Wie hilft das DKTK bei der Translation in die Gesundheitsversorgung?

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Deutsche Krebsgesellschaft
Brennpunkt-Onkologie-Veranstaltung
INTRODUCING DKTK: MISSION

• Discover, develop, validate, and apply novel strategies for personalized oncology and translate them into clinical practice
• Provide advanced training opportunities for the next generation translational and clinical scientists
Focus on **five major challenges** in cancer research:

- Molecular profiling-based diagnosis and therapy
- Tumor heterogeneity and resistance
- Immunotherapy beyond checkpoint inhibition
- Early diagnosis of cancer and detection of minimal residual disease
- Turning big data into smart data
STRUCTURAL ACHIEVEMENTS: SUMMARY 2012-2016

- Legal framework (statute, implementation agreements) completed
- Governance structure successfully established
- Joint Translation centers at DKTK partner sites built up
- Efficient administrative and coordinative structures implemented
- DKTK Professorships and Young Investigator Groups recruited
- "Joint Funding Program" up and running
- DKTK Community building accomplished
- School of Oncology
- Cooperations with German Centers for Health Research
SCHOOL OF ONCOLOGY

Goals

• Fill the gaps in education of physician scientists & postdocs
• **Continued education & professional mentoring**
• **Translational research curricula** for natural scientists & physicians
• Become a national & international **leader in translational cancer research education**

Actions

• Regular **summer schools, conferences, workshops**
• Program for **physician scientists: protected research time**
MAJOR ACHIEVEMENTS OF DKTK – IMPORTANT RESEARCH INFRASTRUCTURES

- Key elements of **Clinical Communication Platform (CCP)**
- Illumina X-Ten Sequencing Platform
- RadPlanBio-Platform
  Particle Therapy Research Network
- Expansion of GMP
KEY OBJECTIVES OF THE CLINICAL COMMUNICATION PLATFORM (CCP)

- Create hypotheses
- ... 
- Perform clinical trials
- Develop Biomarkers

TRANSLATION

REVERSE TRANSLATION

- Systematically note clinical response
- Reprofile samples
- ...
Structured programs to optimize translation efficiency:

Differently weighted focus to *bridge* the *translational valley of death*
FOCUS ON 5 MAJOR CHALLENGES

1: Molecular profiling-based diagnosis & therapy
2: Tumor heterogeneity and resistance
3: Immunotherapy beyond checkpoint inhibition
4: Early diagnosis of cancer and detection of minimal residual disease
5: Turning big data into smart data
FUTURE STRATEGY –
1: MOLECULAR PROFILING-BASED DIAGNOSIS AND THERAPY

Aims 2016 – 2020:
• Extension to PANOMICS
• Extension to larger entities: GI, Lung, Breast, Head & Neck
• Broadening spectrum of druggable lesions

Unique Strength: Sequencing platform Illumina Hiseq X Ten

Highlights:
• MASTER (advanced cancer)
• INFORM (pediatric cancer)
• N2M2 (glioma)
• Integrative lymphomics
• HNPrädBio (radiation oncology)
The Paradigm Shift: Imaging each Individual Patient’s Cancer At the Molecular Level
NCT Precision Oncology Program

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NCT DataThereHouse
Organized in SAP HANA

NCT OMICS

PATIENT ADMISSION – DOCUMENTATION - BANKING
NCT MASTER Workflow

- Patient Admission
- Enrollment
- Clinical Data
- Diagnosis & Sampling
- NCT Omics
- Bioinformatics
- Clinical Report
- Molecular Tumor Board
- Individualized Therapy & Trials
- Response
- Resistance
- Prevention

NCT DataThereHouse (SAP HANA)
Stefan Fröhling, Christoph Heining, Hanno Glimm, Stefan Gröschel, Claudia Scholl (Functional Genomics); DKTK – LMU München, Frankfurt, Dresden, Essen/Düsseldorf, Freiburg, Berlin

NCT MASTER – Registry & Interventional Trial

- Patient Sample Asservation
- Sequencing
- Bio-informatic Analysis
- Clinical Evaluation
- Validation
- Molecular Tumor Board*

Unbiased Functional Testing
Focused Functional Testing
Feed Back Results
Adapt Treatment/
Focused Functional Testing

PI3K-AKT-mTOR
RAF-MEK-ERK
Tyrosine Kinases
Developmental Pathways
DDR Signaling
Hypermutated/Immuno-therapy

Stefan Fröhling, Christoph Heining, Hanno Glimm, Stefan Gröschel, Claudia Scholl (Functional Genomics); DKTK – LMU München, Frankfurt, Dresden, Essen/Düsseldorf, Freiburg, Berlin
NCT Data There House
Display Data from Various Sources for a Comprehensive Overview of Information Relevant for Personalized Treatment

- Sequencing Data
- Array Data
- Clinical Pathways
- Unstructured Data
- Doctor’s Letter
- Structured Data

Physician
Scientist
Tumor Board
Case Manager
Study Nurse
Documentalist
INFORM = BLUEPRINT FOR PERSONALIZED MEDICINE TRIALS

Individualized Therapy For Relapsed Malignancies in Childhood

Stefan Pfister  Peter Lichter  Angelika Eggert  Olaf Witt

German Cancer Consortium

National Patient Recruitment

11 Trial Coordination Centers
INFORM WORKFLOW

Treating Centers (n=58) → Request → Trial Coordination Centers (n=11) → Data

Advice: INFORM → Molecular Tumor Board

DKFZ Sequencing Core Facility

Data → INFORM – Registry: Documentation

Target Prioritization + Potential Drugs

Validation of Mutations (up to 5 targets)

Central Pathology Lab, DKFZ

Quality Control & Nucleic Acid Extraction

Central Pathology Lab, DKFZ

Biomaterial (FF + FFPE) + Normal Tissue

INFORM Biomaterial (FF + FFPE) + Normal Tissue Validation of Mutations (up to 5 targets)

RNA Seq
Exome Seq
Low-cov. WGS
450k methylation
Gene expression

Treating Centers (n=58)

Trial Coordination Centers (n=11)

Molecular Tumor Board

Data

DKFZ Sequencing Core Facility

Central Pathology Lab, DKFZ

INFORM – Registry: Documentation

Molecular Tumor Board

Target Prioritization + Potential Drugs

Validation of Mutations (up to 5 targets)

Central Pathology Lab, DKFZ

INFORM Biomaterial (FF + FFPE) + Normal Tissue Validation of Mutations (up to 5 targets)
INFORM² GOES INTERNATIONAL

INFORM² as complementary part of a European precision medicine program
FUTURE DKTK PERSONALIZED MEDICINE CYCLE

Tumor Biology

PanOMIC

Clinical

Network Analysis/
Key Targets/Stratification

Discover
Develop
Apply
Validate

Monitoring: Response

Biomarkers
Imaging

Clinical Trial

in vitro  in vivo  in silico

Validate

DKTK

German Cancer
Consortium
Translational Oncology…

- needs to **RETHINK** the old & the new
- needs **SMART** Data
- is a **TEAM** Effort
- is based on **PATIENT EMPOWERMENT**
NATIONAL CENTER FOR TUMOR DISEASES

NCT HEIDELBERG

THANK YOU