NeuROX

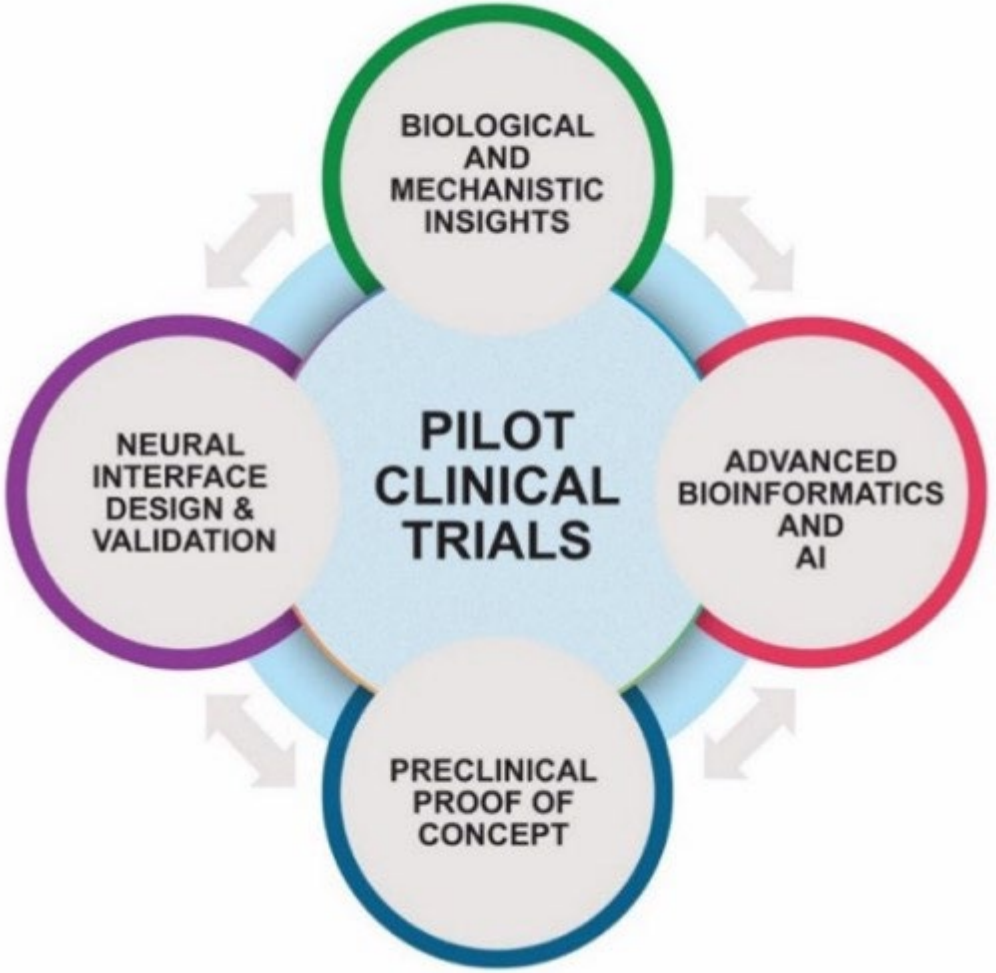
CENTRUL ROMÂN DE EXCELENȚĂ
ÎN NEUROȘTIINȚE CLINICE

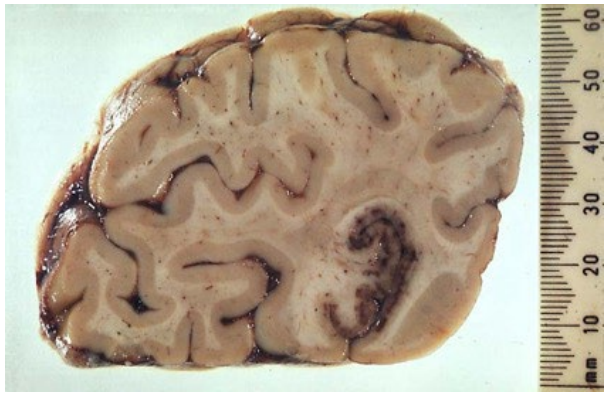
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Societal impact zone; 4.5 New tools technologies and digital solutions for a healthy society

