

The Effects of Haloperidol on Acute Carrageenan-Induced Inflammation

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Abstract

© 2017, Springer Science+Business Media New York. The objective of the study was to assess potential anti-inflammatory or pro-inflammatory effects of haloperidol, a classic typical neuroleptic, a butyrophenone derivative. It has been hypothesized that the anti-inflammatory mechanisms of some psychotropic drugs might become a rationale for their use for potential prevention of neurodegenerative diseases, including Alzheimer's, which are known to include chronic inflammation as disease progression component. We looked at the effects of haloperidol on the acute carrageenan-induced inflammation of rat paws and showed that haloperidol with prolonged use (for 7 days prior to edema modeling) considerably increased the inflammatory response at 48 h. A single dose of haloperidol also stimulated the progression of inflammation but at earlier time points—at 3 and 4 h after carrageenan injection.

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Keywords

Acute inflammation, Carrageenan, Haloperidol, Rats

References

- [1] Miller, B. J., Buckley, P., Seabolt, W., Mellor, A., & Kirkpatrick, B. (2011). Meta-analysis of cytokine alterations in schizophrenia: clinical status and antipsychotic effects. *Biological Psychiatry*, 70, 663–671.
- [2] Potvin, S., Stip, E., Sepelhy, A. A., Gendron, A., Bah, R., & Kouassi, E. (2008). Inflammatory cytokine alterations in schizophrenia: a systematic quantitative review. *Biological Psychiatry*, 63, 801–808.
- [3] Schubert, P., Morino, T., Miyazaki, H., et al. (2000). Cascading glia reactions: a common pathomechanism and its differentiated control by cyclic nucleotide signaling. *Annals of the New York Academy of Sciences*, 903, 24–33.
- [4] Cotel, M. C., Lenartowicz, E. M., Natesan, S., Modo, M. M., Cooper, J. D., Williams, S. C., Kapur, S., & Vernon, A. C. (2015). Microglial activation in the rat brain following chronic antipsychotic treatment at clinically relevant doses. *European Neuropsychopharmacology*, 25(11), 2098–2107. doi:10.1016/j.euroneuro.2015.08.004.
- [5] Tourjman, V., Kouassi, É., Koué, M. È., Rocchetti, M., Fortin-Fournier, S., Fusar-Poli, P., & Potvin, S. (2013). Antipsychotics' effects on blood levels of cytokines in schizophrenia: a meta-analysis. *Schizophrenia Research*, 151, 43–47.
- [6] Nassar, A., Sharon-Granit, Y., & Azab, A. N. (2016). Psychotropic drugs attenuate lipopolysaccharide-induced hypothermia by altering hypothalamic levels of inflammatory mediators in rats. *Neuroscience Letters*, 626, 59–67. doi:10.1016/j.neulet.2016.05.019.
- [7] Khaziakhmetova, V. N., & Ziganshina, L. E. (2012). Anti-inflammatory properties of antidepressants (a review of experimental results) (review). *Ekspieriment'naya i Klinicheskaya Farmakologiya*, 75(11), 38–43.
- [8] Hashioka S. Anti-neuroinflammatory effects of psychopharmaceuticals: further than monoamine modulators //mini-reviews in Medicinal Chemistry. 2011. V.11(7). P.553-554.

- [9] Hashioka, S., McGeer, P. L., Monji, A., & Kanba, S. (2009). Anti-inflammatory effects of antidepressants: possibilities for preventives against Alzheimer's disease. *Central Nervous System Agents in Medicinal Chemistry*, 9(1), 9-12.
- [10] Ballard CG, Waite J, Birks J (2006). Atypical antipsychotics for aggression and psychosis in Alzheimer's disease. *Cochrane Database of Systematic Reviews*. (1):CD003476. doi: 10.1002/14651858.CD003476.pub2.
- [11] Cruz Jung IE, Machado AK, da Cruz IB, Barbisan F, Azzolin VF, Duarte T, Duarte MM, Do Prado-lima PA, Bochi GV, Scola G, Moresco RN Haloperidol and Risperidone at high concentrations activate an in vitro inflammatory response of RAW 264.7 macrophage cells by induction of apoptosis and modification of cytokine levels. *Psychopharmacology* 2016 May;233(9):1715-1723. doi: 10.1007/s00213-015-4079-7
- [12] Baumeister, D., Ciufolini, S., & Mondelli, V. (2016). Effects of psychotropic drugs on inflammation: consequence or mediator of therapeutic effects in psychiatric treatment? *Psychopharmacology*, 233, 1575. doi:10.1007/s00213-015-4044-5.
- [13] On the approval of the Rules of Laboratory Practice: order of the Health Ministry of the Russian Federation dated August 23, 2010 N 708n: Registered at the Ministry of Justice of the Russian Federation, October 13, 2010 N 18713//Ros.gaz. October 22, 2010.
- [14] (1986) <http://www.lawmix.ru/abro.php?id=11036> (accessed: 29.04.2016). Online resource: European Convention for the protection of vertebrate animals used for experimental and other scientific purposes.
- [15] Ialenti A., Ianaro A., Monaco S. *Eur.J. Pharmacol.* 1992. V.211 (4). P.177-182.
- [16] Winter, A., Risley, E. A., & Nuss, G. W. (1962). *Proceedings of the Society for Experimental Biology and Medicine*, 111, 544-547.
- [17] Posadas, I., Bucci, M., Roviezzo, F., Rossi, A., et al. (2004). *British J. of Pharm*, 142, 331-338.
- [18] Hanh, C. H., Khaziakhmetova, V. N., & Ziganshina, L. E. (2015). Modeling inflammatory edema: are the models interchangeable. *Ekspierimental'naya i Klinicheskaya Farmakologiya.*, 78(7), 24-31.
- [19] Khaziakhmetova, V. N., Valeeva, I. H., & Ziganshina, L. E. (2011). Anti-inflammatory effects of amitriptyline, diazepam and mebicar on carrageenan-induced paw edema in rats. *Ekspierimental'naya i Klinicheskaya Farmakologiya*, 74(12), 19-22.
- [20] Khaziakhmetova, V. N., Luchai, K. V., & Ziganshina, L. E. (2015). Experimental comparative study of the analgesic activity of the diurnal anxiolytic mebicar, amitriptyline, and diazepam. *Ekspierimental'naya i Klinicheskaya Farmakologiya*, 78(3), 9-12.
- [21] (2016) Federal drug registry: http://www.rlsnet.ru/mnn_index_id_114.htm accessed September 2016.
- [22] Ziganshina, L. E., Lepahin, V. K., Petrov, V. I., Habriev, R. W. (Eds.). (2011). *Bol'shoj spravochnik lekarstvennyh sredstv*. Moscow: GEOTAR Media. 3344 p. ISBN 978-5-9704-1887-1.