Personalized Medicine and Big Data:
Opportunities and challenges for the Tomorrow medicine

From years, the diagnostic and therapeutic processes have focused on the generalization of statistical data obtained by a large population, without considering the information of the important inter-individual differences.

The Precision Medicine revolution. Today, the "Precision Medicine" revolution is currently underway and, unlike what has been done in the past, has the objective of modelling the prevention, the diagnosis and the treatment of diseases on the basis of the unique characteristics of a single individual or a small group of patients. Personalized Medicine is a topic of great interest for the entire international scenario. In the last few months, a lot of projects have been funded with the aim to analyze the genetic data of millions of people and to collect detailed information about their lifestyle and their state of health. The goal is to create a specific knowledge on genes, environment and diseases and their relation to "common" diseases like cancer and diabetes or "rare" diseases in which the study is more difficult for the scarcity and the dispersal of the affected patients.

The role of Big Data. To achieve this important goal, it is crucial to digitalize enormous amounts of data, and that is why, alongside the "Precision Medicine" revolution growths the "Big-Data" revolution: an industrial sector with a great potential. In this context, bioinformatics and biostatistics play a key role in collecting and classifying genetic data and clinical data in relational databases. From the analysis of these data, the discovery of new biological networks to help the medicine.

How is it possible to obtain patient specific diagnosis and therapies? The combination of genetic and clinical information will lead to an accurate diagnosis and, consequently, to more effective therapies, lowering the onset of undesirable side effects. Like all the most important innovations in the scientific and medical field, the "Precision Medicine" concept anticipates extraordinary improvements in terms of individual and public health and great challenges in the ethical, social and economic environment. The outlining scenario, that will be achieved in the next future, implicate the necessity to ask some questions about the old and the new individual rights, how they will be characterized and protected respect to the new technics and how they will be accepted from our social organization.

In collaboration with:
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