



**MENARINI**  
silicon biosystems



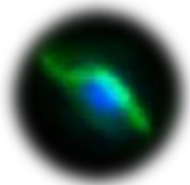
# **CANCER-ID**

## **IMI project Case study**

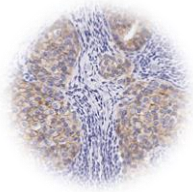
**N. Manaresi, Ph.D.**  
**Chief Scientific Officer**

**21-gennaio-2020**

# Where we play



Cell based Liquid Biopsy – market leader



Oncology: small tissue biopsies



Forensic genetics



Non-invasive prenatal diagnosis

# How we play



# How we play

### Load image

Group instrument

- ctc(1) ☒
- Undefined (0) ☒
- wbc (2) ☒

Select experiment and Panel

CTC

Order by

### Visible attributes

- id ☒
- creation\_id ☒
- row ☐
- col ☐
- x ☐
- y ☐
- cluster ☐
- in\_cluster ☐
- area\_apc ☐
- area\_brightfield ☐
- area\_dapi ☐
- area\_pe ☐
- bg\_max\_intensity\_apc ☐

	Group instrument	pe_dapi_0	pe_1	dapi_2	apc_3	brightfield_4	dapi_apc_5	pe_dapi_apc_6	dapi_brightfield_7	
15	CTC									<input checked="" type="checkbox"/>
16	CTC									<input type="checkbox"/>
17	CTC									<input type="checkbox"/>
18	CTC									<input checked="" type="checkbox"/>
19	CTC									<input checked="" type="checkbox"/>
20	CTC									<input type="checkbox"/>
21	CTC									<input checked="" type="checkbox"/>
22	CTC									<input type="checkbox"/>

# How we play

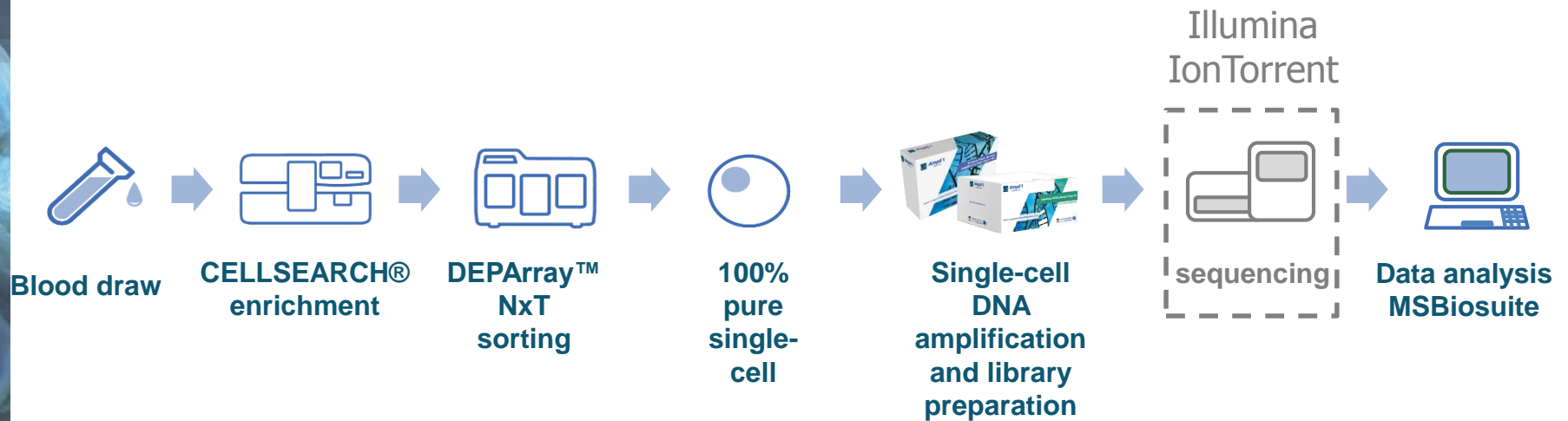
The screenshot displays the CellBrowser™ Software interface, which is divided into several functional panels:

