Horizon 2020 projects, PREMUROSA, PANBioRA and ExcellMater, successfully organised a session at the TERMIS2021 World Congress

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Abstract

Three Horizon 2020 projects: "PANBioRA: Personalised and generalised integrated biomaterial risk assessment", MSCA ITN project "PREMUROSA - Precision medicine for musculoskeletal regeneration, prosthetics, and active ageing", and "ExcellMater: Twinning to excel materials engineering for medical devices" jointly organised a very successful session entitled: "Strategies to enhance musculoskeletal regeneration: from bench to bedside" at the 6th world congress of the Tissue Engineering and Regenerative Medicine International Society (TERMIS2021). The session provided a comprehensive insight into the strategies for musculoskeletal regeneration, and it was a source of information on the latest achievements in the area thanks to the renowned speakers. Besides participants in the projects organising the session, many other researchers were attracted to the session, which is a key benchmark that the topic was interesting and relevant. In general, this session was a successful outcome of the collaboration among Horizon 2020 projects and at the same time, encouragement for similar activities to be organised in the future. Here, a short overview of the session is presented.

Keywords: Horizon 2020 projects collaboration; session review; tissue engineering; regenerative medicine; musculoskeletal regeneration.

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BOOK AND EVENT REVIEW

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The session "Strategies to enhance musculoskeletal regeneration: from bench to bedside" offered a thorough insight into musculoskeletal tissue regeneration: answers were given to the questions concerning what has been done so far, current efforts, and future perspectives in the field. Besides participants in the projects organising the session, many other researchers were attracted to the session, which is a key benchmark that the topic was interesting and relevant. Thus, the

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session was a source of information on the latest achievements in the area thanks to the renowned speakers presenting ongoing studies that are breaking the boundaries between state-of-the-art science and issues yet to be resolved.

Figure 1. Overview of the session "Strategies to enhance musculoskeletal regeneration: from bench to bedside" at the TERMIS2021 World Congress organised by Horizon 2020 projects PREMUROSA, PANBioRA and ExcellMater

Chairs of the session – Prof. Lia Rimondini from the University of Eastern Piedmont, Italy, and Prof. Michael Gasik from the Aalto University Foundation, Finland, welcomed session attendees and introduced two keynote speakers: Prof. Mauro Alini from the AO Research Institute, Switzerland, and Prof. Sophia Antimisiaris, from the University of Patras, Greece. Prof. Alini presented the talk "Organ culture and bioreactors for assessing biomaterials (and more) for tissue

regeneration“ in which he stressed the necessity for development and utilization of *in vitro* models for biomaterials evaluation and presented bioreactors for engineering of intervertebral discs created in his laboratory as well as cultured tissue models. The 3rd generation of intervertebral disc bioreactors with a uniaxial loading device and an advanced model with added hexapod for 6 degrees of freedom aim to recapitulate complex motions existing *in vivo* to a greater extent. In his opinion, *in vitro* models for biomaterial testing would significantly increase the prospects for clinical translation, while advancements in design and utilization of bioreactors will allow the 3R principle (replacement, reduction, refinement) in animal experimentation to come into force. Prof. Antimisiaris, the second keynote speaker, gave a different perspective on musculoskeletal tissue regeneration in her talk: ”Novel liposomal drug delivery and targeting approaches for tissue regeneration“. She introduced challenges in tissue regeneration and provided an overview of current knowledge and the future potential of delivery of growth factors to the site of regeneration. Prof. Antimisiaris pointed out that issues in drug administration such as low stability and inadequate physicochemical drug properties can be overcome by utilization of liposomal nanomedicines.

Other speakers who equally contributed to the high-quality program of the session were:

- Prof. Alicia El Haj, Healthcare Technology Institute; University of Birmingham, UK – “Engineering orthopaedic cell therapies: translation to the clinic“
- Dr Anh Vu Truong, Department of Chemical Engineering, National Tsinghua University, China - “Crispr-mediated epigenetic modification rescues osteoporotic ASC chondrogenic deficiency and promotes calvarial bone healing in osteoporotic rat“
- Dr Jonathan Dawson, University of Southampton, UK - “Regenerative nanoclays - translating a novel biomaterial“
- Prof. Michael Gasik, Aalto University Foundation, Finland – “Model-free assessment of biomechanical properties for personalized medical devices“
- Dr Michael Pujari Palmer, Department of Materials Science and Engineering, Uppsala University, Sweden – “Development, and preclinical evaluation, of a novel, bioinspired biomaterial, for use as a calcified tissue adhesive “

In conclusion, this session originated as the result of the fruitful collaboration of PANBioRA, PREMUROSA, and ExcellMater projects, which are funded within the European Union’s Horizon 2020 research and innovation programme. This event was a proper opportunity to increase the participants’ awareness of common aspirations of the projects reflected in the session theme. Generally, the session accomplished its goal by providing a comprehensive understanding of the strategies for musculoskeletal regeneration as well as addressing the challenges to be overcome in the future. According to the questions speakers received from the audience, the presentations were thought-provoking, to the mutual pleasure of both organisers and the audience. This session was a successful outcome of the collaboration among these projects and at the same time, encouragement for similar activities to be organised in the future.

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SAŽETAK

Horizon 2020 projekti PREMUROSA, PANBioRA i ExcellMater uspešno su organizovali sesiju na Svetskom kongresu TERMIS2021

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(Prikaz knjiga i događaja)

Tri Horizont 2020 projekta: "PANBioRA: Personalised and generalised integrated biomaterial risk assessment", MSCA ITN projekat "PREMUROSA - Precision medicine for musculoskeletal regeneration, prosthetics, and active ageing", i "ExcellMater: Twinning to excel materials engineering for medical devices" su zajedno organizovali veoma uspješnu sesiju pod nazivom: "Strategije za unapređenje mišićno-skeletne regeneracije: od klupe do kreveta" na Šestom svjetskom kongresu Međunarodnog društva za inženjerstvo tkiva i regenerativnu medicinu (TERMIS2021). Sesija je pružila opširan uvid u strategije regeneracije mišićno-skeletnog tkiva i bila je izvor informacija o najnovijim dostignućima u ovoj oblasti zahvaljujući renomiranim predavačima. Pored učesnika projekata koji su organizovali sesiju, ovaj događaj je privukao mnoge druge istraživače, što je ključni pokazatelj da je tema bila zanimljiva i interesantna. Uglavnom, ova sesija je ishod uspješne saradnje Horizont 2020 projekata i istovremeno je ohrabrenje za organizovanje sličnih aktivnosti u budućnosti. Ovaj rad predstavlja kratak pregled sesije.

Ključne reči: Saradnja Horizont 2020 projekata; pregled sesije; inženjerstvo tkiva; regenerativna medicina; regeneracija mišićno-skeletnog tkiva