PSY-PGx

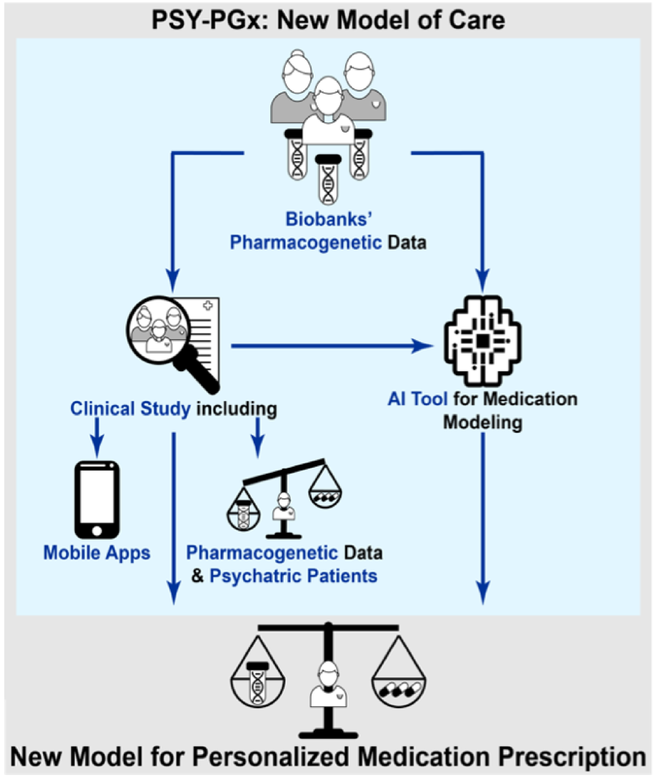
PSY-PGx – A New Intervention for Implementation of Pharmacogenetics in Psychiatry

Urs Heilbronner[1], Allan H Young[2], Mario Juruena[2], Eduard Vieta[3], Esther Jimenez[3], Martien J Kas[4], Marin Jukic[5,9], Markus Nöthen[6], Alexandra Philipsen[7], Laura Kilarski[7], Jaakko Kaprio[8], Magnus Ingelman-Sundberg[9], Moritz Rossner[10], Sven Wichert[10], Ramona Moldovan[11,12,13], Bart Rutten[14], Sinan Guloksuz[14,15], Koen Schruers[14], Noam Shomron[16], Thomas G. Schulze[17], Roger Man Kin Ng[18], Nigel Olisa[19], Erik Van der Eycken[19], Monika Budde[1], Erika van Hell[14] and Roos van Westrhenen[20,2,14]

1 Institute of Psychiatric Phenomics and Genomics (IPPG), LMU Munich, Germany
2 Institute of Psychiatry, Psychology & Neurosciences, King's College London, United Kingdom
3 Bipolar and Depressive Disorders Unit, Hospital Clinic, Institute of Neurosciences, IDIBAPS, CIBERSAM, University of Barcelona, Spain
4 Groningen Institute for Evolutionary Life Sciences, Faculty of Science & Engineering, University of Groningen, the Netherlands
5 Faculty of Pharmacy, University of Belgrade, Serbia
6 Institute of Human Genetics, Universitätsklinikum Bonn, Germany
7 Department of Psychiatry and Psychotherapy, University of Bonn, Germany
8 Institute for Molecular Medicine Finland FIMM & Department of Public Health, University of Helsinki, Finland
9 Department of Physiology & Pharmacology, Karolinska Institute, Sweden
10 Systasy Bioscience GmbH, Germany
11 Department of Psychology, Babeș-Bolyai University, Romania
12 Division of Evolution and Genomic Sciences, University of Manchester, United Kingdom
13 Manchester Centre for Genomic Medicine, Manchester University Hospitals NHS Foundation Trust, United Kingdom
14 School for Mental Health and Neuroscience, Department of Psychiatry and Neuropsychology, Maastricht University Medical Centre, the Netherlands
15 Department of Psychiatry, Yale University School of Medicine, USA
16 Faculty of Medicine, Tel Aviv University, Israel
17 Department of Psychiatry, SUNY Upstate Medical University, USA
18 World Psychiatric Association
19 Global Alliance of Mental Illness Advocacy Networks-Europe (GAMIAN-Europe)
20 Department of Psychiatry, Parnassia Groep BV, the Netherlands