- Top Left Panel:** A list of cell lines or conditions, including "C-CellTeraA", "C-CellTeraB", and "C-CellTeraC". It shows a grid of cells with a color scale from 0 to 100.
- Top Center Panel:** A large image showing a cross-section of a cell or tissue structure, likely a microfluidic device.
- Top Right Panel:** A large image showing a grid of cells, likely a microfluidic device, with a color scale from 0 to 100.
- Bottom Left Panel:** A list of cell lines or conditions, including "C-CellTeraA", "C-CellTeraB", and "C-CellTeraC". It shows a grid of cells with a color scale from 0 to 100.
- Bottom Center Panel:** A diagram of a microfluidic device with a grid of cells. The grid is labeled "TOP" and "Tube cap side". It shows a color scale from 0 to 100.
- Bottom Right Panel:** A control panel with various settings, including "Microscopy Filter", "Exposure", "Gain", and "Offset". It also includes a "Run" button and a "Stop" button.

At the bottom of the interface, there is a status bar with the following text:

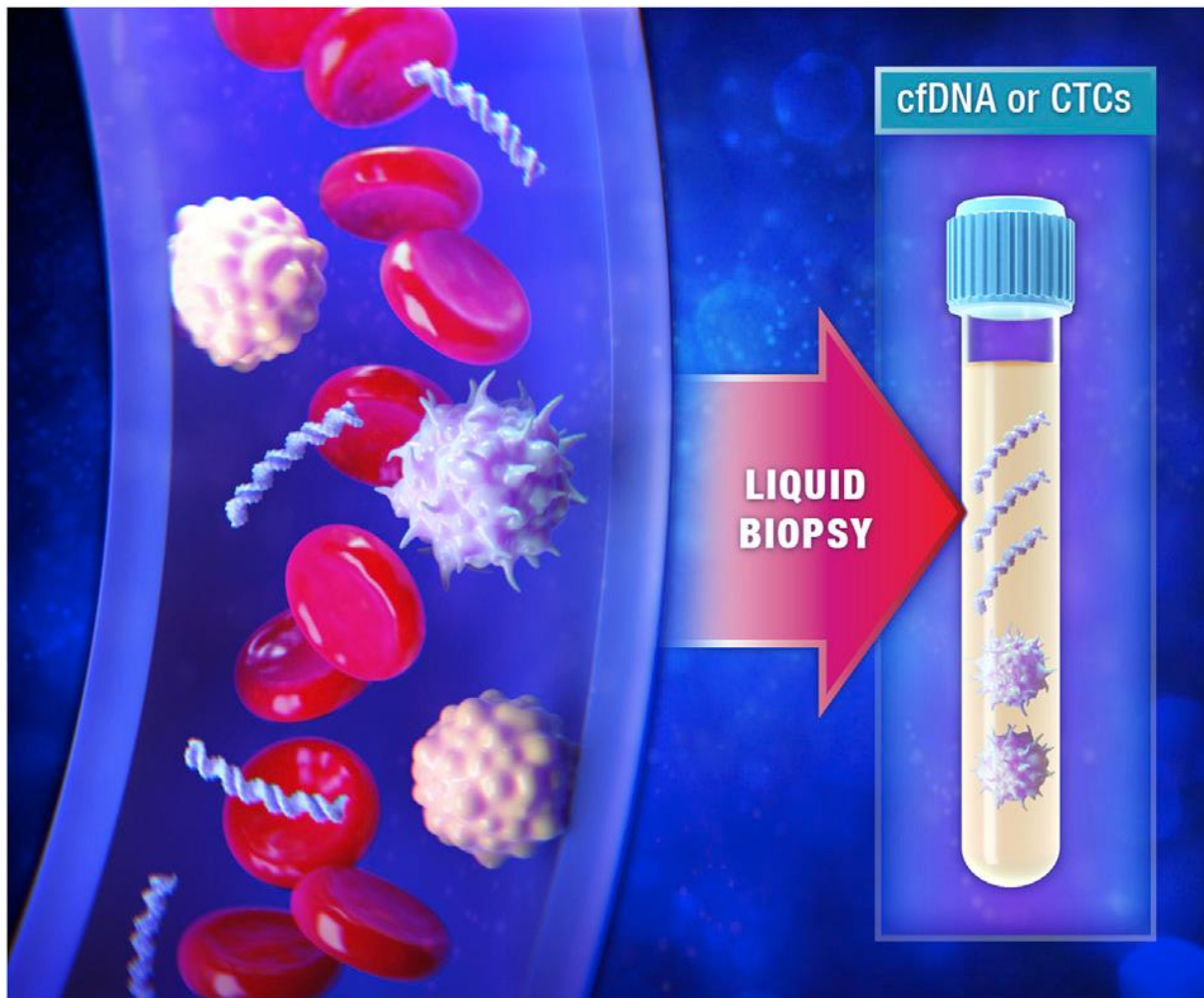
- Pinning Microscopy: 2 to 8000 • 0 to 1 Cells: 1 to 8000
- 1-10 Cells: 1-10 Pico • 1-10 Cells: 1-10 Pico

