Proposal 277

Type: Pilot Project / New

Title:
Development of an automated database to collect and structure non-animal methods (NAMs) for use in biomedical research

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Heading: 1. Single Market, Innovation and Digital
Budget line: PP 01 22 XX

Appropriations (EUR):
Commitments: 500.000 **Payments:** 250.000

Remarks:
The overall objective of this pilot project is to create the first EU public database of human biology- based models and non-animal methods, providing open access to the scientific community with project evaluators and ethical review committees among others.

Roughly 10 million animals are used in procedures for research and testing across the EU each year and about 200 million worldwide. In 2017, the European Commission DG JRC EURL ECVAM embarked on a series of studies to review available and emerging non-animal models (NAM) being used for research in seven disease areas: 1) respiratory tract diseases 2) breast cancer 3) immune-oncology 4) immunogenicity of advanced therapeutic medicinal products 5) neurodegenerative disorders, 6) cardiovascular diseases and 7) autoimmunity. In 2020, the two first studies (on respiratory tract diseases and breast cancer) were published while the others will follow in 2021. In spite of this remarkable effort, this work is in danger of quickly becoming outdated, given that the rapid increase in knowledge is accompanied by a decrease in the useful lifespan of that knowledge. Therefore, the aim of this pilot project is to develop an artificial intelligence (AI) automated database that collects and structures the NAMs in use for biomedical research. NAMs corresponds to in vitro methods based on human cells and engineered tissues or in silico approaches employing computer modelling and simulation. Using AI to mine the vast body of published literature enables the creation and maintenance of an up-to-date, state of the art knowledge source collating NAMs applied to biomedical research. Moreover, the AI approach will allow the development of a sustainable design and implementation of the platform, which can be easily maintained by a third party and further refine through a community based support.

By understanding and sharing information on successful NAMs in biomedical research, it is expected that the transition of the scientific community towards human biology-based methodologies will be encouraged, facilitated and potentially accelerated. In fact, the use of human biology-based models and methods is vital to improve the relevance of biomedical research, to enhance the likelihood that results will translate to patients and to accelerate the transfer of research results into clinical and public health practices.

The use of AI is vital for the automation and cost-effective retrieval of the huge amount of data which will be required to ensure that the knowledge remains updated and current. In fact, the application of AI has already proven its worth and is frequently used by EU institutions such as EFSA for the automation of evidence-based science.

Objectives:
Ultimately, this project will result in the development of the first EU public database of human biology-based NAM for biomedical research. This will be achieved through the following objectives:

- Combine the results of the existing seven studies from DG JRC EURL ECVAM to create an initial database.
- Apply these results to enable training of an AI-boosted algorithm that will further populate the database and ensure it is kept up-to-date.
- Design further integrations to expand the database to include NAMs for other human diseases.
- Develop a user-friendly web interface to facilitate public searches of content and allow filtering for NAM for specific human diseases.
- Provide recommendations on how to successfully deploy this AI-boosted NAM database to the scientific community.
- Provide specific recommendations to ensure long term sustainability of the database to all stakeholders (scientific community at large as well as Member States and competent authorities responsible for project evaluation).

Justification:
Europe should lead the human-biology-based biomedical research era by providing a NAM database, in the same way that the USA has provided public databases such as PubMed and Clinicaltrials.gov. Collecting NAM in one coherent, up-to-date AI-driven database will reinforce the leading position of Europe to contribute to the 3Rs (replacement, reduction, refinement) principles enshrined in Directive 2010/63/EU and ensures continual alignment with rapid advances in the non-animal technologies to help promote the use of data for a better understanding of human diseases.

Preferred DG: DG Joint Research Centre (JRC)

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