ISSN 3009-3848
ISSNe 3009-383X

Oncology Insights

Official Journal of the Serbian Association for Cancer Research

SDCR

Year 2023/No. 1

ISSN 3009-3848
ISSNe 3009-383X

ONCOLOGY INSIGHTS

Official Journal of
the Serbian Association for Cancer Research

Belgrade, Serbia
October, 2023

ONCOLOGY INSIGHTS
Official Journal of the Serbian Association for Cancer Research
Publishing annually

Publisher
Serbian Association for Cancer Research
Belgrade, Serbia

Printed by:
Connect Online Studio
Ćirila i Metodija 2a
Belgrade, Serbia

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

616-006-08

ONCOLOGY Insights : official Journal of the Serbian Associaton for Cancer Research / editor in chief Milena Čavić. - [Štampano izd.]. - 2023, no. 1- . - Belgrade : Serbian Associaton for Cancer Research, 2023- (Belgrade : Connect Online Studio). - 30 cm

Godišnje. - Drugo izdanje na drugom medijumu:
Oncology Insights (Online) = ISSN 3009-383X
ISSN 3009-3848 = Oncology Insights (Štampano izd.)
COBISS.SR-ID 125366281

SDIR-6 ORGANIZING COMMITTEE

President: Prof. dr Katarina Zeljić, Faculty of Biology, University of Belgrade

Dr Milena Čavić, Institute for Oncology and Radiology of Serbia
Dr Milica Pešić, Institute for Biological Research "Siniša Stanković", University of Belgrade
Dr Radmila Janković, Institute for Oncology and Radiology of Serbia
Dr Marko Radulović, Institute for Oncology and Radiology of Serbia
Prof. dr Katarina Zeljić, Faculty of Biology, University of Belgrade
Dr Ivana Matić, Institute for Oncology and Radiology of Serbia
Dr Ana Krivokuća, Institute for Oncology and Radiology of Serbia
Dr Lidija Todorović, The Vinča Institute of Nuclear Sciences, University of Belgrade
Dr Jelena Spasić, Institute for Oncology and Radiology of Serbia
Dr Nina Petrović, The Vinča Institute of Nuclear Sciences, University of Belgrade
Dr Milica Nedeljković, Institute for Oncology and Radiology of Serbia
Dr Sofija Jovanović Stojanov, Institute for Biological Research "Siniša Stanković", University of Belgrade
Dr Ana Damjanović Veličković, Institute for Oncology and Radiology of Serbia
Dr Marija Đorđić Crnogorac, Institute for Oncology and Radiology of Serbia
Dr Jelena Grahovac, Institute for Oncology and Radiology of Serbia
Dr Ana Đurić, Institute for Oncology and Radiology of Serbia
Dr Tijana Išić Denčić, Institute for the Application of Nuclear Energy - INEP
Dr Bojana Kožik, The Vinča Institute of Nuclear Sciences, University of Belgrade
Ivana Pašić, Institute for Oncology and Radiology of Serbia
Aleksandra Stanojević, Institute for Oncology and Radiology of Serbia
Mladen Marinković, Institute for Oncology and Radiology of Serbia
Valentina Karadžić, Institute for Oncology and Radiology of Serbia
Marina Popović Krneta, Institute for Oncology and Radiology of Serbia
Ana Stepanović, Institute for Biological Research "Siniša Stanković", University of Belgrade

SDIR-6 SCIENTIFIC COMMITTEE

President: Dr Milena Čavić, Institute for Oncology and Radiology of Serbia

Dr Milena Čavić, Institute for Oncology and Radiology of Serbia
Dr Milica Pešić, Institute for Biological Research "Siniša Stanković", University of Belgrade
Dr Radmila Janković, Institute for Oncology and Radiology of Serbia
Dr Marko Radulović, Institute for Oncology and Radiology of Serbia
Prof. dr Katarina Zeljić, Faculty of Biology, University of Belgrade
Dr Ivana Matić, Institute for Oncology and Radiology of Serbia
Dr Ana Krivokuća, Institute for Oncology and Radiology of Serbia
Prof. dr Tatjana Simić, Faculty of Medicine, University of Belgrade
Dr Ljubica Harhaji-Trajković, Institute for Biological Research "Siniša Stanković", University of Belgrade
Dr Miljana Tanić, Institute for Oncology and Radiology of Serbia
Dr Lidija Todorović, The Vinča Institute of Nuclear Sciences, University of Belgrade
Dr Jelena Spasić, Institute for Oncology and Radiology of Serbia
Dr Nina Petrović, The Vinča Institute of Nuclear Sciences, University of Belgrade
Dr Nevenka Gligorijević, Institute for Oncology and Radiology of Serbia
Dr Ana Podolski-Renić, Institute for Biological Research "Siniša Stanković", University of Belgrade
Dr Jelena Dinić, Institute for Biological Research "Siniša Stanković", University of Belgrade
Prof. Chiara Ambrogio, Department of Molecular Biotechnology and Health Sciences, Molecular BiotechnologCenter, University of Torino
Dr Thomas Mohr, Center for Cancer Research and Comprehensive Cancer Center, Medical University of Vienna
Prof. Engin Ulukaya, Medical Faculty of Istinye University
Prof. Vilma Petrikaite, Life Sciences Center, Vilnius University
Prof. Konstantinos Dimas, Faculty of Medicine - University of Thessaly
Dr. Cristina Xavier, i3S - Institute for Research and Innovation in Health, Porto
Dr Remond Fijneman, the Netherlands Cancer Institute
Dr Ieronymos Zoidakis, Biomedical Research Foundation Academy of Athens, Greece
Dr Sergi Castellvi-Bel, Fundació de Recerca Clínic Barcelona-Institut d'Investigacions Biomèdiques August Pi i Sunyer, Barcelona
Dr Petar Ozretic, Ruđer Bošković Institute, Zagreb
Prof. Sonja Levanat, Ruđer Bošković Institute, Zagreb