# Liquid Biopsy Workflow: Enabling CTC Molecular Characterization





# Liquid Biopsy – *the 21st century X-Ray*



## DIAGNOSIS:

Genotyping cfDNA in the blood to determine the tumor profile

## RESPONSE AND FOLLOW UP:

Analysis of cfDNA and CTC for real time monitoring of response to treatment

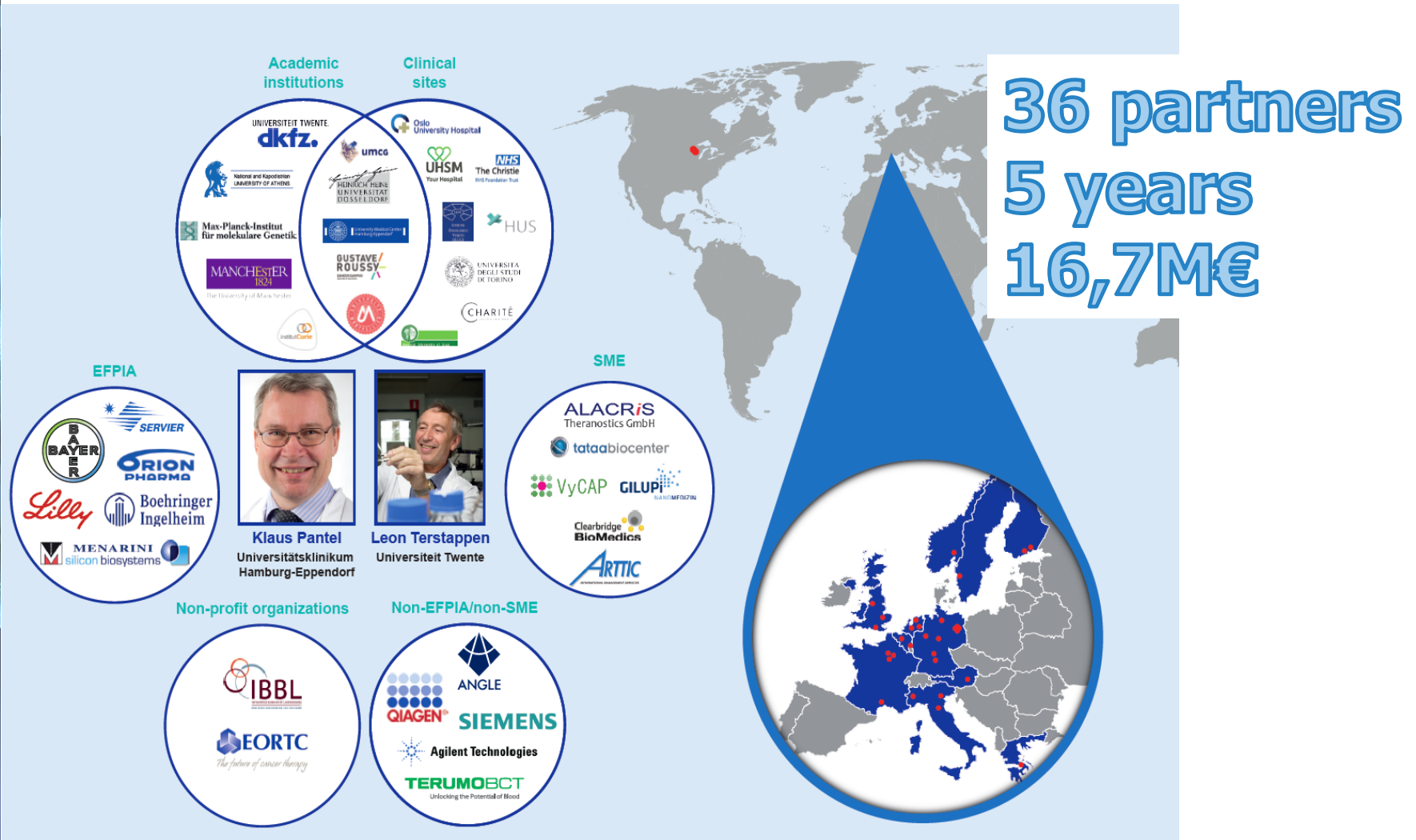
## TUMOR EVOLUTION:

