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Smart Diaspora 2023

Universitatea de Științe Agricole și Medicină Veterinară 1869 USAMV Cluj-Napoca

Revoluții și evoluții ale științelor omice în epoca postgenomică

10 - 13 Aprilie 2023, Timișoara

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Eveniment aflat sub înaltul patronaj al Președintelui României

Universitatea de Vest din Timișoara

Universitatea de Medicină și Farmacie Victor Babeș | Timișoara

Universitatea Politehnica Timișoara

NATIONAL NETWORK OF GENOMIC MEDICINE

Octavian Bucur, MD, PhD, representing
The Genomics Research and Development Institute, Bucharest
Coordinated by Carol Davila University of Medicine and Pharmacy

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Affiliations

- **Honorary Research Advisor** of the Carol Davila University of Medicine and Pharmacy Rector, Prof. Dr. Viorel Jinga
- **Associate Investigator**, Viron Molecular Medicine Institute, Boston, MA, USA
- **Group Leader, CS I, Next Generation Pathology**, Victor Babes National Institute of Pathology (*nextgenpathology.eu*)

- **Co-Founder & former CEO/Vice-President** of Viron Therapeutics LLC / Inc., Boston USA; vironrx.com

- **Co-Editor in Chief** of the journal ***Discoveries***

- initiated by a group of professors from Harvard University and Aachen University;
- successfully passed PubMedCentral's evaluation; PMC & PubMed indexed

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Problem

- In Romania, the genomic research infrastructure and the human resource have a *dispersed, regional or local character*.
- This fragmented environment makes it nearly impossible to discover genomic variation in normal cohorts (national reference genome), pathological cohorts or to reuse the data for personalized medicine purposes, such as drug response or disease risk prediction.
- The *lack of a unified approach* at the national level limits the performance of research in Romania in genomics. This results in the need for a project with innovative, integrated actions.
- Thus, the development of a national research network in genomic medicine is required.

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Strategic documents – genomics initiative

The need for a national genomics initiative is justified and included in:

1. Programme for Government 2021-2024

2. The National Strategy for Smart Research, Innovation & Specialisation 2022-2027

3. The National Health Strategy 2022-2030 (draft)

4. The National Plan for Cancer Prevention and Therapy

- The project is subject to the World Health Organization General Assembly Resolution WHA57.13, Genomics and world health

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Genomics Research and Development Institute

In 2020, the Government of Romania

- designated **genomics** as a field of strategic importance
- approved the field of genomics within the national preparations for the 2021-2027 programming period for the project *"Implementation of a national RDI infrastructure in the field of genomics, the creation of an institutional mechanism adequate and strengthening the existing capacity at the national level"*.

As such, the Romanian Government founded the *Genomics Research and Development Institute*, through the Government Decision no. 693/2021, with the scope of:

- creating
- developing
- managing the national genomics infrastructure

The main aim is to increase the research-development and innovation capacity in the fields of genomics, proteomics, transcriptomics, metabolomics, bioinformatics and other omic sciences, as well as in the materialisation of the scientific opportunities and objectives.

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ROGEN: Development of genomic research in Romania

The **main objective** of the ROGEN project is the **development of the genomic medical research** in Romania, through an integrated approach to research-development, innovation and technological transfer activities, focused on technological progress, resilient, accessible and efficient, to ensure the transferability of project results in the health sector and their propagation at the national level.

The project contributes to the achievement of the Priority 5 objective of the Health Operational Programme, in correlation with the National Health Strategy 2022-2030 and National Strategy for Research, Innovation and Intelligent Specialization 2022-2027.

Core team:

Dr. Simona Dima, MD, PhD, Scientific Director, Fundeni Clinical Hospital
Ec. Adrian Buzatu (administration, infrastructure)
Dr. Octavian Bucur, MD, PhD

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ROGEN: Specific Objectives

I **Implementation of the national genomics research agenda within the national genomics medical research network**, in synergy with partners' agendas and the needs of the national health system;

II **Development of the national genomics infrastructure to support the realisation of research projects and the implementation of genomic medical research**, in order to sequence, store, process and analyse the obtained genomic data and develop the associated standards, procedures and methodologies;

III **The transfer of the genomic research results in the national health system**, through the national network of genomic research in medicine, in order to improve the quality of life of patients in Romania

IV **Obtaining RDI solutions in genomics with impact in economy and society.**

ROGEN: Strategic operation (1)

Health Operational Programme

Priority 5: Innovative approaches in medical research

Specific objective: OP1- RSO1.1 Developing and enhancing research and innovation capacities and the uptake of advanced technologies

Implementation of research solutions in the field of genomics

Financial allocation: 85 million EUR

Project coverage: national

Eligible beneficiaries: Partnership between the Genomics Research and Development Institute and relevant entities e.g. (genomics research institutes, other research organizations, public medical units, universities/UMF, CDI units, innovation and technological transfer entities, etc.).