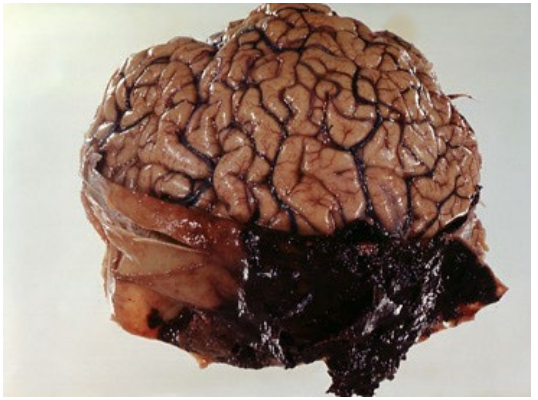
BRAIN British-Romanian Academic Institute of Neuroscience

Aim: to harness and integrate cutting-edge technological advancements in neuropathology, genetics/epigenetics, neuro-engineering and artificial intelligence, intertwining next generation novel and state-of-the-art pre-clinical models and clinical trials to unlock new avenues of translational research with measurable positive impact on the diagnosis, prognosis and treatment of neurological conditions





Rationale



- Neurological diseases represent the **single most major cause of disability in the world** and the third in Europe (after cardiovascular diseases and cancer)
- **No national dementia strategy and 600,000 living with dementia in Romania**
- **Cost of ALS treaments in Romania is highest in Europe**
- CNS tumours (14%) top the cancer diagnosis of the Romanian pediatric population **with highest mortality rate in Europe**
- TBI is the main cause of death in people under 40 years old, incidence: 300 cases /100,000 citizens. **Every 8 minutes a Romanian has a TBI.**
- **Romania has one of the highest incidences of stroke and highest mortality rate due to brain haemorrhages in Europe.**

Partners

- Grigore T. Popa University of Medicine and Pharmacy Iași through Advanced Center of Research-Development in Experimental Medicine (CEMEX)





- Transylvania University of Brașov



- "Victor Babeș" National Institute of Pathology, Bucharest



- "Iuliu Hatieganu" University of Medicine and Pharmacy Clui-Napoca.
- Emergency County Clinical Hospital Târgu Mureș





Key persons: Roxana Carare, Irina Mohorianu, Mark Slevin, Romeo Racz

Management of project: Nicoleta Suciu

Scientific Council: Kevin O'Neill (neurosurgery), Raj Kalaria (neuropathology), Britta Englehardt (neuroimmunology), Mo Al'Onaizi (neuro metabolism)

Mentors: Ajay Verma (biotechnology, industrial partner), Stefano Pluchino (bioinformatics).

Objective 1:Assessment of Unmet Needs in common neurodegenerative and neurovascular diseases including head injury.

All partners participate

- Biological: retrieval and cross-assessment of **sequencing and imaging high throughput datasets**

- Engineering: literature review of **engineering-driven approaches for targeted delivery of drugs.**

- Computational: leading to a scalable and generalizable framework permitting the integration of heterogeneous sequencing and imaging data ;**AI/ML-driven identification of common patterns and specific differences for major disease models.**

Neurological diseases across the lifespan

Young brains: Paediatric brain tumours

Adults: TBI, Multiple Sclerosis, Parkinson's disease

Aged brains: Alzheimer's disease

nature medicine

Article

https://doi.org/10.1038/s41591-025-03562-5

Prospective, multicenter validation of a platform for rapid molecular profiling of central nervous system tumors