40, and C-reactive Protein in Patients with Unresectable Pancreatic Cancer. Cancer Epidemiol Biomarkers Prev. 2020;29(1):176-84. doi: 10.1158/1055-9965.EPI-19-0672.

9. Chen HT, Zheng JM, Zhang YZ, Yang M, Wang YL, Man XH, Chen Y, Cai QC, Li ZS. Overexpression of YKL-40 Predicts Poor Prognosis in Patients Undergoing Curative Resection of Pancreatic Cancer. Pancreas. 2017;46(3):323-34. doi: 10.1097/MPA.0000000000000751.

10. Rebelo R, Polónia B, Santos LL, Vasconcelos MH, Xavier CPR. Drug Repurposing Opportunities in Pancreatic Ductal Adenocarcinoma. Pharmaceuticals (Basel). 2021;14(3):280. doi: 10.3390/ph14030280.

L14

Establishment of a first cancer Biobank at the Institute for Oncology and Radiology of Serbia – advantages, challenges and future perspectives

Snežana Bjelogrlić[1], Miljana Tanić[1], Mladen Marinković[2], Jelena Spasić[3], Ana Đurić[1], Suzana Stojanović-Rundić[2,4], Aleksan dra Stanojević[1], Marija Đorđić Crnogorac[5], Katarina Mirjačić Martinović[1], Ana Vuletić[1], Ana Damjanović Veličković[1], Marko Radulović[1], Radmila Janković[1], Jerome Zoidakis[6,7], Remond Fijneman[8], Sergi Castellví-Bel[9], Ana Krivokuća[5], Milena Čavić[1]

[1]Department of Experimental Oncology, Institute for Oncology and Radiology of Serbia, Belgrade, Serbia
[2]Clinic for Radiation Oncology and Diagnostics, Department of Radiation Oncology, Institute for Oncology and Radiology of Serbia, Belgrade, Serbia
[3]Clinic for Medical Oncology, Institute for Oncology and Radiology of Serbia, Belgrade, Serbia
[4]Faculty of Medicine, University of Belgrade, Belgrade, Serbia
[5]Department of Genetic Counseling for Hereditary Cancers, Institute for Oncology and Radiology of Serbia, Belgrade, Serbia
[6]Department of Biotechnology, Biomedical Research Foundation, Academy of Athens, Athens, Greece
[7]Department of Biology, National and Kapodistrian University of Athens, Greece
[8]Department of Pathology, The Netherlands Cancer Institute, Amsterdam, the Netherlands
[9]Gastroenterology Department, Fundació de RecercaClínic Barcelona-Institutd'InvestigacionsBiomèdiques August Pi iSunyer, Centro de InvestigaciónBiomédica en Red de EnfermedadesHepáticas y Digestivas, Hospital Clínic, University of Barcelona, Barcelona, Spain

Background: Procurement and storage of different biospecimens from cancer patients has been a standard practice over decades at the Institute for Oncology and Radiology of Serbia (IORS). However, such organized repositories were exclusively project-based. The type and amount of collected samples was defined by research needs, or by limited capacity of the storage units, while collecting of biospecimens relied on hands-on involvement of researchers and medical professionals. Although necessary ethical guidelines were respected and the whole process was well controlled by individual researchers, there were several disadvantages that needed to be addressed and resolved. Information on the stored samples was not collected systematically and tracking was difficult. Most biospecimen were disposed after project end due to storage space shortage rendering the previous collection efforts non-economic. Within the framework of the Horizon Europe STEPUPIORS (101079217) project, the goal was to solve the identified drawbacks of project-based repositories and to create a highly organized and well controlled biobanking system. The biobank was envisioned to function in accordance with internationally accepted technical, scientific and logistical standards and guidelines while respecting the national legislative, with the aim to contribute to elucidation of pathophysiology, diagnosis, and treatment of cancer. Organized biobanks provide assurance that patients' biospecimens and derived data are collected, stored, and managed in a way that enables optimal sharing and usage with minimal risk of misuse. Here we present the road towards the establishment of a proper procedural workflow for setting up a first rectal cancer biobank at IORS, and the identified advantages, challenges and future perspectives. **Material and Methods:** Future biobanking personnel attended intensive online and in person training and performed expert visits to each partner institution with insight into biobanking practices. Biobanking procedures were developed according to recommendations of the International Society of Biological and Environmental Repositories (ISBER), the Biobanking and BioMolecular resource Research Infrastructure (BBMRI), European Research Infrastructure Consortium (ERIC), and EU regulations followed by partner institutions. A rigorous evaluation of ethical and legal regulations was performed, respecting national and European legislation. Essential biobank equipment and laboratory information software were procured to ensure maximum accordance with infrastructural, storage and data protection requirements. Decisions were made during regular weekly meeting of IORS biobanking staff and consensus consortium approvals reached on all aspects. Management and internal and external oversight committees were formed of members of all four partner institutions. **Results:** Fifteen professionals of different disciplines (5 physicians, 3 biochemists, 4 molecular biologists, 3 pharmacists),

