

IT Future of Medicine (ITFoM)

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Abstract. The IT Future of Medicine (ITFoM) initiative will produce computational models of individuals to enable the prediction of their future health risks, progression of diseases and selection and efficacy of treatments while minimizing side effects. As one of six Future and Emerging Technologies (FET) Flagship Pilot Projects funded by the EC, ITFoM will foster the integration of technology development in functional genomics and computer technologies to enable the generation of patient models to make them available for clinical application. The realization of the patient model is based on the recent breakthroughs in sequencing technology that enables the high-throughput analysis of a large number of individual genomes and transcriptomes. The genome profile will be integrated with proteome and metabolome information generated via new powerful chromatography, mass spectrometry and nuclear magnetic resonance techniques. Computational and mathematical tools enable the development of systems approaches for deciphering the functional and regulatory networks underlying the complex biological systems and form the basis for the future patient model.

The -omics information will provide the basis to establish integrated molecular, physiological and anatomical models of every individual in the health care system. The first approach to the “Virtual Patient” modeling system that has been generated at the Max Planck Institute for Molecular Genetics combines general information available about cancer relevant pathways with the individual tumor/patient information. This individualized model will not only be able to analyze the current situation, but will allow the prediction of the response of the patient to different therapy options or intolerance for certain drugs. ITFoM is an initiative of more than 150 academic and industrial partners from 31 countries to set up a research concept for the development of the “virtual patient”.