Received: 28 March 2024

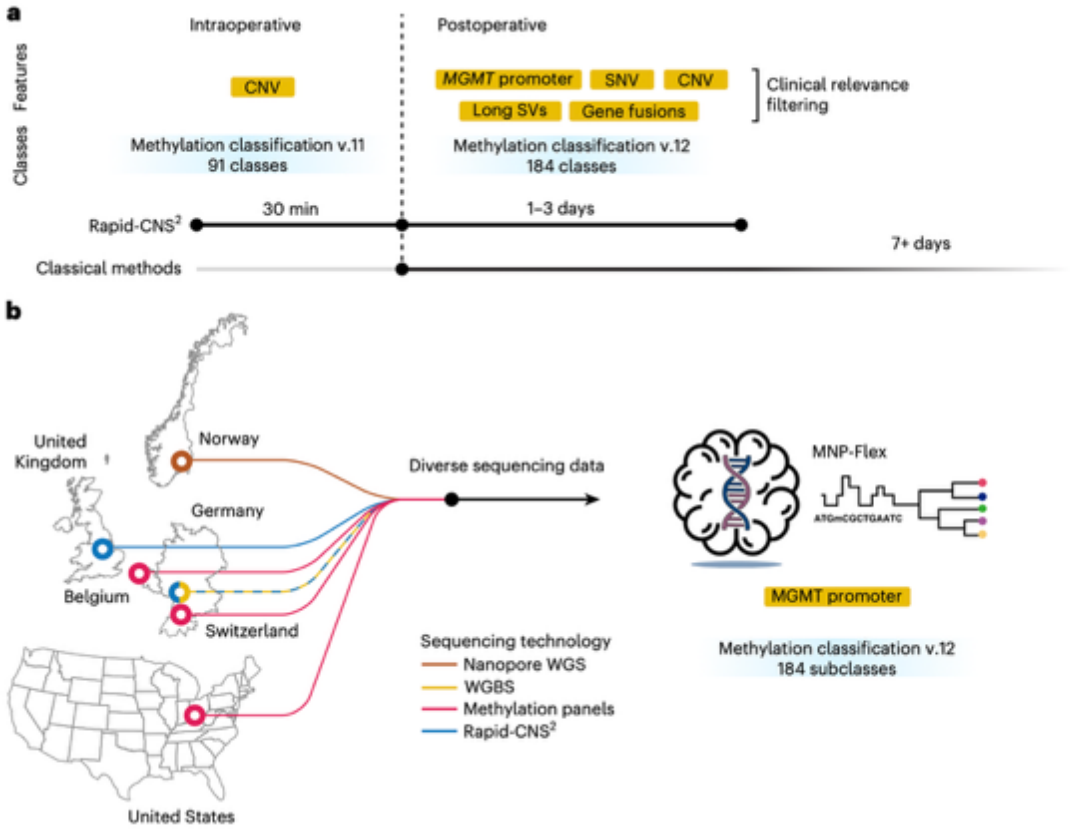
Accepted: 4 February 2025

Published online: 25 March 2025

Check for updates

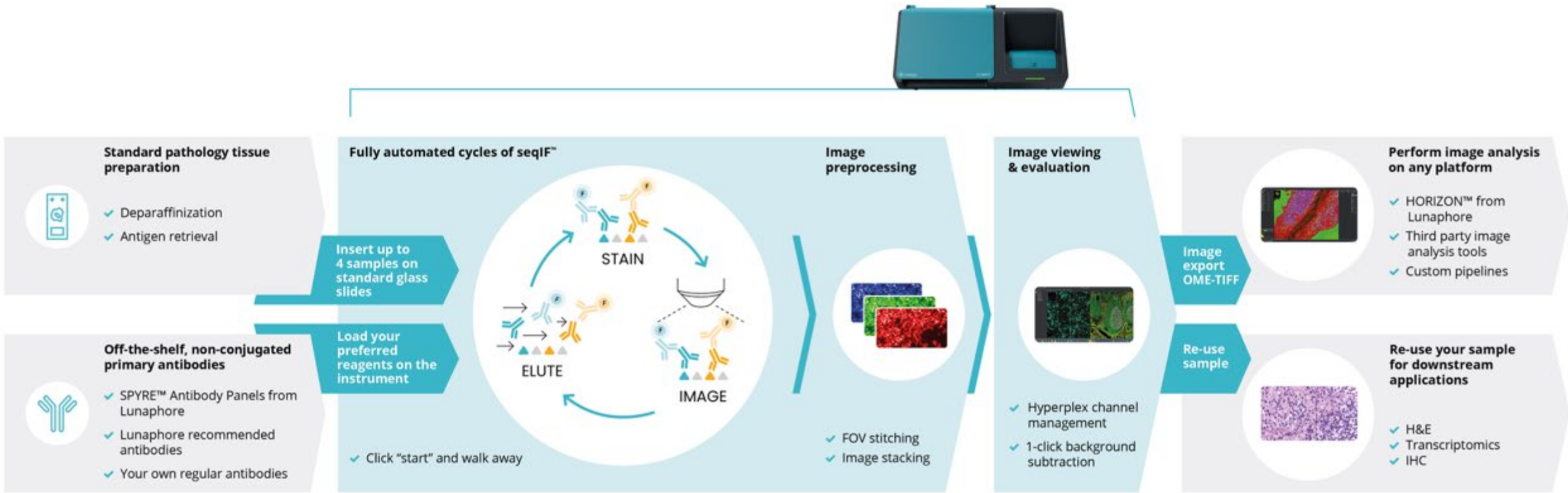
A list of authors and their affiliations appears at the end of the paper