Emergence of molecular alterations associated with resistance to therapy

## MINIMAL RESIDUAL DISEASE:

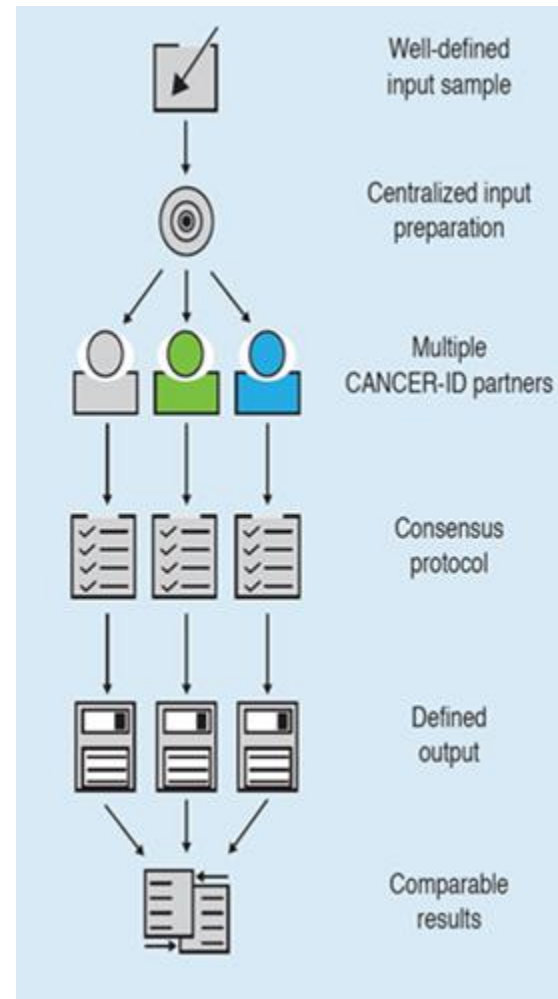
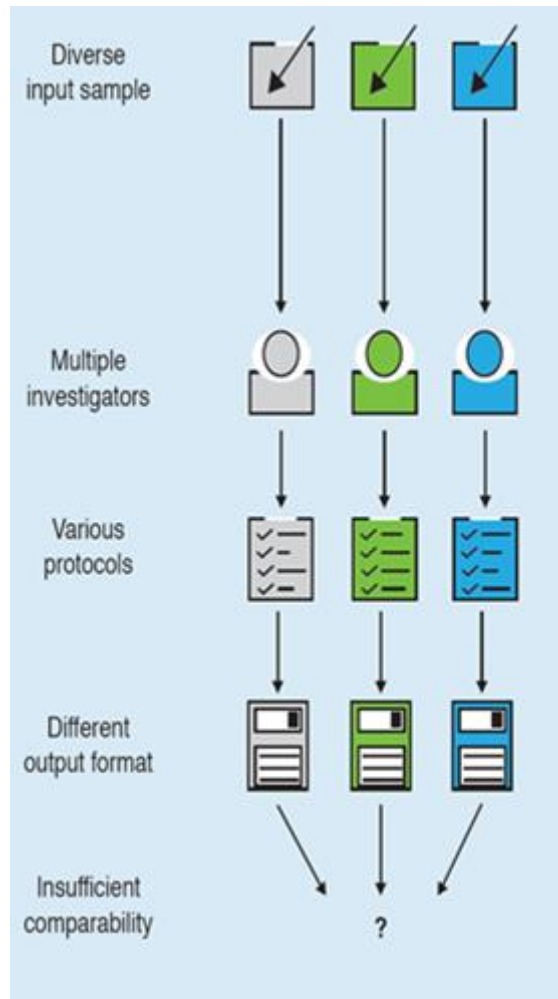
The presence of cfDNA or CTC in the circulation indicates that the disease is still present

