Welcome to the Inaugural Edition of Drug Repurposing

Dear Readers,

It is with great enthusiasm that my co-editor-in-chief Hermann Mucke and I present the inaugural edition of Drug Repurposing, a journal dedicated to the transformative field of finding new therapeutic uses for existing drugs, enhanced for precision by systems and network medicine. This first edition features a robust collection of discussion articles, research papers, and review articles, jointly portraying the breadth of this innovative field. Our goal is to catalyze progress, inspire collaboration, and ultimately improve patient outcomes through the strategic repurposing of pharmaceuticals. Given the highly interdisciplinary nature of drug repurposing, we invite contributions from bioinformatics, cheminformatics, preclinical validation, clinical trials, ethics by design, freedom-to-operate, patenting strategies, business development, funding, regulatory, and reimbursement sectors.

We begin with Stephanie Dawson’s introduction to our open-access strategy for the drug repurposing community, emphasizing the importance of shared data and resources to accelerate innovation and collaboration across the global scientific community: why it is advantageous for young scientists as it effectively increases chances to be seen and quoted; why it is also best for quality and reproducibility; and finally why open peer review = fair peer review.

We then feature our inaugural highlight, Hermann Mucke’s honorary lecture at the 2023 2nd International Conference on Systems Medicine, AI, and Drug Repurposing (RexPo’23), offering a comprehensive overview of the history, current state, and future potential of drug repurposing. This piece sets a foundational context for our journal, highlighting pivotal moments and future directions in the field.

Sarah Bonnin reviews the latest advancements in machine learning and artificial intelligence as applied to drug repurposing, discussing the challenges and promising perspectives these technologies offer in accelerating drug discovery. Similarly, Ira Hebold Haraldsen discusses the AI-Mind project, which aims to revolutionize personalized neurology by leveraging AI for automated diagnostics and advanced data management, showcasing the potential of AI in repurposing drugs for neurological disorders.

The power of multi-omics data integration in drug discovery is demonstrated by Francis Edem Agamah presenting a network-based approach to identify potential drug repurposing candidates for different phases of Covid-19. Paul Perco from Delta4 and collaborators have repurposed clopidogrel for a rare form of glomerulosclerosis, enabled by big-data network biology, demonstrating the potential of our field for small and medium enterprises and young start-ups as well the promising strategy of focusing on rare diseases. As Patrick Vallance in his famous interview for Nature Reviews Drug Discovery once phrased it, “studying rare diseases begins to foreshadow how common diseases might eventually fragment. Currently, many of the disease labels we have are nineteenth or twentieth century definitions … They are not molecular or cellular classifications of subtypes. So, as we fragment common diseases … they start to look … like rare diseases. It may be a long time before we get there, but that is the direction in which we seem to be going.”

Besides repurposable drugs, diagnostics are essential to provide treatments only to those patients who benefit, thereby derisking the entire development process. Thus, Thomas Krahn reviews the role of diagnostics in the successful repurposing of drugs, emphasizing the importance of accurate and timely diagnostic tools in identifying patient populations that can benefit from repurposed therapies.

Funding is critical in drug repurposing, particularly because commercial profit is not always the guiding principle, necessitating alternative routes. Barbara Goodman explores how philanthropic efforts can drive the discovery and development of new therapeutic uses for existing drugs, highlighting successful case studies and potential strategies for future initiatives. Savva Kerdemelidis discusses innovative approaches to clinical trials and contractual agreements that can facilitate the repurposing of generic drugs, potentially leading to significant cost savings and improved patient access to treatments.

To enable commercial uses, however, a detailed freedom-to-operate analysis and patent strategy are critical. Thus, in two additional contributions, Hermann Mucke provides a detailed guide on conducting freedom-to-operate analyses, a crucial step in the drug repurposing process to ensure that new uses for existing...
drugs can be developed without infringing on existing patents. Subsequently, he offers an in-depth patent landscape analysis focused on drug repurposing for rare diseases, providing valuable insights into existing intellectual property and identifying opportunities for new repurposing projects. Finally, Bianca Pauly discusses the need for streamlined regulatory pathways and collaborative research efforts to bring new treatments to market more quickly.

The articles presented in this inaugural edition of Drug Repurposing represent the diverse and dynamic nature in our field. By exploring and advancing new uses for existing drugs, we can uncover treatments faster and more cost-effectively, ultimately benefiting patients worldwide. We invite you to delve into these insightful contributions and join us in fostering innovation and collaboration in drug repurposing.

Thank you for being a part of this exciting journey.

Sincerely,
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