Molecular data integration plays a central role in central nervous system (CNS) tumor diagnostics but currently used assays pose limitations due to technical complexity, equipment and reagent costs, as well as lengthy turnaround times. We previously reported the development of Rapid-CNS², an adaptive-sampling-based nanopore sequencing workflow.



Objective 2: Creation of a national and multi-national clinical trials centre and co-ordination of cross centre neurological investigations

- Clinical: Creation of NeuRoBank: blood, CSF, tissue (surgical, postmortem).
- Biological: Novel biomarkers. Pre-market evaluation of new potential therapeutics and pharmacologics.



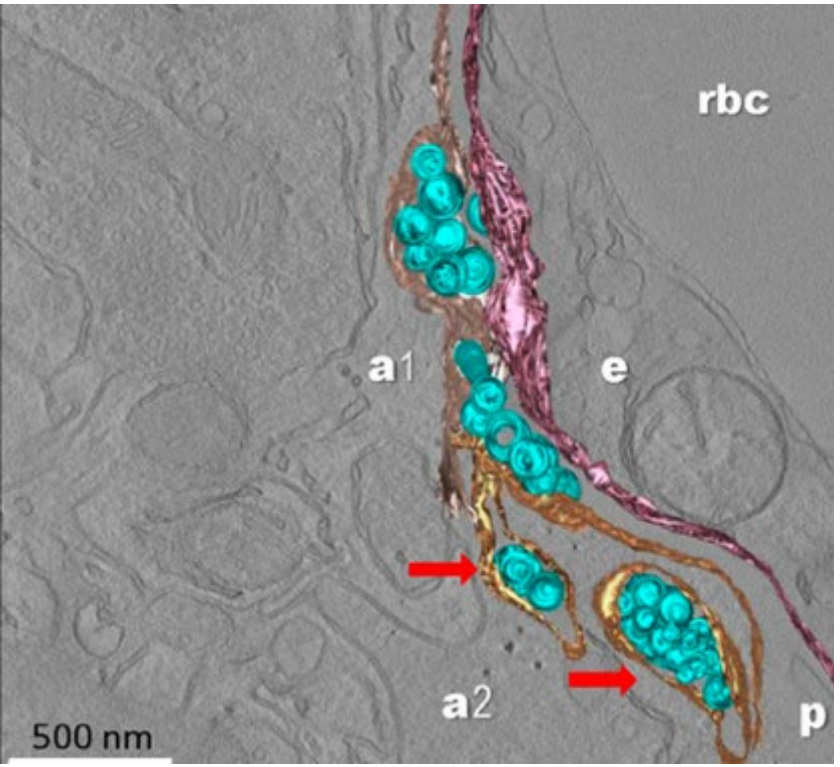
Objective 3: Pre-clinical development, modelling, interpretation