*Bardelli & Pantel, 2017, Cancer Cell 31, 172-179*





# Working with the same technology at different sites...



# Worldwide interactions with other stakeholders in the field

**Other consortia and organizations active in Liquid Biopsy related fields. CANCER-ID fostered collaboration in the field and contact with several initiatives:**

- Blood Profiling Atlas in Cancer (BloodPAC) Consortium – US-based PPP established in Oct 2016, enabling access to and harmonization of liquid biopsy data, ongoing negotiations about collaboration  
Meeting at AACR 2018 together with NIH representative  
→ In preparation a White Paper on pre-analytical sample handling, joint data base infrastructure, shared data access

**BloodPAC**



- SPIDIA4P (Standardisation and improvement of generic pre-analytical tools and procedures for in-vitro diagnostics) – H2020 program, development of CEN documents





## CEN/TC 140/WG 3 N 391

[CEN/TC 140/WG 3](#)  
Quality management  
E-mail of Secretary: [ulrike.schroeder@din.de](#)  
Secretariat: DIN

### CEN/TS for CTCs

Date of document

Expected action  
Due Date

#### Background

Please find enclosed the final draft CEN/TS for *Molecular in vitro diagnostic examinations — Specifications for pre-examination processes for Circulating Tumor Cells (CTCs) in venous whole blood — Part 3: Preparation*.  
WebEx meeting in January.

If you have any objections, please contact the Secretary of CEN/TC 140 to prepare N 391.



## CEN/TC 140/WG 3 N 397

**REPLACES:** N 389

[CEN/TC 140/WG 3](#)  
Quality management in the medical laboratory  
E-mail of Secretary: [ulrike.schroeder@din.de](mailto:ulrike.schroeder@din.de)  
Secretariat: DIN

