REPO4EU: The end of drug discovery as we know it

Harald H.H.W. Schmidt

Department of Pharmacology and Personalised Medicine, School of Mental Health and Neuroscience, Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht (The Netherlands)

Abstract

Drug repurposing reduces the time and costs of drug development but is often serendipitous and less effective than classical drug discovery [1]. Both, discovery [2] and repurposing, suffer from the same knowledge gap that diseases are mechanistically not understood and treated symptomatically in an imprecise manner [3]. Our team of world-leading scientists overcome this by breakthroughs in advanced bioinformatics and artificial intelligence (AI) on real-world big data to redefine diseases in a mechanism-based manner. Patients are still identified by symptom, but stratified according to causal mechanism, the endotype [4]. REPO4EU unites a group of long-standing collaborators in innovative drug repurposing, who will build together with our partner project, REMEDI4ALL, a comprehensive European/global platform for validated precision drug repurposing open to stakeholders for information, multimedia training, matchmaking and cooperation. Our molecular diagnostic-enabled [5] clinical trials are small, precise, innovatively designed, prioritising, in coordination with regulators, payers and investors, patient-defined outcomes with high safety and operational excellence. This revolutionary new era of organ-agnostic medicine and network pharmacology [6] will allow unprecedented efficacy and cost effectiveness. The promiscuity of small molecules and recently expanded knowledge of protein structures are exploited by cheminformatics and deep learning to repurpose drugs beyond their original target. At any level of the development chain, even for classic projects, REPO4EU provides expertise and matchmaking for freedom-to-operate, intellectual property, reformulation and value-creation, specialised in drug repurposing. Within 5 years, REPO4EU will establish a first-in-class coherent and innovative web-based platform for safe and efficient drug repurposing for all types of high unmet medical need indications to all European researchers and SMEs with a unique Open Science concept, ensuring global medical impact. Finally, within a 2-year interphase, REPO4EU will be converted into a sustainable European infrastructure.

Keywords

Systems medicine, network pharmacology, drug repurposing

References