VARIOMIS: Deconvoluting genetic diversity to de-risk drug discovery

Challenge

- Drugs are commonly designed based on the genetics of a narrow subset of the human population.
- The result is that many drugs don't work as well for people in countries not represented in that subset, often in regions with fewer alternatives.
- Trial failures due to lack of efficacy in some populations mean that fewer drugs get to market, resources are wasted and the cost to patients is increased for successful drugs.
- Drugs can also be recalled for safety reasons if they have unpredicted effects in some populations.
- The challenge is therefore to account for global genetic diversity to make safer and and more broadly effective drugs.

Technology (TRL3)

Variomis is an AI startup, guiding the development of drugs which reflect the true complexity of the human population. Our software is designed to reduce global healthcare disparities by enabling the development of drugs which are safer and work better, for everyone. For each potential target region, we provide a report on variation likely to occur in human populations. We assess the consequence of this variation on binding, to a range of small molecules. AI derived models are validated and refined on state-of-the-art experimental methods via our lab in the loop. Our diversity effect assessments allow our customers to compare and rank preclinical targets to deprioritise those which may be affected by global genetic diversity.

VARIOMIS

Internal EMBLEM Reference

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Key Inventors

James Stephenson, **PhD.**
Lead Data Scientist/Bioinformatician
EMBL-EBI Hinxton, UK

EMBLEM TECHNOLOGY TRANSFER GMBH
Boxbergring 107
69126 Heidelberg
Germany
Tel.: +49 (0) 6221 363 22 10
info@embl-em.de
www.embl-em.de

Dr. Birgit Kerber
kerber@embl-em.de

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Applications

- **Drug target selection:** identify targets resilient to global genetic variation (diversity-based target screening)
- **Lead optimisation:** select compounds effective across diverse genotypes
- **Clinical trial design:** stratify participants and select representative sites
- **Regulatory support:** demonstrate global efficacy and safety robustness
- **Pharmacovigilance:** predict population-specific safety risks
- **Global health:** improve access by ensuring drug effectiveness worldwide

Benefits

- Reduces trial failures across diverse populations
- Improves global drug safety and efficacy
- Cuts R&D costs by deprioritizing risky targets
- Speeds up drug development decisions
- Promotes equitable healthcare worldwide
- Supports regulatory approval with global data
- Enables better target ranking and selection

Keywords

AI-driven
Lab-in-the-Loop
Genetic Diversity
Target Selection
Lead Optimisation
Clinical Trials
Global Health
Drug Safety
Drug Efficacy
Pharmacogenomics

Intellectual Property

☒ Know-how based

☒ Copyright

Commercial Opportunity

We provide an AI-driven platform to guide target prioritisation accounting for global genetic diversity and are seeking collaboration and investment to scale its impact.

Seeking:

☒ Development partner

☒ Commercial partner

Further Reading

[1] https://doi.org/10.1093/nar/gkae413

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