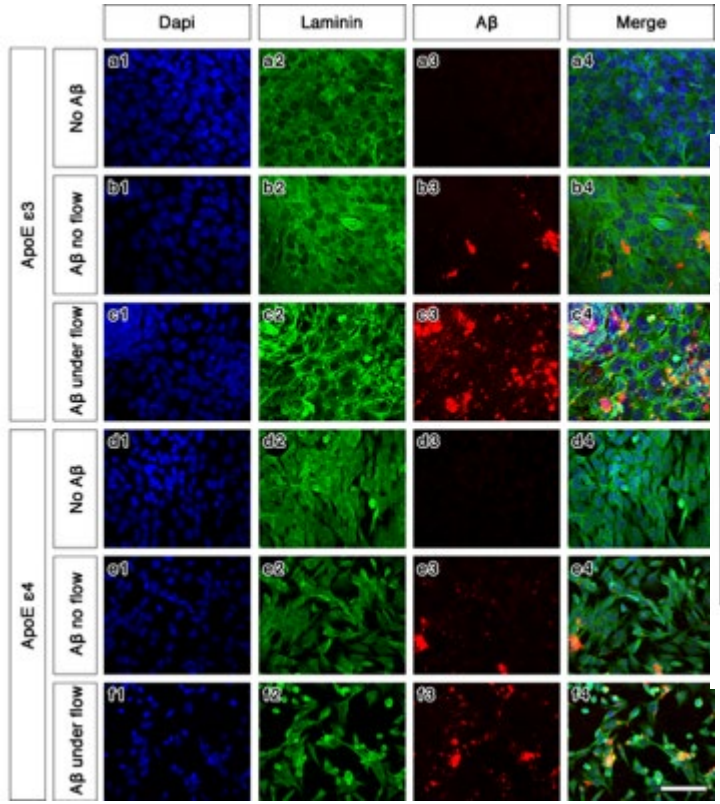
„Victor Babeș" National Institute of Pathology

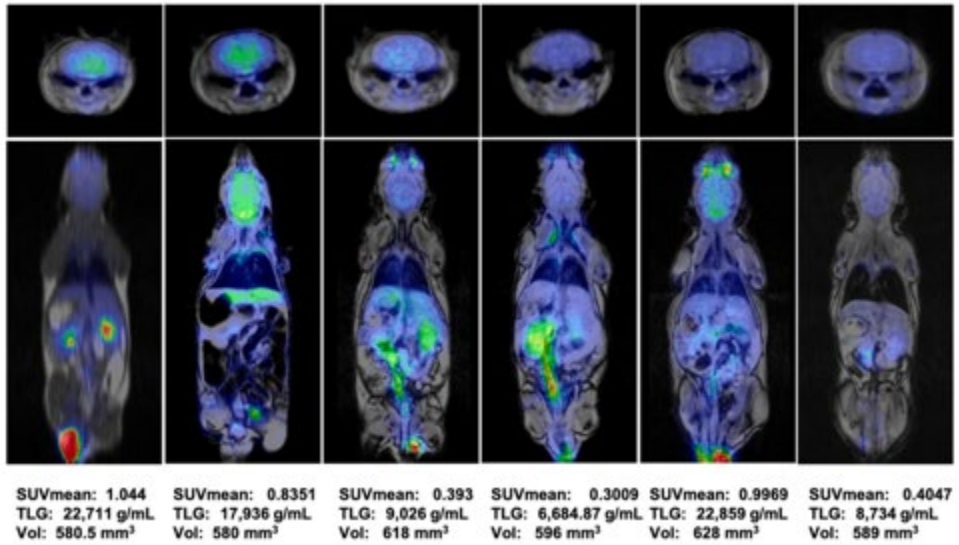
UNIVERSITATEA DE MEDICINĂ, FARMACIE, ȘTIINȚE ȘI TEHNOLOGIE GEORGE EMIL PALADE TÂRGU MUREȘ

CEMEX
ADVANCED RESEARCH-DEVELOPMENT CENTER IN EXPERIMENTAL MEDICINE „PROF. OSTIN C. MUNGIU"

