New Discoveries, New Hope

The IPC project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No. 826121.

Facts

- **Budget**: €15.1 Million
- **Consortium**: 21 Partners
- **Duration**: 48 Months (01/2019 - 12/2022)

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**Partners**

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   Max-Planck-gesellschaft zur Förderung der Wissenschaften
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4. Institut Curie
   France (Paris)
5. Technische Universität Darmstadt
   Germany (Darmstadt)
6. Università degli Studi di Napoli Federico II
   Italy (Naples)
7. Universiteit Gent
   Belgium (Ghent)
8. Germans Trias i Pujol Research Institute (IGTP)
   Spain (Barcelona)
9. Barcelona Supercomputing Center
   Spain (Barcelona)
10. Instituto de Medicina Molecular
    Portugal (Lisbon)
11. Deutsches Krebsforschungszentrum Heidelberg
    Germany (Heidelberg)
12. Academisch Medisch Centrum
    The Netherlands (Amsterdam)
13. Prinses Maxima Centrum voor Kinder-oncoloogie
    The Netherlands (Utrecht)
14. Universitätsklinikum Heidelberg
    Germany (Heidelberg)
15. Università degli Studi di Napoli Federico II
    Italy (Naples)
16. Travis County Health District
    USA (Austin, Texas)
17. Children’s Medical Research Institute
    Australia (Westmead, NSW)
18. Children’s Hospital of Philadelphia
    USA (Philadelphia, Pennsylvania)
19. Children’s Medical Research Institute
    Australia (Westmead, NSW)
20. Alacris Theranostics GmbH
    Germany (Berlin)
21. Universitat Zürich
    Switzerland (Zurich)
22. Ludwig-Maximilians-Universität München
    Germany (Munich)
23. Consiglio nazionale delle ricerche
    Italy (Rome)
24. Baylor College of Medicine
    USA (Houston, Texas)
25. Universitätsklinikum Heidelberg
    Germany (Heidelberg)
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Cancer in children is rare, but when it happens, clinically prescribed treatment options are not always as efficient as one would hope. Of those patients who are successfully treated, a substantial proportion suffers serious and long-term health consequences from the intensive therapies they underwent.

Cancer can be difficult to treat effectively because cancer cells undergo many random changes which means that each cancer has an essentially unique combination of molecular characteristics. To address this problem, it is important to develop ways of specifically tailoring treatment combinations for the molecular profile of each individual cancer, to maximize cures and to minimize short and long-term treatment side-effects. That is the goal of iPC.

**Motivation**

Tumours differ broadly across patients and show large molecular heterogeneity; each one being composed of cells with varied expressions. Consequently, similar tumour types, and even cells within the same tumour, show different outcomes and responses to the same therapy. On average, only a quarter of oncology patients respond to the drugs they receive. Worse yet, chemotherapy could have severe side effects. This is of particular importance for childhood cancers because the treatment itself could be the culprit for developmental disorders and secondary tumours.

**Vision**

The project team will focus on identifying effective personalised treatment options for paediatric cancers.

A comprehensive computational effort to combine knowledge base, machine learning, and mechanistic models to predict optimal standard and experimental therapies for each child will be proposed. We will produce, assemble, standardize, and harmonize high quality, multidisciplinary data and leverage the potential of big data and high-performance computing for the personalised treatments of European citizens.

iPC will address the critical need for personalized medicine for children with cancer, while marking a valuable contribution to the digitalization of clinical workflows, thus supporting the European Digital Single Market.

**Mission & Objectives**

The goal of the iPC project is to collect, standardize and harmonize existing clinical knowledge and medical data and, with the help of artificial intelligence, create treatment models for patients. Armed with these treatment models, scientists will then test them on virtual patients to evaluate treatment efficacy and toxicity, thus improving both patient survival and their quality of life.

To accomplish these goals, iPC has assembled an interdisciplinary team consisting of basic, translational, and clinical researchers - all amongst the leaders in their respective fields - and established strong relationships with European Centres of Excellence, patient organizations, and clinical trials which focus on personalised medicine for our proposed case studies. Fundamentally, iPC will address the critical need for personalised medicine for children with cancer, while making a valuable contribution to the digitalization of clinical workflows, and support the European Digital Single Market Strategy.