Reactivity of the rat distal colon to autoantibodies targeting angiotensin type 1 receptors

R. Magalhães1, A. Philippe2, R. Catar3, D. Dragun3, M. Morato4

1 Laboratory of Pharmacology, Department of Drug Sciences, Faculty of Pharmacy of University of Porto, Portugal
2 Department of Nephrology and Critical Care Medicine, Charité University Medicine, Berlin, Germany
3 Department of Nephrology and Critical Care Medicine, Charité University Medicine, Berlin, Germany; Berlin Institute of Health, Berlin, Germany
4 Laboratory of Pharmacology, Department of Drug Sciences, Faculty of Pharmacy of University of Porto, Portugal; MedInUP - Center for Drug Discovery and Innovative Medicines, University of Porto, Portugal

E-mail address: rtmglhs@gmail.com
(R. Magalhães).

Aim: To describe the reactivity of the rat distal colon to AT1R-Abs and to compare it to that of Ang II.

Introduction: Agonistic IgG (IgG1 and IgG3 subclasses) autoantibodies against the angiotensin II type 1 receptor (AT1R-Abs) have been associated with hypertension, preeclampsia, placental ischemia, renal-allograft rejection and systemic sclerosis. It is thought that AT1R-Abs mimic the action of angiotensin II (Ang II) and contribute to the physiopathology of several diseases and the associated complications.

Methods: Male Wistar rats (9–12 weeks of age) were killed by decapitation and strips of the distal colon were mounted in organ baths along their longitudinal axis. Tissues were stretch to 1 g of resting force and isometric responses to AT1R-Abs (25, 50 and 100 mg/dl) obtained from sera of systemic sclerosis and renal-allograft rejection patients and to Ang II (10 µM-1 mM) were recorded on a polygraph. The response of Ang II were expressed as % of the response to 125 mM potassium chloride (KCl).

Results: AT1R-Abs caused a long-lasting response. Very often, AT1R-Abs induced an increase in the frequency and amplitude of distal colon spontaneous contractions. Occasionally, AT1R-Abs caused a slight decrease in the resting tone and, more rarely, they caused colonic constriction. The effects of the AT1R-Abs seem to be attenuated by candesartan. The pattern of the response to Ang II was different; Ang II caused a fast developing contraction of the colon with an Emax of 64.37 ± 12.68 (%KCl) and EC50 of 1.22 ± 0.20 mM.

Conclusion: AT1R-Abs change the normal rhythm of spontaneous contractions of the rat distal colon but more studies are necessary to evaluate whether this reactivity is mediated by AT1 receptors. Moreover, Ang II cause a marked AT1 receptor-mediated contraction of the rat distal colon.

Acknowledgements: The authors acknowledge Mrs. Céu Pereira and Mrs. Mónica Caldas for excellent technical assistance.

http://dx.doi.org/10.1016/j.pbj.2017.07.026