Lecture series on the subject "AI, Data Science and Society"

2. Wolfram-Hubertus Zimmermann: AI Supported Phenotypic Drug Screens in Stem Cell Models

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Abstract

Target agnostic phenotypic drug screens are increasingly used to identify bioactive compounds and classify them as hits in drug discovery campaigns. With the introduction of human induced pluripotent stem cells it is today in principle possible to simulate every patient and drug target organ phenotype in the dish. However, it has to be realized that most disease phenotypes, especially in phased where therapeutic interventions would be most effective, are subtle and not readily apparent by simple inspection of an individual patient or a patient model in the dish. To decode disease and disease mechanism related phenotypes, we are setting-up a pipeline of high-throughput/content cell screens, supported by deep learning approaches to identify disease specific features as potential unique endpoints for drug screening. Although the focus of my presentation is primarily on the heart, and in particular on sarcomere protein phenotyping, it can be anticipated that artificial-intelligence supported phenotypic screens can be more generally applied in patient-in-the-dish modelling and the linking of in vitro data with clinical data obtained in clinical trials or clinical routine practice. The overall aim is to establish a solid data base for drug development with a high chance for clinical success.