

Accepted Manuscript

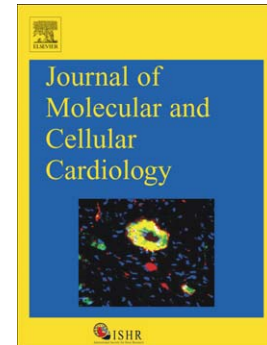
Interactive effect of beta-adrenergic stimulation and mechanical stretch on low-frequency oscillations of ventricular action potential duration in humans

Esther Pueyo, Michele Orini, José F. Rodríguez, Peter Taggart

PII: S0022-2828(16)30114-6
DOI: doi: [10.1016/j.yjmcc.2016.05.003](https://doi.org/10.1016/j.yjmcc.2016.05.003)
Reference: YJMCC 8388

To appear in: *Journal of Molecular and Cellular Cardiology*

Received date: 28 October 2015
Revised date: 21 March 2016
Accepted date: 3 May 2016



Please cite this article as: Pueyo Esther, Orini Michele, Rodríguez José F., Taggart Peter, Interactive effect of beta-adrenergic stimulation and mechanical stretch on low-frequency oscillations of ventricular action potential duration in humans, *Journal of Molecular and Cellular Cardiology* (2016), doi: [10.1016/j.yjmcc.2016.05.003](https://doi.org/10.1016/j.yjmcc.2016.05.003)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Full title:

Interactive effect of beta-adrenergic stimulation and mechanical stretch on low-frequency oscillations of ventricular action potential duration in humans

Authors:

Esther Pueyo PhD^{a,b}, Michele Orini PhD^c, José F. Rodríguez PhD^d, Peter Taggart MD DSc^c

Institutions:

^aBiomedical Signal Interpretation and Computational Simulation (BSICoS) group, Aragón Institute of Engineering Research, IIS Aragón, University of Zaragoza. Edificio I+D+i, C/ Mariano Esquillor s/n. 50018, Zaragoza, Spain.

^bBiomedical Research Networking Center in Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN), Instituto de Salud Carlos III. C/ Monforte de Lemos 3-5, pabellón 11, planta 0. 28029, Madrid, Spain.

^cInstitute of Cardiovascular Science, University College London. Gower Street. WC1E 6BT, London, United Kingdom.

^dLaBS, Department of Chemistry, Materials and Chemical Engineering 'Giulio Nata', Politecnico di Milano. Piazza Leonardo da Vinci, 32. 20133, Milano, Italy.

Corresponding author and address

Dr Esther Pueyo,
BSICoS group, I3A, University of Zaragoza
Edificio I+D+i, C/ Mariano Esquillor s/n.
50018 Zaragoza, Spain
E-mail: epueyo@unizar.es

Abstract

Ventricular repolarization dynamics are crucial to arrhythmogenesis. Low-frequency oscillations of repolarization have recently been reported in humans and the magnitude of these oscillations proposed to be a strong predictor of sudden cardiac death. Available evidence suggests a role of the sympathetic nervous system. We have used biophysically detailed models integrating ventricular electrophysiology, calcium dynamics, mechanics and β -adrenergic signaling to investigate the underlying mechanisms. The main results were: (1) Phasic beta-adrenergic stimulation (β -AS) at a Mayer wave frequency between 0.03 and 0.15 Hz resulted in a gradual decrease of action potential (AP) duration (APD) with concomitant small APD oscillations. (2) After 3-4 minutes of phasic β -AS, the mean APD adapted and oscillations of APD became apparent. (3) Phasic changes in haemodynamic loading at the same Mayer wave frequency (a known accompaniment of enhanced

Download English Version:

<https://daneshyari.com/en/article/8473747>

Download Persian Version:

<https://daneshyari.com/article/8473747>

[Daneshyari.com](https://daneshyari.com)