Instituto de Investigación Sanitaria Aragón

Facultad de Medicina Universidad Zaragoza

Novel genetic modulators of Duchenne muscular dystrophy

Presential Biomedical Seminar, Thursday, May, 26, 2022 at 16:00h

Abstract:

Duchenne muscular dystrophy (DMD) is a severe X-linked neuromuscular childhood disorder that causes progressive muscle weakness and degeneration and results in functional decline, loss of ambulation and early death of young men due to cardiac or respiratory failure. Despite the vast knowledge on mutations in the DMD gene encoding dystrophin, one of the largest human genes, the disease is still incurable. Although some therapies may lead to partial effects in skeletal muscle, they are highly ineffective in the heart and the efficient treatment is still lacking.

In this lecture I will address our recent studies demonstrating the significance of the genes modulating the progression of DMD. We have demonstrated, that heme oxygenase-1 (Hmox-1, HO-1), the stress-induced gene playing numerous functions not only directly related to its antioxidant properties, regulates the skeletal muscle repair after the injury, modulates the expression of other genes, including specific microRNAs involved in differentiation of satellite cells, the skeletal muscle bona fide stem cells. Dystrophin-deficient mdx mice, additionally devoid of functional Hmox-1 gene, demonstrated aggravated muscle injury, increased inflammation and impaired exercise capacity. On the other hand, the mdx mice lacking miR-378, one of the most abundant microRNA in the skeletal muscle and the heart showed unexpectedly improved muscle properties. Interestingly, the absence of miR-378 affected also the liver metabolism, and double knockout mice revealed improved glucose tolerance and restored the expression of genes regulating lipid metabolism.

The studies presented in this lecture reveal not only novel potential pharmacological targets for DMD, but offer also the opportunity for investigating the global effects of these modulators, with potential for treatment of numerous pathologies associated with DMD.

Speaker :

Józef Dulak, PhD, DSc, Professor & Head

Affiliation and CV Summary:

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Organizers:

Grupo de Investigación GIIS018-TISSUE MICROENVIRONMENT LAB (TME LAB). Instituto de Investigación Sanitaria Aragón (IIS Aragón)

Facultad de Medicina, Universidad de Zaragoza

Registration form:

https://us02web.zoom.us/meeting/register/tZcocO-orDIiG9HJYMV2QYww3wODs4-Rna8d

Place: Sala de Grados, Facultad de Medicina, Universidad de Zaragoza.
Presential with Online Transmission via ZOOM
Date: May, 26, 2022 at 16:00h

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CV Summary:

Prof. Józef Dulak, PhD, DSc, dr h.c. is a tenured professor of biochemistry and biotechnology, and since 2005 the head of the Department of Medical Biotechnology at the Faculty of Biochemistry, Biophysics and Biotechnology of the Jagiellonian University in Krakow, Poland.

His research interests concern medical biotechnology, and particularly stem cell biology, vascular biology and medicine, gene and cell therapy, cancer biology, microRNAs, inflammation, hypoxia and oxidative stress-driven mechanisms of diseases. Prof. Dulak is the co-author of more than 250 papers, cited more than 9800 times (without auto citation) and his h-index is 55. He is also the co-inventor of one patent. Prof. Dulak obtained numerous grants (more than 13,5 million Euro in the last 10 years), both research and infrastructural.

Prof. Dulak was on post-doctoral fellowships at Free University in Amsterdam (1991); Muenster University (1994); Stanford University (1997) and was research scientists for 2 years at University of Innsbruck (1999-2001). He is the doctor honoris causa of the University of Orleans, France (2012), a corresponding member of the Polish Academy of Arts and Sciences (since 2011). He was the president of the European Vascular Biology Organisation (EVBO) (2013-2015; 2015-2017). From 2013 till 2020 he was the coordinator of the International Associated Laboratory (LIA – Laboratoire International Associe), supported by CNRS, France and Jagiellonian University (2013-2016 and 2017-2020). He is the Fellow (elected) of the European Society of Cardiology (FESC), professional member of American Heart Association, International Society for Stem Cell Research, and he is in the editorial board of Arteriosclerosis, Thrombosis and Vascular Biology, Scientific Reports, Vascular Pharmacology and IUBMB Life. Currently he is also the vice-president of the Committee of Biotechnology of the Polish Academy of Sciences.

Prof. Dulak and his team work was instrumental in elucidating the crucial role of Nrf2-heme oxygenase-1-microRNAs pathways in regulation of numerous reparative and regenerative processes, associated also with the pathologies being at the background of the major non-communicable acquired and inherited diseases. His research led to discovery of new mechanisms of tissue responses to injury, activation and differentiation of stem cells, formation of blood vessels and regeneration or disturbed repair of such organs as heart, muscles and skin.

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