Impact

With an annual number of approximately 1.4 million cases and with 1.1 million of them resulting to death, stroke is the second most common cause of mortality in Europe.

Carotid artery disease:

- is a leading cause of cerebrovascular events and ischaemic stroke,
- causes 150.000 deaths annually,
- leads to over than €12 billion per year in direct and indirect costs, in Europe.

Expected impact of TAXINOMISIS

New models for patient stratification to inform clinical decision-making

Accelerate the translation of biomedical and clinical research results to medical use

Increased cost-effectiveness of the novel concepts in comparison to already established practices

Research and innovation opportunities particularly for small or medium-sized enterprises

Consortium

MEDICAL TECHNOLOGY
Med Lab & INTELLIGENT INFORMATION SYSTEMS

UMC Utrecht

MRI
Klinikum rechts der Isar
Technische Universität München

UNIVERSITY OF BELGRADE
SCHOOL OF MEDICINE

imec

BRFAA
BIOMEDICAL RESEARCH FOUNDATION
ACADEMY OF ATHENS

UNIVERSITY OF OXFORD

ZORA
BIOSCIENCES

Tays
Tampere University Hospital

nivel

OSPEDALE SAN MARTINO
ist

National and Kapodistrian
UNIVERSITY OF ATHENS

CLÍNIC
BARCELONA
Hospital Universitari

BioIRC

ENGINEERING

ESCVS
The European Society for Cardiovascular
and Endovascular Surgery
.. brings together what belongs together!

TAXINOMISIS

A multidisciplinary approach for the stratification of patients with carotid artery disease

The 6 main objectives of the project are to:

1

Investigate the causal relationship of the major pathways and factors identified in symptomatic carotid artery disease

2

Study disease phenotypes and disintegrate them into endotypes according to specific pathobiological mechanisms

3

Integrate a computational model and an agent based model of plaque progression in the risk stratification tool

4

Perform a test for determining the presence of single Nucleotide Polymorphisms and predicting drug response
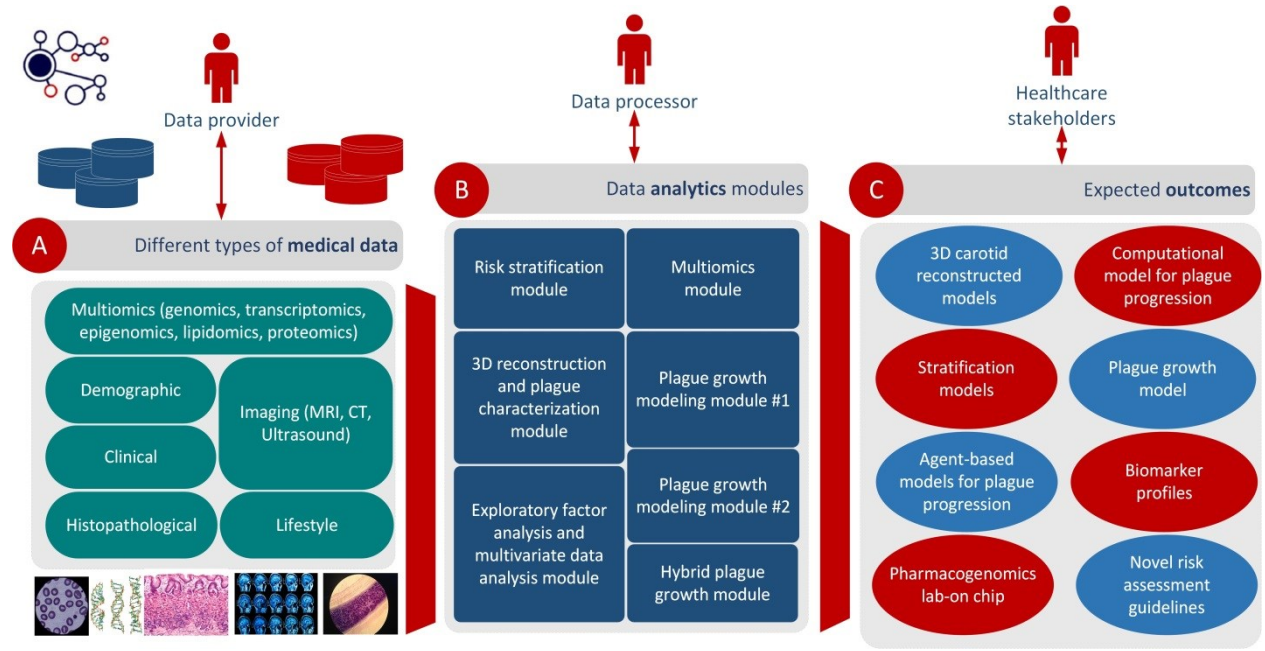
5

Evaluate the risk model of carotid artery disease stratification in an observational multicentre clinical study

6

Present a cost-effectiveness analysis

- The **data providers** will upload prospective and retrospective medical data in the platform, including: (i) demographic, (ii) multiomics (e.g., lipidomics, transcriptomics, proteomics, epigenomics, genomics), (iii) imaging, (iv) clinical, (v) histopathological, and (vi) lifestyle, which will be stored in secure databases within the cloud.

- The **data sharing process** will be GDPR compliant fulfilling all the necessary legal and ethical requirements. The **data processor** is responsible for the establishment of the data analytics modules which offer the basis for addressing the objectives of the TAXINOMISIS initiative.

- The **data analytics modules** include: (i) the risk stratification module, (ii) the multiomics module, (iii) the plaque growth modeling module, (iv) the hybrid plaque growth module, (v) the exploratory factor analysis and multivariate data analysis module, and (vi) the 3D reconstruction and plaque characterization module.

- The successful establishment of the data analytics services will in turn yield the **expected outcomes** of the TAXINOMISIS platform which are: (i) 3D carotid reconstructed models, (ii) computational models for plaque progression, (iii) risk stratification models, (iv) plaque growth models, (v) biomarker profiles, (vi) agent-based models for plaque progression, (vii) pharmacogenomics lab-on chip, and (viii) novel risk assessment guidelines.

Data provider — Data processor — Healthcare stakeholders

A Different types of **medical data**
- Multiomics (genomics, transcriptomics, epigenomics, lipidomics, proteomics)
- Demographic
- Imaging (MRI, CT, Ultrasound)
- Clinical
- Histopathological
- Lifestyle

B Data **analytics** modules
- Risk stratification module
- Multiomics module
- 3D reconstruction and plaque characterization module
- Plaque growth modeling module #1
- Exploratory factor analysis and multivariate data analysis module
- Plaque growth modeling module #2
- Hybrid plaque growth module

C Expected **outcomes**
- 3D carotid reconstructed models
- Computational model for plaque progression
- Stratification models
- Plaque growth model
- Agent-based models for plaque progression
- Biomarker profiles
- Pharmacogenomics lab-on chip
- Novel risk assessment guidelines

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