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Mechanisms Involved in Superiority of Angiotensin Receptor Blockade over ACE Inhibition in Attenuating Neuropathic Pain Induced in Rats

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Although previous reports described the beneficial role of angiotensin-converting enzyme inhibitors (ACE-Is) or AT1 receptor blockers (arbs) in attenuating neuropathic pain (NP), no study has yet explored the exact underlying mechanisms, as well as the superiority of using centrally versus peripherally acting renin–angiotensin–aldosterone system (RAAS) drugs in NP. We investigated the effects of 14 days of treatment with centrally (telmisartan and ramipril) or peripherally (losartan and enalapril) acting arbs and ACE-Is, respectively, in attenuating peripheral NP induced by sciatic nerve chronic constriction injury (CCI) in rats. We also compared these with the effects of pregabalin, the standard treatment for NP. Behavioral changes, inflammatory markers (nfkb, TNF- α , COX-2, PGE2, and bradykinin), oxidative stress markers (NADPH oxidase and catalase), STAT3 activation, levels of phosphorylated P38-MAPK, ACE, AT1 receptor (AT1R), and AT2 receptor (AT2R), as well as histopathological features, were assessed in the brainstem and sciatic nerve. CCI resulted in clear pain-related behavior along with increased levels of inflammatory and oxidative stress markers, and STAT3 activity, as well as increased levels of phosphorylated P38-MAPK, ACE, AT1R, and AT2R, along with worsened histopathological findings in both the brainstem and sciatic nerve. Arbs improved both animal behavior and all measured parameters in CCI rats and were more effective than ACE-Is. At the tested doses, centrally acting arbs or ACE-Is were not superior to the peripherally acting

drugs of the same category. These findings suggest that arbs (centrally or peripherally acting) are an effective treatment modality for NP.

Recent Publications

1. Nora Hegazy & Samar Rezaq Mechanisms Involved in Superiority of Angiotensin Receptor Blockade over ACE Inhibition in Attenuating Neuropathic Pain Induced in Rats The American Society for Experimental Neuro Therapeutics : 17 August 2020
2. Nora Hegazy & Samar Rezaq Renin-angiotensin system blockade modulates both the peripheral and central components of neuropathic pain in rats: Role of calcitonin gene-related peptide, substance P and nitric oxide Basic Clin Pharmacol Toxicol. 2020;127:451–460.
3. Nora Hegazy & Samar Rezaq Mechanisms Involved in Angiotensin Receptor Blockade Superiority over ACE-inhibition in Attenuating Neuropathic Pain Induced in Rats FASEB Journal Volume34, issues1.

Biography

Nora Hegazy is currently working as Department of Pharmacology and Toxicology, School of Pharmacy, Zagazig University, Egypt. Academic position in pharmacology. Board certified pharmacotherapy specialist, researcher and Master pharmacology. UAE Golden visa holder, A dedicated and committed researcher in the field of experimental Neuro-pharmacology along with clinical knowledge as a board certified pharmacotherapy specialist, looking for an opportunity for a research.

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