EU efforts in cancer research: towards personalised medicine

IMI Stakeholder Forum Consultation workshop Oncology Brussels, 29 September 2016

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Non communicable diseases and the challenge of healthy ageing
DG Research and Innovation European Commission
The context

• A global health priority
• A changing healthcare landscape
• Raising costs and increasing pressure on European healthcare systems
• Differences in outcomes, insufficient comparative assessment of current practices and approaches
• Advancing understanding of cancer biology
• Innovative drugs in the pipeline
• Molecular profiling and risk classification approaches
• Stratified and subsequently personalised medicine can deliver cost savings and better outcomes for patients
• Provide evidence-based solutions for clinical challenges
• Foster integrated translational research
• Shorten the innovation life cycle
• Build expertise and leverage resources
• Promote research coordination
• Develop research capacities in EU and globally
• Underpin the development of health policies
EU cancer research – what’s being funded (FP7)

- **translational research**
- metastasis
- tumour microenvironment
- biomarkers, drugs, MoAbs
- imaging
- models
- resistance
- technology
- prevention
- early detection
- **investigator-driven trials**
- **palliative & end-of-life care**

**FP7: € 1,5 billion (2007-2013)**

Increased focus on clinical research
Enhancing clinical evidence

> 340,000 patients recruited
165 Projects, 286 CTs, € 1.1 billion

Phase I: 16%
Phase I/II: 23%
Phase II: 21%
Phase II/III: 5%
Phase III: 6%
Phase IV: 1%
Interventional Study: 17%

FP7 Health Programme
Maximising cohorts value

266 projects, > € 1 billion
55 collaborative projects ~ 3 million subjects

FP7 Health Programme
Number of subjects in 55 projects
National research policies - Stronger together

• Linking national/regional cancer registries and bio-banks to improve quality of data collection, optimise cancer control in Europe and evaluate therapy effectiveness

• Linking 29 national/regional funding organisations in 20 countries working on translational cancer research. EUR 33 million mobilised

- 1st joint call on 'Tumour heterogeneity' (EUR 16 million)
- 2nd joint call on 'Immunotherapy' (EUR 10 million)
Horizon 2020: Three priorities

€24 billion
- European Research Council
- Future & Emerging technologies (FET)
- Marie Curie
- Research infrastr.

€17 billion
- Leadership in Enabling and Industrial Technologies (LEIT)
- Risk finance
- Innovation in SMEs

€29 billion
- SC1 Health (€7.4b)
- SC2 Food & bio eco
- SC3 Energy
- SC4 Transport
- SC5 Environment
- SC6 EU in the world
- SC7 Security
Our priorities 2014-2017

Healthy ageing (2014-2017)

Human biomonitoring (2016-2017)


Personalised medicine

Call 2014-15: EUR 1.3 B

Call 2016-17: EUR 1.4 B

Maternal and child health (2016-2017)

Health, demographic change and wellbeing
Setting the path for personalised medicine

Prevention
- Stratification and high risk groups

Aetiology
- Molecular understanding of disease
- Molecular classification of cancer subtypes
- Molecular taxonomy

Diagnosis / Prognosis
- Biomarker identification for:
  - Diagnosis
  - Prognosis
  - Prediction
  - Monitoring
- Medical Imaging to optimize treatment options

Model Systems
- Wide range of animal models
- In silico models
- In vitro & ex-vivo models (xeno patients)

Therapy
- Targeted drug development via biology driven hypothesis
- Bio-informatics for treatment decision making
- Novel CT design

Survivorship / QoL
- Identification of sub-groups for better quality of life

ReQuTe

EU-TOPIA

HPV AHEAD

EPI FEM CARE

COLThERES colon therapy research consortium
**EU cancer research – what’s being funded (HORIZON2020)**

- **translational research**
  - metastasis, resistance
  - tumour microenvironment
  - biomarkers, drugs, MoAbs
  - imaging and technology
  - models
  - prevention & early detection
  - co-morbidities
- **investigator-driven trials**
- **comparative effectiveness**
- **palliative & end-of-life care**

**€ 650 million (2014-2016)**

**€ 103 million on cancer prevention and early diagnosis**

- Increased focus on innovation and research to patients, to market
Advancing targeted therapies development

137 projects
258 million EUR

- T-CAR cells
- DNA vaccines
- RNA vaccines
- Peptide vaccines
- Dendritic cells
- Antibodies

- FP7 preclinical projects:
  - 88 projects
  - EUR 109 million

- FP7 trials:
  - 9 projects
  - EUR 53 million

- H2020 preclinical projects:
  - 34 projects
  - EUR 38 million

- H2020 trials:
  - 10 projects
  - EUR 54 million
## Biomarkers informing care

<table>
<thead>
<tr>
<th>Cancer indication</th>
<th>Project</th>
<th>Beneficiary</th>
<th>EU funding</th>
<th>What it will deliver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple</td>
<td>NO-META</td>
<td>Cytofind</td>
<td>€ 50,000</td>
<td>Liquid biopsy using a new method to count and isolate CTCs based on single cell determination of the anomalous metabolic properties of tumour cells (Warburg effect)</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>CYTOPRO</td>
<td>CYTOTRACK APS</td>
<td>€ 50,000</td>
<td>A device to identify and isolate metastatic cancer cells from a blood sample based on CTC KRAS analysis</td>
</tr>
<tr>
<td>Multiple</td>
<td>MAINTRAC-Auto</td>
<td>SIMFO GmbH</td>
<td>€ 50,000</td>
<td>Automatization and validation of a liquid biopsy assay &quot;Maintrac-AUTO CTC-analyser&quot;</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>SENSITIVITYMARKERS</td>
<td>NTRC</td>
<td>€ 50,000</td>
<td>Clinical validation of prognostic biomarkers of chemotherapy response in liquid biopsies</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>CELLETEST</td>
<td>STEM SEL</td>
<td>€ 50,000</td>
<td>Medical device for non-invasive diagnosis and prognosis of metastatic lung cancer</td>
</tr>
</tbody>
</table>

