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Editorial

Biomarkers: Towards the Dream of Personalized Medicine

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Since the completion of the Human Genome Project in the early 2000's, genome-wide high-throughput technologies have transformed the biomedical research field. The growing quantity of information produced is collected in specific public repositories and is available for the scientific community, however only few of this "OMICS" information have been transferred to the patient bedside.

Among these huge amount of data produced, the most important concern biomarkers.

Biomarkers - biological indicators of physiological and pathological conditions, but also of diagnosis, prognosis, prediction and pharmacological responses to a therapeutic intervention - have become relevant for theranostic applications. Over the last decades, molecular biomarkers provided a dynamic and powerful approach to understanding the whole spectrum of the disease processes: from the discovery stage, where they are used to investigate the pathophysiological mechanisms related to either differential diagnosis or prognosis of a disease, through their progression monitoring and response prediction to the treatment. Their use is revolutionizing the diagnosis and the management of several pathological conditions in different medical fields. Bear in mind the importance of the breast cancer molecular taxonomy for diagnosis, prognosis and treatment of affected patients, but also their individual inter-variability to the pharmacological treatment due to single nucleotide polymorphisms.

Narrowing the context to the drug development process, bio-

markers can be used as an alternative to the conventional clinical endpoint, allowing a faster assessment of the drug mechanisms of action, efficacy, safety and metabolic profiles. By enhancing the ability to evaluate whether the pharmacological candidates are promising already in the early drug development stages, biomarkers reduce times and costs of drug development process, and enhance the safety of new drugs, with the consequent advantages for pharmaceutical companies but above all for patients. Furthermore, the possibility to guide therapeutic decision-making by enabling identification of patients who will benefit from the specific therapeutically agents will provide a valuable contribution to personalized medicine.

We have every reason to expect that the evolution of molecular medicine, coupled with the discovery and clinical application of new biomarkers, will continue to advance in this field, where individualized and customized treatment for each individual patient will define the standard of care. However, we are still far from being able to use profitably all the information already available to us. New integrated and easy-to-use technologies are in developing in order to move omics biomarkers-based data analysis to the bedside.

To facilitate the growth of this rapidly developing multidisciplinary field, and to promote the implementation of new technologies able to offer qualitative and quantitative multi-biomarkers analysis, Jacobs Journal of Biomarkers aims to facilitate a rapid dissemination and exchange of scientific advances about all aspects of biomarkers applications in various biomedical disciplines.