Genomics for Next Generation Healthcare in Haematological Diseases

The consortium of GenoMed4All - Genomics and Personalised Medicine for all through Artificial Intelligence in Haematological Diseases is pleased to announce the launch of an ambitious joint initiative selected and granted by the European Commission under the Horizon 2020 Research & Innovation programme.

GenoMed4All will develop a secure and private data sharing platform based on Federated Learning for the pooling of genomic, clinical data and other high-throughput “-omics” health data. The ultimate goal is to unleash the power of novel Artificial Intelligence (AI) models to advance research in personalised medicine for haematological diseases, combining already-established clinical-pathological parameters with advanced genomic profiling to create innovative diagnostic, prognostic and therapeutic strategies.

Haematological diseases involve a large group of up to 450 disorders resulting from abnormalities of blood cells, lymphoid organs and coagulation factors, generally divided in groups of oncological or non-oncological diseases. The majority have a genetic background and they represent a public health challenge: haematological malignancies account for about 5% of cancers, most can cause chronic health problems and many are life-threatening conditions. In 2016, the European Haematology Association (EHA) evaluated the financial burden of blood disorders on European society at €22.5 billion per year.

GenoMed4All will develop 3 application cases covering common and rare oncological (Myelodysplastic syndromes and Multiple Myeloma) and non-oncological (Sickle Cell Disease) haematological diseases. AI solutions will be implemented to enhance the diagnostic capacity, assess treatment options and predict disease outcomes.

GenoMed4All’s Federated Learning will seize the power of High Performance Computing facilities and key EU networks like ERN-EuroBloodNet, pooling resources from hospital registries, data processing tools, and pre-existing repositories to support clinical research and decision making. Our mission is to link Europe’s most relevant genomic repositories in haematological diseases, facilitating standardized sharing of cross-
border data, ensuring full compliance with data protection legislation and ethical principles, and thus demonstrating the potential and benefits of trustable and explainable AI technologies in personalised medicine.

Our Key Results in a nutshell:

- 66 clinical sites repositories connected from ERN-EuroBloodNet.
- 20+ additional genomics data repositories linked.
- 10% increase in prediction accuracy for genomic landscaping models.
- 80% increase in prognosis accuracy and individual treatment response.

GenoMed4All will span 4 years and mobilize a large consortium of 23 key partners from Spain, Italy, Germany, France, Cyprus, Greece and Denmark, covering the whole value chain of clinical, regulatory and ethics research, academia, healthcare, disruptive tech and digital service providers.
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