*http://cordis.europa.eu/projects/home_en.html*
PanCare Studies in Fertility and Ototoxicity to Improve Quality of Life after Cancer during Childhood, Adolescence and Young Adulthood

Validating predictive models of radiotherapy toxicity to improve quality-of-life and reduce side-effects in cancer survivors

Advance Care Planning; an Innovative Palliative Care Intervention to Improve Quality of Life in Cancer Patients - a Multi-Centre Cluster Randomized Clinical Trial

Randomised controlled trial to evaluate electronic Symptom Management using the Advanced Symptom Management System (ASyMS) Remote Technology for patients with cancers

Children’s Liver Tumour European Network
Big Data – it's about better data

Patients at the heart of R&I

In projects

- Partners
- Through ethics board, safety monitoring board, and patient input platform
- Offer patients’ perspective on recruitment, study design, project communication
- Translate results in lay language, modify guidelines to better fit patients’ needs, contribute to dissemination activities...

In policy design

- Work programmes based on wide consultations:
  - Advisory Group: representative of European Patient Associations
  - workshops: participation patients
- Horizon 2020 topics are patient-centred
- Many events are triggered by patient organisations
Innovative Medicines Initiative

- **Public-private partnership between the EU and pharmaceutical industry launched in 2008**
- **Cancer is strategic priority (Strategic Research Agenda 2014-2020)**
- **Cancer research has benefited from IMI support:**
  - Development of an outcomes-focused data platform to empower policy makers and clinicians to optimize care for patients with hematologic malignancies
  - A comprehensive ‘paediatric preclinical POC platform’ to enable clinical molecule development for children with cancer

**IMI2 topics**

**Development of an outcomes-focused data platform to empower policy makers and clinicians to optimize care for patients with hematologic malignancies**

**A comprehensive ‘paediatric preclinical POC platform’ to enable clinical molecule development for children with cancer**
Timing up with global partners

International Rare Disease Research Consortium
- 200 new therapies by 2020
- 43 international partners, funders so far
- Commitment to allocate $10 million over 5 years

International KO Mouse Consortium
- Mutate all protein-encoding genes in the mouse
- NIH, EU Commission, Genome Canada
- Total investment > $100 million; EU: €13 million

International Cancer Genome Consortium
- Full molecular fingerprint 50 tumours
- NIH, EU Commission, and 11 other countries
- Total investment > $250 million; EU: €21 million

International Human Epigenome Consortium
- Identify genome-wide DNA methylation patterns of all human genes
- NIH, EU Commission, CA, DE, UK, IT, Korea
- Total investment > $120 million
International Consortium for Personalised Medicine (IC PerMed)

WHAT

Collaboration of research funders and policy makers from EU Member States and beyond

- Establish Europe as a global leader in PM research
- Support the PM science base through a coordinated approach to research
- Provide evidence to demonstrate the benefit of PM to citizens and healthcare systems
- Pave the way for PM approaches for citizens

WHY

HOW

Implementation of a Roadmap based on PerMed Strategic Research Agenda (SRIA)
IC PerMed Challenges and facilitators

Policy, Funders, Researchers, Industry, Ethics/Data committees, Patients/Citizens

1. Citizens and Patients
- Policy, Patients/Citizens, Industry, Funders, Researchers

2. Data and ICT
- Innovations in Diagnosis, Therapies, Prevention & ICT with economic value and fair access.

3. Research efforts
- Policy, Industry, Health Technology Assessment, Providers, Researchers, Patients/Citizens

4. Market Access
- Industry, Policy, Regulators, Funders, Researchers, Patients/Citizens

5. Health Systems

Image source © Wolfgang Ballensiefen / PerMed project 2016

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Innovation Fund, Denmark
IC PerMed roadmap – under development

Will include actionable research activities

Aims to map ongoing activities

Proposed means for implementation – EU, national, regional levels

Available in Q4 2016

Will be updated regularly

What can we EU offer?

- A network of collaborative projects throughout Europe and beyond, addressing the continuum of cancer research
- An efficient public-private partnership to accelerate the delivery of innovative therapies
- An established framework for effective research coordination between EU countries
- A strong experience in international/global cooperation, via a flexible model
Conclusions

- Lot of potential for collaboration, knowledge and data across disciplines and sectors, including public-public and public-private partnerships, building on existing projects and schemes

- Accelerating innovative research for the benefit of patients: prevention, risk reduction, early diagnosis, treatment, care

- Strong support to international efforts, including the development of research plans and policies

Horizon 2020 provides many opportunities to rapidly deliver in the field of cancer research!
Learn more

- Horizon 2020 Societal Challenge 1 website

- Participant portal: All H2020 calls and topics

- Search topics by keywords - use the search engine of the Participant Portal

- Find partners: register to Fit for Health

- Support & advice about Horizon 2020: Spanish NCPs