The ExcellMater project: Advancing biomaterials engineering towards novel medical devices

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Available on-line at the Journal web address: http://www.ache.org.rs/HI/

INTRODUCTION: The route of novel biomaterials from synthesis to utilization in medical devices and products is complex requiring comprehensive physico-chemical, biological and functional characterization of biomaterials followed by preclinical and clinical studies adhering to strict procedures and regulations. Faculty of Technology and Metallurgy (FTM) in Belgrade is one of the leading institutions in Serbia in the field of materials engineering including certain areas in biomaterials engineering. Various biomaterials with bioactive agents were synthesized by variety of methods and characterized in detail regarding composition, morphology, structure, and mechanical and thermal properties. However, the next phases towards translation to medical devices and products are lacking primarily due to the lack of knowledge in these fields. The aim of the project "Twinning to excel materials engineering for medical devices – ExcellMater" [1] funded by the European Union's Horizon 2020 research and innovation programme is to tackle this weakness by twinning the needed expertise to FTM from the international project partners: University of Eastern Piedmont, Italy, AO Research Institute Davos, Switzerland, and Aalto University, Finland.

METHODOLOGY: The ExcellMater project included various activities such as site expert visits (SEV), short-term staff exchanges (STSE), workshops, specialized seminars, and topic-focused schools, closing with the ExcellMater Conference 2024: Innovative Biomaterials for Novel Medical Devices.

RESULTS AND DISCUSSION: The ExcellMater project provided meetings of the involved research groups by 15 SEVs from FTM to the partners and 9 SEVs from the partners to FTM and acquaintance with the experiments, equipment and practices carried out at each institution. These visits also served to plan joint research specifically during the STSE missions, 17 in total, involving doctoral students and young scientists. Specialized seminars on biological characterization of biomaterials, medical imaging, regulatory aspects, and clinical utilization of biomaterials complemented with the workshop on the latter topic, gathered not only FTM scientists but also local partners working in the fields of life sciences, with the aim to build a viable local ecosystem for efficient translation of novel biomaterials to the clinical use. Two topic focused ExcellMater schools on biomaterials for dental and orthopaedic applications and on hydrogels aimed for wound treatments, respectively, targeted doctoral students in multidisciplinary fields and were accredited by FTM as PhD courses of 2 ECTS, each. Additionally, the project strengthened the capacity of FTM researchers in project proposal writing and project management by a dedicated seminar followed by a hands-on workshop. The ExcellMater Conference 2024 organized in Belgrade as a final project event gathered internationally renowned experts in the field and provided possibilities to present scientific results obtained in the ExcellMater project as well as in two related H2020 projects.

CONCLUSIONS: Various intensive and dynamic activities performed within the ExcellMater project accompanied with efficient dissemination and communication significantly increased the scientific and technological capacity of FTM researchers in the field of biomaterials engineering and established fruitful and sustainable collaboration among the project partners as well as within the local scientific community.

REFERENCES

[1]   https://excellmater.tmf.bg.ac.rs/ Accessed February 20, 2024

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