadillo, Y., Trujillo, X., Huerta, M., Feria-Velasco, A., Gonzalez-Perez, O., Luquín, S., 2011. Chronic exposure of juvenile rats to environmental noise impairs hippocampal cell proliferation in adulthood. Noise Health 13 (53), 286–291.

Jiang, C., Xu, X., Yu, L., Xu, J., Zhang, J., 2015. Environmental enrichment rescues the degraded auditory temporal resolu- tion of cortical neurons induced by early noise exposure. Eur. J. Neurosci. 42 (5), 2144–2154.

Kraus, K.S., Mitra, S., Jimenez, Z., Hinduja, S., Ding, D., Jiang, H., Gray, L., Lobarinas, E., Sun, W., Salvi, R.J., 2010. Noise trauma impairs neurogenesis in the rat hippocampus. Neuroscience 167 (4), 1216–1226.

Kujawa, S.G., Liberman, M.C., 2006. Acceleration of age-related hearing loss by early noise exposure: evidence of a misspent youth. J. Neurosci. 26 (7), 2115–2123.

Laviola, G., Hannan, A.J., Macri, S., Solinas, M., Jaber, M. (2008). Effects of enriched environment on animal models of neurodegenerative diseases and psychiatric disorders. Neurobiol. 31:159-168.

Lores-Arnaiz, S., Bustamante, J., Arismendi, M., Vilas, S., Paglia, N., Basso, N., Capani, F., Coirini, H., Costa, J.J., Arnaiz, M.R., 2006. Extensive enriched environments protect old rats from the aging dependent impairment of spatial cognition, synap- tic plasticity and nitric oxide production. Behav. Brain Res. 169 (2), 294–302.

Molina S.J., Miceli, M. and Guelman, L.R. (2016). Noise exposure and oxidative balance in auditory and extra-auditory structures in adult and developing animals. Pharmacological approaches aimed to minimize its effects. Pharmacological Research pp. 86-91

Molina, S.J., Capani, F. & Guelman, L.R. (2016). Noise exposure of immature rats can induce different age-dependent extra-auditory alterations that can be partially restored by rearing animals in an enriched environment. Brain Res. 1636:52-61.

Petrosini, L., De Bartolo, P., Foti, F., Gelfo, F., Cutuli, D., Leggio, M. G., Mandolesi, L., 2009. On whether the environmental enrichment may provide cognitive and brain reserves. Brain Res. Rev. 61 (2), 221–239.

Pienkowski, M., Eggermont, J.J., 2012. Reversible long-term changes in auditory processing in mature auditory cortex in the absence of hearing loss induced by passive, moderate- level sound exposure. Ear Hear. 33 (3), 305–314.

Sakurai, Y., 2002. Coding of auditory temporal and pitch information by hippocampal individual cells and cell assemblies in the rat. Neuroscience 115 (4), 1153–1163.

Säljö , A., Mayorga, M., Bolouri, H., Svensson, B., Hamberger, A., 2011. Mechanisms and pathophysiology of the low-level blast brain injury in animal models. Neuroimage 54 (Suppl. 1), S83–S88

Uran, S.L., Gómez-Casati, M.E., Guelman, L.R., 2014. Long-term recovery from hippocampal-related behavioral and biochemical abnormalities induced by noise exposure during brain development. Evaluation of auditory pathway integrity. Int. J. Dev.Neurosci.37,41–51.

Uran, S.L., Aon-Bertolino, L., Caceres, L.G., Capani, F., Guelman, L. R., 2012. Rat hippocampal alterations could underlie behavioral abnormalities induced by exposure to moderate noise levels.BrainRes.1471,1–12.

Uran, S.L., Caceres, L.G., Guelman, L.R., 2010. Effects of loud noise on hippocampal and cerebellar-related behaviors. Role of oxidative state. BrainRes.1361,102–114.

Wang, X., 2004. The unexpected consequences of a noisy envir onment. Trends Neurosci. 27 (7), 364–366.