Editorial

Ndeye Coumba Ndiaye

Systems Medicine in the era of ‘Big Data’: a game-changer for Personalized Medicine?

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Over the last decade, methodological and technical breakthroughs allowed the scientific community to address Systems Biology approaches in medical concepts and particularly, its future realistic and actionable implementation in medical practice [1].

Indeed, the multiplicity of ‘Big Data’ [2] integrating various multi-scale types of biological information (clinical, anthropometric, multi-omics, environmental) – and most importantly their sharing within International Research Consortia – support the development of translational and cross-disciplinary approaches to understanding and controlling biological complexity of chronic non-communicable diseases.

The major challenge resides in converge heterogeneous data from genome-wide, high-throughput sequencing, transcriptome, proteome, interactome ... in a highly-orchestrated and tangible discipline with robust statistical modeling and computational strategies. However, the growing importance of standardized biobanking facilities and Electronic Medical Records is a step in the right direction.

For now, Systems pharmacology and pharmacogenomics overcame the one-drug/one-target/one-disease paradigm [3] which failed on complex diseases, and the current issue of Drug Metabolism and Drug Interactions propose an overview of the resulting knowledge and insights of its translation to personalized health and therapy so far.

So the scientific community reached a consensus on the necessity to look at the bigger picture, in order to understand not only each constituent of a biological network leading to a specific disease but also how all of a network’s constituents function together. However, in the era of ‘Big Data’, we should take a step further and implement Systems Biology to diseases networks, knowing that non-communicable diseases share numerous pathophysiological pathways and risk factors. Moreover, the aging issue leads to the comorbidities issues and logically, to the need for developing combination therapies.

This necessity to foster new creative approaches leveraging ‘Big Data’, technology, and innovative design thinking for Systems Medicine, Pharmacogenomics and practicable Predictive, Preventive, Personalized, and Participatory (P4) medicine applications is the central plot of the seventh Santorini Conference – Systems Medicine, Personalized Health and Therapy, co-organized by Biologie Prospective, the European Society of Pharmacogenomics and Theranostics (ESPT) and the UMR INSERM U1122 Research Team. In line with its previous editions, this seventh Conference gathers renowned clinicians, laboratory medicine specialists, pharmacologists, hospital pharmacists, scientists from pharmaceutical and biotechnological industries, geneticists, and epidemiologists in the common objective of promoting holistic rather than reductionist approaches for patient-centered healthcare.

Welcome in Santorini!

Conflict of interest statement

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References


Ndeye Coumba Ndiaye
UMR INSERM U 1122; IGE-PCV, Université de Lorraine, Faculté de Pharmacie – 30 rue Lionnois Nancy 54000, France
E-mail: coumba.ndiaye@inserm.fr