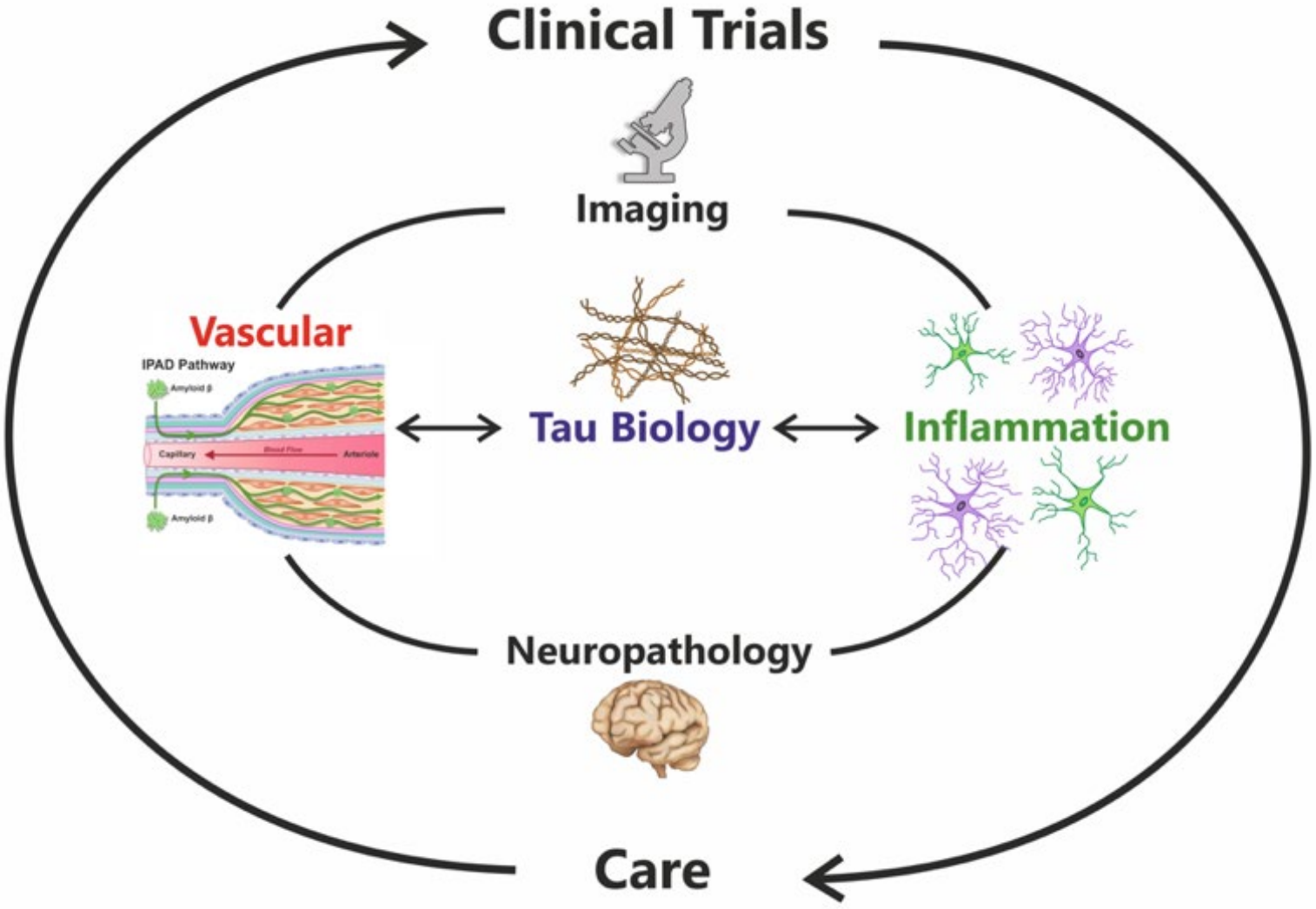
GRIGORE T. POPA UNIVERSITY OF MEDICINE AND PHARMACY IASI



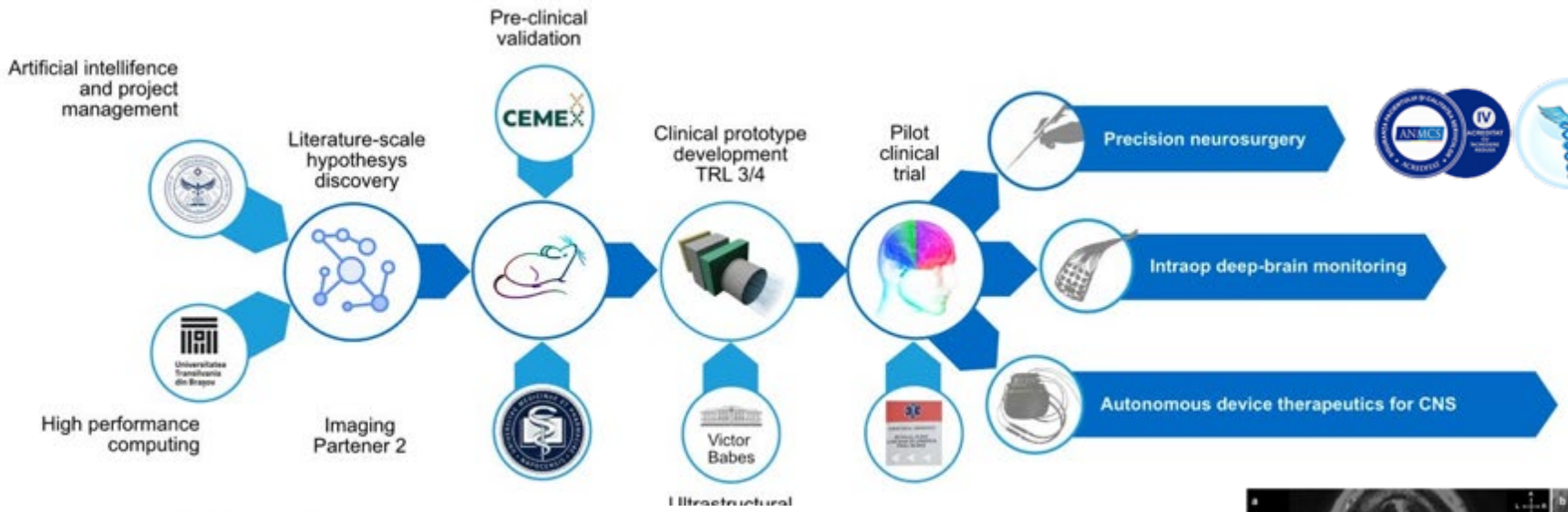




Example: development of new preclinical models such as organoids for testing biomarkers and new therapeutics in dementia



Objective 4. Enhancing Neurotechnology with Advanced Devices



SPITALUL CLINIC JUDEȚEAN DE URGENȚĂ TÂRGU - MUREȘ

UMF UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE IULIU HAȚIEGANU CLUJ-NAPOCA

