Optogenetic investigation of cardiac arrhythmia mechanisms

Feola, I.

LIST OF PUBLICATIONS

Full papers

*Equal contribution

Majumder R*, **Feola I***, Teplenin A, de Vries AAF, Panfilov AV, Pijnappels DA. Optogenetics enables real-time spatiotemporal control over spiral wave dynamics in an excitable cardiac system. eLife. 2018; 7pii: e41076.

Feola I, Volkers L, Majumder R, Teplenin A, Schalij MJ, Panfilov AV, de Vries AAF, Pijnappels DA. Localized Optogenetic Targeting of Rotors in Atrial Cardiomyocyte Monolayers. Circ Arrhythm Electrophysiol. 2017; 10pii: e005591.

Watanabe M*, **Feola I***, Majumder R, Jangsangthong W, Teplenin AS, Ypey DL, Schalij MJ, Zeppenfeld K, de Vries AA, Pijnappels DA. Optogenetic manipulation of anatomical reentry by light-guided generation of a reversible local conduction block. Cardiovasc Res. 2017; 113:354-366.

Feola I, Teplenin A, de Vries AA, Pijnappels DA. Optogenetic Engineering of Atrial Cardiomyocytes. Methods Mol Biol. 2016; 1408:319-31.

Majumder R, Jangsangthong W, **Feola I**, Ypey DL, Pijnappels DA, Panfilov AV. A Mathematical Model of Neonatal Rat Atrial Monolayers with Constitutively Active Acetylcholine-Mediated K+ Current. PLoS Comput Biol. 2016; 12:e1004946.

Bingen BO, Engels MC, Schalij MJ, Jangsangthong W, Neshati Z, **Feola I**, Ypey DL, Askar SF, Panfilov AV, Pijnappels DA, de Vries AA. Light-induced termination of spiral wave arrhythmiasby optogenetic engineering of atrial cardiomyocytes. Cardiovascular Res. 2014; 104:194-205.

Engels MC, Askar SF, Jangsangthong W, Bingen BO, **Feola I**, Liu J, Majumder R, Versteegh MI, Braun J, Klautz RJ, Ypey DL, De Vries AA, Pijnappels DA. Forced fusion of human ventricular scar cells with cardiomyocytes suppresses arrhythmogenicity in a co-culture model. Cardiovascular Res. 2015; 107:601-612.

Bingen BO, Askar SF, Neshati Z, **Feola I**, Panfilov AV, de Vries AA, Pijnappels DA. Constitutively active acetylcholine-dependent potassium current increases atrial defibrillation threshold by favoring post-shock re-initiation. Sci Rep. 2015; 5:15187.

Letters

Feola I, Volkers L, Majumder R, Teplenin A, Schalij MJ, Panfilov AV, de Vries AAF, Pijnappels DA. Response by Feola et al to Letter Regarding Article, "Localized Optogenetic Targeting of Rotors in Atrial Cardiomyocyte Monolayers". Circ Arrhythm Electrophysiol. 2018; 11:e006130.

Presented abstracts (Selection)

Feola I, Watanabe M, Teplenin AS, Schalij MJ, Zeppenfeld K, Ypey DL, de Vries AAF, Pijnappels DA. Local light exposure terminates anatomical reentry in optogenetically modified transverse rat ventricular tissue slices. Oral presentation during Young Investigator Award at *Rembrandt Simposium 2015*.

Jangsangthong W, **Feola I**, Teplenin AS, Schalij MJ, de Vries AAF, Pijnappels DA. Microfoci of oxidative stress increase pro-arrhythmic risk as revealed by patterned illumination of optogenetically engineered myocardial cultures. Poster presentation at *HRS Conference 2016*.

Feola I, Watanabe M, Teplenin AS, Schalij MJ, Zeppenfeld K, Ypey DL, de Vries AAF and Pijnappels DA. Optogenetic termination of anatomical reentry in rat myocardial slices. Oral presentation at *EHRA EUROPACE − CARDIOSTIM 2017*.

Feola I, Volkers L, Majumder R, de Vries AAF, Pijnappels DA. Optogenetic ablation of spiral wave arrhythmias by creating light lesions. Oral presentation during Young Investigator Award at *EHRA EUROPACE − CARDIOSTIM 2017*.

Feola I, Majumder R, de Vries AAF, Panfilov AV, Pijnappels DA. Optogenetic manipulation of atrial spiral wave trajectory in space and time: capture, drag and terminate. Poster presentation at *HRS Conference 2018*.

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CURRICULUM VITAE

Iolanda Feola was born on May 20th, 1987 in Vallo della Lucania, Italy. After finishing high school in 2006 she left her little town and moved to Parma where she started her academic journey. She obtained her bachelor's degree in Biotechnology in 2009. Three years later she obtained her master's degree in Medical, Veterinary and Pharmaceutical Biotechnology. During her bachelor, she performed her first internship at the Department of Neuroscience, at University of Parma, under the guidance of prof. R. Tirindelli and dr. L. Silvotti. During her master, she won the Erasmus scholarship that allowed her to move to The Netherlands. There, she spent her six-month internship at the Department of Molecular and Cell Biology at Leiden University Medical Center under the supervision of dr. H. Mikkers and S. Van Leeuwen. In 2013, she started her PhD training in the laboratory of experimental cardiology, Department of Cardiology, under the supervision of prof. dr. M.J. Schalij, dr. D.A. Pijnappels and dr. A.A.F. de Vries. During her training, she investigated the underlying mechanisms of cardiac arrhythmias by using optogenetics to precisely control, in time and space, the electrical properties of cardiac cells. The work performed during her training is presented in this thesis.

AWARDS

2017 Diploma in recognition of the best original work. EHRA Europace-Cardiostim Conference.

2017 Runner-up during the Young Investigator Award competition. EHRA Europace-Cardiostim Conference.

2015 Best Oral Presentation Award. Rembrandt Conference of Cardiovascular Science.

2010 Erasmus scholarship from the University of Parma to perform an internship abroad.