Background

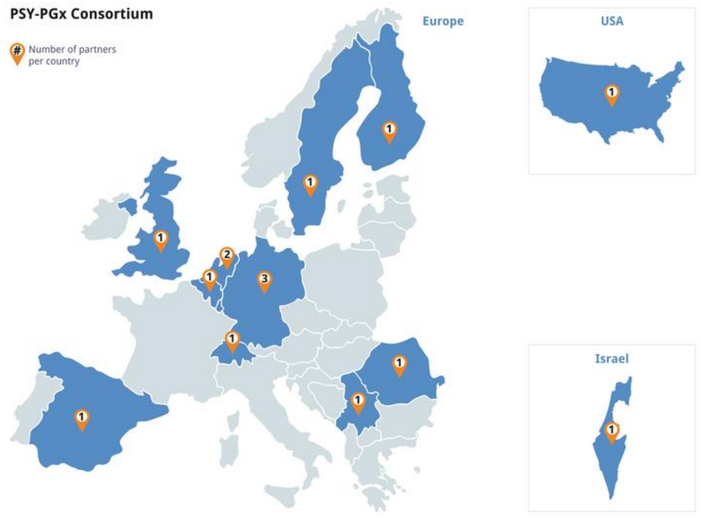
- Limited efficacy of pharmacological treatments for mental disorders due to genetic heterogeneity of patients, low treatment compliance, and frequent adverse effects
- Assessment of person-specific genetic factors that are suggested to be able to predict clinical response and adverse effects via pharmacogenetic testing
- Potentially improved efficacy and tolerability of treatment by genotyping of genes encoding drug-metabolizing enzymes



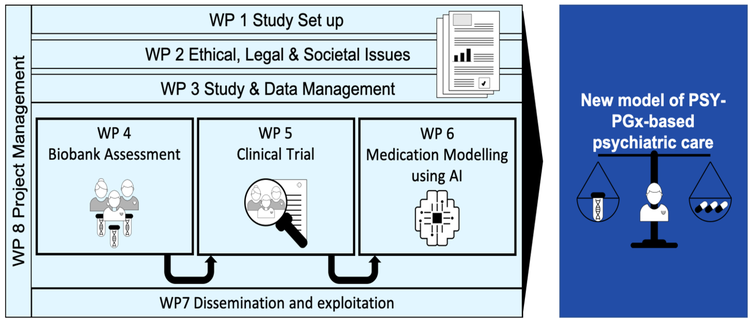
Overview of PSY-PGx's New Model of Care

Methods

- First initiative adding clinical evidence by proposing a multi-center, large-scale, non-industry sponsored randomized clinical trial systematically researching the clinical benefits and potential of pre-emptive pharmacogenetic-based interventions for psychiatric patients
- Usage of Biobank data from Finland and the UK to evaluate the impact of pharmacogenetic variation on actual patient profiles and outcomes
- Investigation of the influence of additional pharmacogenetic associations on medication response by using AI and existing biobank data
- Incorporation of this information with previously existing knowledge to conduct an international, multi-center clinical trial in real-life psychiatric care for patients suffering from depression, anxiety or psychotic disorders



International PSY-PGx Consortium Partners



PSY-PGx Organizational Chart

Results

- Evaluation of the influence of individual patient characteristics, including pharmacogenetics and digital phenotyping, on efficacy and tolerability of psychiatric medication
- Development of an algorithm for personalized medication prescription, assisted by AI-based decision-support tools

Discussion

Potential for…

- …improving efficacy and tolerability of psychiatric drug treatment through PSY-PGx's resulting algorithm
- …improving the lives of millions of psychiatric patients and their families
- …considerable financial savings in healthcare systems
- … contributing to guide future policies on mental health on international and national levels

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 945151.