Nat Med. 2024 November ; 30(11): 3345–3356. doi:10.1038/s41591-024-03196-z.

Chronic adaptive deep brain stimulation versus conventional stimulation in Parkinson's disease: a blinded randomized feasibility trial

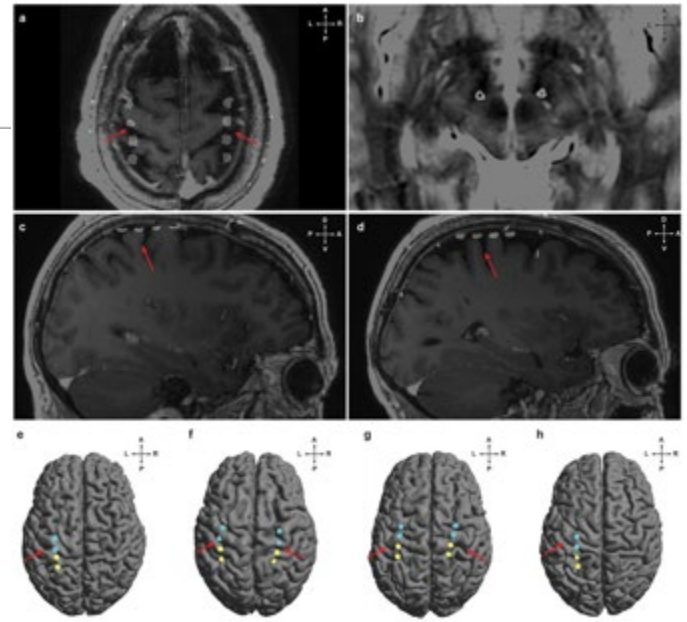
Carina R Oehrn[1,*], Stephanie Cernera[1,*], Lauren H Hammer[2,*], Maria Shcherbakova[1], Jiaang Yao[1,3], Amelia Hahn[1], Sarah Wang[2,4], Jill L Ostrem[2,4], Simon Little[2,3,4,], Philip A Starr[1,3,4,**]**