### CEN/TS for CTCs - Isolated DNA - final

Date of document 2019-02-01

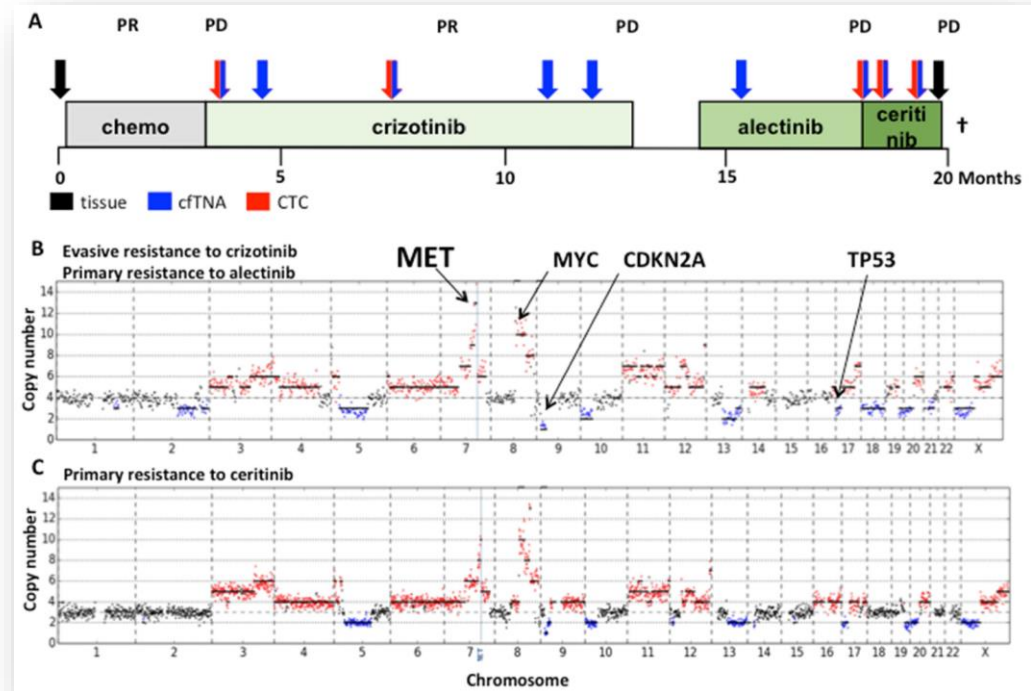
Expected action Info

#### Background

Please find enclosed the final draft CEN/TS for *Molecular in vitro diagnostic examinations — Specifications for pre-examination processes for Circulating Tumor Cells (CTCs) in venous whole blood — Part 2: Isolated DNA* with changes according to the December meeting and the WebEx meeting in January. For a text comparison to N 381, please see N 398.

# MSB Liquid Biopsy workflow provided results in ALK inhibitors resistance

- Evasive resistance to ALK inhibitors linked to MET amplification



Berger et al. J Thorac Oncol. 2018 Sep 8.

# Scientific visibility

AACR 2018 – opening plenary lecture



The presentation content is displayed on a large screen at the front of the hall. It consists of several slides. The top row shows a video of Klaus Pantel speaking, followed by a title slide for 'Liquid Biopsy: Novel Technologies and Clinical Applications' by Klaus Pantel, MD, PhD, from the Institute of Tumor Biology, University Cancer Center Hamburg (UCCH). The bottom row shows a slide titled 'UKE-Workflow for Genomic Characterization of Single CTCs', which includes a section on 'Automated individual CTC sorting with DEPArray™' and a section on 'Whole genome amplification & NGS'.

**Liquid Biopsy:**  
Novel Technologies and Clinical Applications

Klaus Pantel, MD, PhD  
Institute of Tumor Biology, University Cancer Center Hamburg (UCCH)

**UKE-Workflow for Genomic Characterization of Single CTCs**

Automated individual CTC sorting with DEPArray™

Whole genome amplification & NGS

*Comparative study of whole genome amplification and next generation sequencing performance of single cancer cells*

Anna Behayen<sup>1</sup>, Malin Alawi<sup>1,2</sup>, Michael Gormley<sup>3</sup>, Volker Müller<sup>4</sup>, Harriet Wilkman<sup>5</sup>, Ryan P. McRullan<sup>6</sup>, Denis A. Semisov<sup>7</sup>, Weimin Li<sup>7</sup>, Maria Gellera<sup>8</sup>, Klaus Pantel<sup>1</sup>, Simon A. Joosten<sup>9</sup>

<sup>1</sup>Department of Tumor Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany  
<sup>2</sup>Transferring Cells, University Medical Center Hamburg-Eppendorf, Hamburg, Germany  
<sup>3</sup>Department of Tumor Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany  
<sup>4</sup>Department of Tumor Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany  
<sup>5</sup>Department of Tumor Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany  
<sup>6</sup>Department of Tumor Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany  
<sup>7</sup>Department of Tumor Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany  
<sup>8</sup>Department of Tumor Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany  
<sup>9</sup>Department of Tumor Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany



# Building of a lasting network



➤ Continuity to project consortium  
2020 & beyond