Timeline of the non-competitive call:

- Call opening (2nd trimester 2023),
- Call closing (3rd trimester 2023);
- Starting date - estimation (1st trimester 2024)

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ROGEN: Strategic operation (2)

Eligibile actions

- *R&D activities in genomics, bioinformatics and other omic sciences, piloting genomic testing* in less developed regions and and capitalizing on the results produced
- *Development of the national reference genome, development of the national genomic database* and processing of genomic data to improve prevention and diagnosis in cancer, rare diseases and other conditions
- *R&D activities for prevention and early detection in targeted priority conditions* such as cancer, chronic non-communicable diseases, including early prediction, identifying correlations and integration of medical imaging data and molecular data using AI platforms
- *R&D activities involving functional genomics studies* in order to classify and exploit them for diagnostic and therapeutic purposes
- *Development of rapid translation methods*, including through evaluation of technologies and tests, quality assurance, *development of associated standards, procedures and methodologies*
- *Development of R&D capacity* by adapting the national R&D infrastructure for sequencing, storage, processing, analysis of obtained genomic data, management of large volumes of quality clinical and biological data ("data sharing") and their *integration with similar European initiatives*

National Network of Genomic Medicine

- setting up of a national network of partner *research* centres, hospitals, and medical institutes, with expertise in the field of genomic research

CO - Genomics Research and Development Institute	P10 - Oncological Institute "Prof. Dr. Ion Chiricută" Cluj
P1- Fundeni Clinical Institute, Bucharest	P11 - "Lucian Blaga" University, Sibiu
P2 - National Institute of Endocrinology "C.I. Parhon" Bucharest	P12 - Transilvania University of Brașov
P3 - Oncological Institute "Prof. Dr. Alexandru Trestioreanu" Bucharest	P13 - Polytechnic University of Bucharest
P4 - "Carol Davila" University of Medicine and Pharmacy from Bucharest	P14 - University of Bucharest
P5 - "Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca	P15 - Ovidius University of Constanta
P6 - University of Medicine and Pharmacy in Craiova	P16 - "Ștefan S. Nicolau" Institute of Virology of the Romanian Academy
P7- "Grigore T. Popa" University of Medicine and Pharmacy	P17 - Institute of Biochemistry of the Romanian Academy
P8- "George Emil Palade" University of Medicine, Pharmacy, Science, and Technology of Targu Mures	P18 - National Institute of Infectious Diseases "Prof. Dr. Matei Balș"
P9 - "Victor Babeș" University of Medicine and Pharmacy from Timișoara	P19 - "Victor Babeș" National Research-Development Institute in the Field of Pathology and Biomedical Sciences
	P20 - "Cantacuzino" National Institute for Medical-Military Research and Development

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Progress (1)

- **Centralization of the information on infrastructure and personnel** for all partners (March 2023)
- **Preliminary discussion, individually with each partner** (March 2023)
- **Identification of the specific activities where each partner wishes and can contribute** (March 2023)
- *Organizing working groups (decentralized) responsible for specific activities (April 2023)*
  - National Reference Genome (WGS sequencing and Bioinformatics)
  - Biobanking
  - Machine Learning/AI in Genomics
  - Single cell sequencing
  - Cancer, Rare Diseases, Infectious Diseases, Neurogenomics, Cardiovascular Genomics, Reno-urinar Genomics
  - Microbiome
  - Omics (Epigenomics, Proteomics, and other subgroups)
  - Functional Genomics (CRISPR, CAR-T, Farmacogenomics, Immunogenomics and several others)
  - Anatomic Pathology and Imaging
  - Ethics and Standardization
- *Organizing specific committees:* DAC (Data Access Committee), SAC (Science Advisory Committee)

Progress (2)

- Design and start implementing a reliable plan to address the lack of personnel with expertise, such as those in computational genomics and machine learning/AI in genomics:
  - Bring Romanians from diaspora to help
  - Start training new personnel
  - Find solutions for higher salaries
  - Any other suggestions?
- Take advantage of international expertise and models (data storage, sharing, bioinformatic tools etc) through impactful collaborations (*April 20-25, 2023 visit several top genomic centers)*
  - *Harvard University*
  - *MIT*
  - *Johns Hopkins University*
- Integration in European and international genomic-related initiatives

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Conclusion

National Network of Genomic Medicine aims to develop the genomic medical research in Romania, through:

- **Integrated approach:** innovative and integrated actions (work together)
- **Impact:** aim for high impact outcomes (patients, Romania, genomics/personalized medicine)
- **International collaborations** and expertise (we should not reinvent the wheel here)
- **Integration** in European and international genomic-related initiatives
- **Support performance**: this network should try to help individual research institutions to reach the next level of development in genomics nation-wide, using an integrated approach.

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