ITFoC

Information Technology: The Future of Cancer Treatment

Main area: Digital Medicine for Cancer
Keywords: Virtual patient modelling; breast cancer; holistic omics data; innovative clinical practices; health economy; policy & guidelines.
Duration: 36 months
Total project funding: € 1.509.168

Abstract

Over the last decades we have made major progress in diagnosing and treating cancer, however, this disease remains one of the leading causes of morbidity and mortality worldwide, responsible for millions of death each year. A 'moonshot to cure cancer' is being called for, which could translate this enormous progress into tangible outcomes for patients.

Every patient is unique. No individual tumour has ever been observed before, or will ever be observed again, due to the enormous genetic/epigenetic heterogeneity between and within tumours and patients, causing each patient (and even cells within the same tumor) to react differently to drugs. While biomarkers can sometimes be used to stratify patients into groups more or less likely to respond to a specific drug, this is still far from the goal of true personalisation, with every patient receiving the drug/drug combination optimal for them. To be able to provide 'the right drug at the right dose for every patient', we propose here to develop demonstrators, based on a deep molecular characterisation of tumour and patient as input to virtual patient models of individual patients in silico.

ITFoC will focus on (short term / 36 months):

1. The construction of one demonstrator for breast cancer to be tested in hospitals after 36 months (HEGP, Nantes Hospitals), comparing i) European medical standards of care and ii) the use of probabilistic mechanistic and systemic models to guide clinical decisions .
2. The proposition of a benchmark test of high quality anonymized curated data to compare the performance of the models in terms of sensitivity and specificity. In consultation with ethicists, a global challenge will be initiated to select the best simulation approaches to predict drug response.
3. The development of a joint platform with access to different modelling methodologies and different business models addressing issues such as data standards, privacy, cybersecurity and data integration strategies.
4. The evaluation of the benefit/risks, the ethical, regulatory, financial and societal impacts at the European level, acceptability and country-specific market access potential.
5. The proposal of policy and guidelines for implementation of digital medicine at the European level.
6. The dissemination of outcomes and analyses to key stakeholders including policy makers, patients groups, health professionals and the scientific community.
7. The preparation of a scale-up phase, comprising lobbying actions, communications, and training activities to extend the project after the 3-year period to include more countries and partners, to incorporate additional sources of 'deep' patient data (e.g. sensor data in collaboration with the CONVERGENCE proposal, plus others), and to extend the scope to other tumour types and therapeutic areas, to prevention and ultimately wellness and health.

Overall, ITFoC will showcase federated activities on breast cancer to propose an advanced TRL demonstrator (TRL 5-6) in digital medicine together with a risk/benefit analysis of regulatory, ethical and economic issues, and a proposal of policy and guidelines.

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