*Acta Physiologica 2009*; Volume 195, Supplement 670
[Belgian Society for Fundamental and Clinical Physiology and Pharmacology, Spring Meeting 2009](http://www.blackwellpublishing.com/aphmeeting/meetingindex1.asp?MeetingID=756)
07/03/2009-07/03/2009
Ghent University, Gent, Belgium

CHARACTERIZATION OF A SK-MEDIATED MEDIUM DURATION AFTER HYPER-POLARI-ZATION IN DORSAL RAPHE NEURONS
Abstract number: O-06

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Most Dorsal Raphe neurons display two characteristics: a long duration (2 ms) action potential due to the presence of a shoulder on its falling phase and a prominent afterhyperpolarization (AHP) following the action potential (Beck et al., 2003; Scuvée-Moreau et al., 2004). Recent in vivo experiments suggest that SK channel blockade increases bursting in serotonergic neurons in this area (Rouchet et al., 2008). The purpose of this study was therefore to characterize the currents responsible for the AHP in these neurons. Using whole-cell recordings of infra-red visualised neurons in acute slices, we elicited and recorded AHP currents under voltage-clamp conditions with repetitive short (20 ms) unclamped depolarizations (holding and recording potential, -60 mV; steps to -10 to +100 mV; (Wolfart and Roeper, 2002)). After pulses to +100 mV, a putative AHP current appeared as an outward current peaking at about 100 ms after the depolarizing pulse. This current had kinetics comparable to those of IAHP (Stocker, 2004). A supra-maximal concentration of the SK channel blockers apamin (300 nM) and (-)-bicuculline methiodide (BMI; 100 M) blocked these outward currents. Block by BMI was reversible and mimicked by an ulterior application of apamin. Block by both agents uncovered an inward current which was sensitive to cobalt (1 mM), as previously observed in hippocampal neurons by Stocker et al. (1999). Moreover, application of cobalt blocked both the inward and outward currents generated in the absence of BMI and apamin. Block of IAHP by apamin, BMI and cobalt suggests that IAHP of Dorsal Raphe neurons is induced by SK channel activation following the opening of voltage-dependant calcium channels.

Supported by grant n° 9.4560.03 from the F.N.R.S. and by a grant from the Belgian Science Policy (PAI 6/31) (VS)

**To cite this abstract, please use the following information:**
***Acta Physiologica 2009*; Volume 195, Supplement 670 :O-06**