all IORS employees, have been gathered sharing a mutual intention to define a sequence of action necessary for the process of setting up a biobank. Within the first year, the STEPUPIORS team has undertaken landmark steps to improve both our knowledge and technical aspects as those involved to establish high-quality criteria for routine biobanking practice. At the very beginning, we were pursuing ways to reconcile some diversities in legal regulations between Serbia and the European Union, which is of crucial importance for future biospecimens and data exchange. Two expert visits of IORS professionals to STEPUPIORS partner biobanks provided on site education regarding different management strategies, funding models, and biosafety requirements that are mandatory for running a biobank. Attending a Basic biobanking course at the Medical University of Graz notably expanded our understanding of minimal requirements for building a biobank, sample handling and logistics, biobank sustainability and risk assessment. We implemented the acquired knowledge to develop a first set of 13 Standard operating procedure (SOP) protocols with appropriate annexes covering patient recruitment, documentation and biospecimens management. We evaluated different models of biobanking Informed consent documents and adapted ours to serve both the patients and the medical community, while respecting all bioethical regulations and data protection legislative. We performed a thorough market and quality analysis of available biobanking laboratory information systems to be implemented which would best support data collection, analysis and management while providing strong security and protection of patients' privacy. We further defined equipment and space requirements to maintain a safe environment for the biospecimen. Special attention has been dedicated to potential biosafety hazards and measures that should be implemented to minimize potential risks while handling biohazardous materials. In August 2023, biobanking software procurement was finalized and the biobank is planned to be fully operational in October 2023. A procedural basis for the collection of a planned project cohort of around 100 locally advanced rectal cancer (LARC) patients was successfully introduced. Scientific and management oversight committees including members of partner institutions were formed from the initiation of the biobank to ensure high-quality biobank-related research and innovation that will advance the treatment of LARC patients. Although the biobank has primarily been established within the framework of the STEPUPIORS project as a project deliverable, the collected rectal cancer cohort is planned to be used for a broad spectrum of future research projects. The developed SOPs and IT infrastructure will allow further advancement in cancer research at our Institute, as it has been envisioned to be expanded to other cancer types and the organized collection of diagnostic samples. The first IORS biobank might be useful as a pilot project for other biobanks planned to be formed in Serbia in the future. **Conclusion:** Building a biobank is a challenging project even in countries with appropriate scientific and health-related funds. Aside from legislative issues and the need for improvement of current infrastructure and performance, it requires a highly dedicated and well-orchestrated team of professionals with on-call duty to ensure maximum safety. Within the framework of the STEPUPIORS Horizon Europe project, the first rectal cancer Biobank has been successfully established at the Institute for Oncology and Radiology of Serbia and is expected to become fully functional by the end of 2023. Plans for its future expanding to accommodate other cancer subtypes are under way.

Keywords: Biobank, bioethics, data protection, rectal cancer

Acknowledgements: This study was funded by the Horizon Europe Twinning Project STEPUPIORS (Agreement No. 101079217) and the Ministry of Education and Science of the Republic of Serbia (Agreement No. 451-03-68/2022-14/200043).

L15

Advancing reversible immunocapture toward scalable purification of extracellular vesicles

Lidija Filipović[1], Milica Spasojević[1], Radivoje Prodanović[2], Suzana Matijašević[3], Goran Brajušković[3], Milica Popović[2]

[1]Innovative Centre of the Faculty of Chemistry, Belgrade, Serbia

[2]University of Belgrade-Faculty of Chemistry, Belgrade, Serbia

[3]University of Belgrade-Faculty of Biology, Belgrade, Serbia

Background: Extracellular vesicles (EVs) are supramolecular structures secreted by majority of cells[1]. Based on their mechanism of release and size, EVs are categorized as exosomes (EXO), microvesicles/shedding particles, and apoptotic bodies. Their content differs according to the characteristics of the cells from which they originated[2]. EVs are involved in a myriad of physological and pathological proceses and correct elucidation of their role in these processes is highly dependent on the reliability of the method used for their purification[3]. Currently available chemical/physical protocols for sample fractionation are time-consuming, often scarcely reproducible and their yields are low. Immune-capture based approaches could represent an effective purification alternative to obtain homogeneous EV samples[4]. **Methodology:** We have set-up an easy-to-operate chromatography system for the purification of intact EVs based on a single domain (VHH) antibodies-copolymer matrix suitable for biological samples as different as conditioned