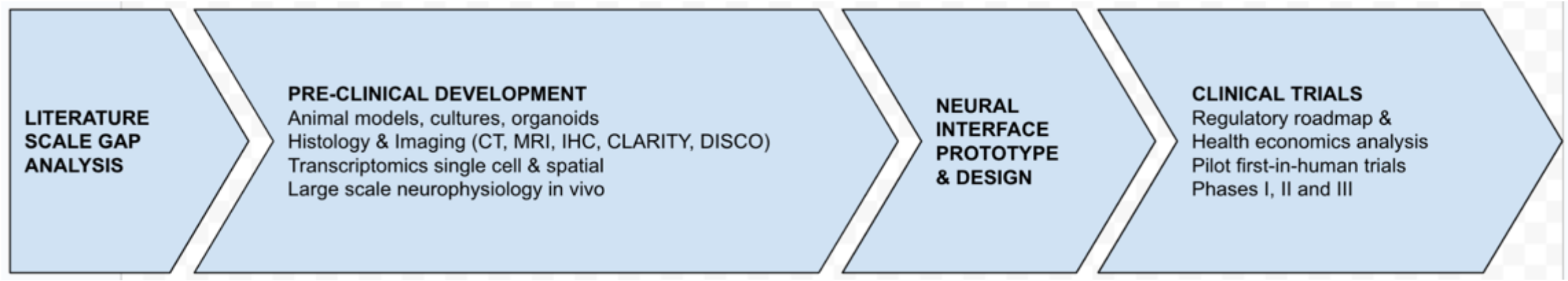
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Published in final edited form as:
Neuron. 2022 December 07; 110(23): 3936–3951.e10. doi:10.1016/j.neuron.2022.09.002.

Myeloid cell interferon secretion restricts Zika flavivirus infection of developing and malignant human neural prog cells

Harry Bulstrode[#*,1,2], **Gemma C Girdler**[#1,2], **Tannia Gracia**[#3], **Alexander Aivazidis**[4] **Moutsopoulos**[1], **Adam MH Young**[1,2], **John Hancock**[3], **Xiaoling He**[1], **Katherine Ridl Zhaoyang Xu**[1,5], **John H Stockley**[1,5], **John Finlay**[1,5], **Clement Hallou**[1,5], **Teodoro F Daniel M Fountain**[8], **Stijn van Dongen**[4], **Alexis Joannides**[2], **Robert Morris**[2], **Richa Colin Watts**[9], **Thomas Santarius**[2], **Stephen J Price**[2], **Peter JA Hutchinson**[2], **Emma Hodson**[10], **Steven M Pollard**[11], **Irina Mohorianu**[1], **Roger A Barker**[1], **Trevor R Swee Omer Bayraktar**[4], **Fanni Gergely**[*,3,13], **David H Rowitch**[*,+,1,4,5]

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[2]Division of Academic Neurosurgery, Department of Clinical Neurosciences; University Cambridge, Cambridge, CB2 0QQ, UK

[3]Cancer Research UK Cambridge Institute; University of Cambridge, Cambridge, CB2

cells

MDPI

Article

Proportions of Basement Membrane Proteins in Cerebrovascular Smooth Muscle Cells After Exposure to Hypercapnia and Amyloid Beta

Jennifer M. Dewing [1,*], Abby Keable [1], Alexandru Laslo [2], Laura Chinezu [2], Adrian Ivanescu [2], J. Arjuna Ratnayaka [1], Raj Kalaria [3], Mark Slevin [2], Ajay Verma [4] and Roxana O. Carare [1,2]

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NeuRoX drives innovation to improve brain health and restore hope







NeuRoX: where the first efficient cure for a neurological disease has been discovered



