The Comprehensive Cancer Centre for quality and innovation of cancer care

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171208
Cancer – an increasing societal problem

• The number of new cancer patients in Europe will increase from 3.6 to 4.3 million in the next two decades, amounting to 716 000 additional cases annually.

• The number of patients living with a cancer diagnosis is increasing even more – cancer is becoming a main chronic disease.

• Globally, 23 000 patients die every day due to cancer.

• Health care and prevention are not balancing the increasing problem. We need innovation of cancer care and prevention
There are two main barriers

• **The intrinsic complexity of cancer** – large number of diseases and subgroups with variability in outcome, genomic instability and heterogeneity

• **Fragmentation** – research, clinical care, prevention, funding
Main reasons for fragmentation of cancer research

- **Suboptimal translational cancer research** – both early and late translational research
- **Lack of critical mass**
- **Outcomes of the EUROCAN+PLUS project**
The Comprehensive Cancer Centre – a key structure

Integration of:

• Multidisciplinary/multiprofessional cancer care
• Prevention
• Research for innovation—translational cancer research
• Education
Criteria and quality assurance of Comprehensive Cancer Centres

- The **Comprehensive Cancer Centre (CCC)** has all components for care, prevention, research and education with aim to innovate

- **Accreditation programs** by:
  - Organisation of European Cancer Institutes (OECI)
  - German Cancer Aid (Deutsche Krebshilfe)

*Cancer care is an infrastructure for research*
High quality cancer - an increasing challenge

• A complete multidisciplinary/professional care has to cover the whole clinical pathway
• All diagnostic and treatment/care components have to be integrated in one organisation
• Quality is dependent on a continuous innovation
• The increasing knowledge of cancer biology is a prerequisite for development of predictive and personalized cancer medicine
Translational cancer research – a coherent research continuum

Basic research/cancer biology

Preclinical research

Clinical research

Outcomes research/clinical effectiveness/health economics

Adoption in the health care systems

Gap 1

Gap 2
Infrastructures and resources needed for translational cancer research

- Technical omics platforms, bioinformatics and functional/molecular imaging
- Screening facilities for new anticancer agents
- Animal facilities/models
- Clinical trial structures for early clinical trials and next generation clinical trials
- Pharmacology
- Biobanks for tumours, normal tissues and liquid biopsies
Infrastructures and resources needed for translational cancer research, cont.

- Quality assured patient registries containing treatment information, also for long term follow-up
- Structure for bidirectional translational research – clinical registries with treatment information and biological materials
- Biostatistics, epidemiology and outcomes research
- Structure for health related quality of life assessment
EurocanPlatform project

• Focus on critical mass for personalized/precision cancer medicine research by collaboration between cancer research centres

• Deliverables:
  • Cancer Core Europe
  • Cancer Prevention Europe
  • Program for Designation of CCCs of Excellence
Collaboration between centres necessary to reach the critical mass – a few examples

• Personalized and predictive cancer medicine – biomarker discovery & validation
• Genetic dependencies of tumours – taxonomy
• Next generation clinical trials
• Bidirectional translational cancer research
• Outcomes research – clinical validation/utility of innovations, survivorship
Six Comprehensive Cancer Centers
Criteria and quality assurance of Comprehensive Cancer Centres of Excellence

• A designation program has been developed by the EurocanPlatform project & the European Academy of Cancer Sciences

• Accredited Comprehensive Cancer Centres (CCCs) can be assessed by the European Academy of Cancer Sciences for designation of excellence

• Focus on assessment of translational cancer research in a CCC
A parallel development in Germany

- **German Cancer Research Consortium (DKTK)** – a formal collaboration between eight German CCCs
- **National Center for Tumour diseases** – now a partnership between two DKTK centres – aim to strengthen the clinical part of translational cancer research
Personalized/precision cancer medicine

• Critical mass regarding patients and biological materials
• Sharing technological resources
• Sharing competences
• Environment for open science – sharing clinical and research data

Open science is a key question
Molecular taxonomy replacing histogenetic classification of tumours

- Genomics
- Epigenomics
- Transcriptomics
- Proteomics
- Metabolomics
- Mutations driving the tumour
- Molecular pathways driving the tumour
Next generation clinical trials

- Histology based – enrichment of patients
- Histology agnostic
- Platform trials
- Basket trials
- Adaptive trials
- Single subject clinical trials – ”N-of-1”

- Dependent of improved stratification methods
- Molecular imaging
Bidirectional translational research

• Clinical information linked to biological materials
• Biopsies before, after and during treatment – tumour tissue, liquid biopsies, normal tissue
• Biomarker discovery – prediction of antitumour effects and side-effects
• Resistance – intrinsic, acquired
• Tumour cell heterogeneity
• Tumour infrastructure

Bridging preclinical and clinical research
Outcomes research

- Outcomes of innovations from early translational research – new drugs and diagnostic technologies
- Outcomes of added value of innovations when compared to existing treatment programs
- Assessment of health related quality of life
- Outcomes of treatment in real life
- Long-term follow-up – cancer survivorship

End points: both survival and quality of life
Clinical efficacy versus clinical effectiveness

• Assumptions on the effects of anti-cancer therapies are usually based on results from clinical trials i.e. the clinical efficacy.

• We need data on clinical effectiveness, i.e. effects of a new therapeutic intervention on a population based patient cohort, equal to clinical validation.

• Data on clinical effectiveness necessary for cost-effectiveness assessment.
Health expenditure on cancer in EU

• €35.7 billion in 1995
• €83.2 billion in 2014

Drugs:
• €7.6 billion in 2005
• €19.1 billion in 2014

B. Jönsson

9/10 drugs are failing registration
Costs for one approved drug
800 million USD
Cancer – a model for the main chronic diseases

• Research strategies for translational cancer research towards personalized/precision cancer medicine and prevention
• Quality assured research environments for translational cancer research, CCCs
• Consortias of CCCs to reach the critical mass
• European Academy of Cancer Sciences for science policy support and analyses of research strategies
Quality and innovation cannot be separated in cancer care

- Improved early translational cancer research increases the demands on the clinical research
- Improved structuring and collaboration will allow more patients to participate in research – new treatments available for more patients
- Research to assess the added clinical value of innovations is an unmet need and should be increased – new treatments available for the health care
- Addition of health economics (cost-effectiveness) makes prioritisation in the health care possible
- Efficient innovation and quality of care will not be possible without CCCs and collaborations between CCCs
So, quality of care and innovation – two sides of the same coin

Congratulations to Athens and Germany for important contribution to integrated European cancer research!

THANKS!