

Der Nutzen von Biobanken für die moderne Krebstherapie



INSELSPITAL

UNIVERSITÄTSSPITAL BERN
HOPITAL UNIVERSITAIRE DE BERNE
BERN UNIVERSITY HOSPITAL

4. Gesundheitspolitische
Tagung der SULM

Bern, 25. Juni 2015

Martin Fiedler



Zentrum für Labormedizin, Universitätsinstitut für Klinische Chemie, Inselspital Bern

BIOBANK BERN



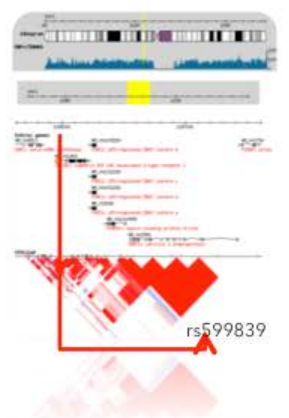
BIOBANK BERN
TISSUE

BIOBANK BERN
LIQUID



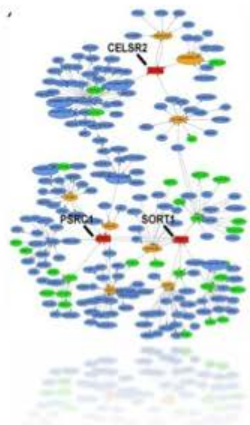
Rasante Entwicklung der Omics-Technologien...

Genomics



„what is possible“

Transcriptomics



„what appears to be happening“

Proteomics



„what makes it happen“

Metabolomics



„what is happening“



Phenotype

...verbunden mit der Hoffnung, neue diagnostische Marker und therapeutische Targets zu identifizieren!

“Over the past 15 years, major investments have been made to discover and validate cancer biomarkers.

Despite such investments, **no new major cancer biomarkers have been approved for clinical use...**”

Eleftherios P. Diamandis

J Natl Canc Inst, 102(19):1462-67, 2010



The
Economist

OCTOBER 19TH-25TH 2013

[Economist.com](http://economist.com)

Washington's lawyer surplus

How to do a nuclear deal with Iran

Investment tips from Nobel economists

Junk bonds are back

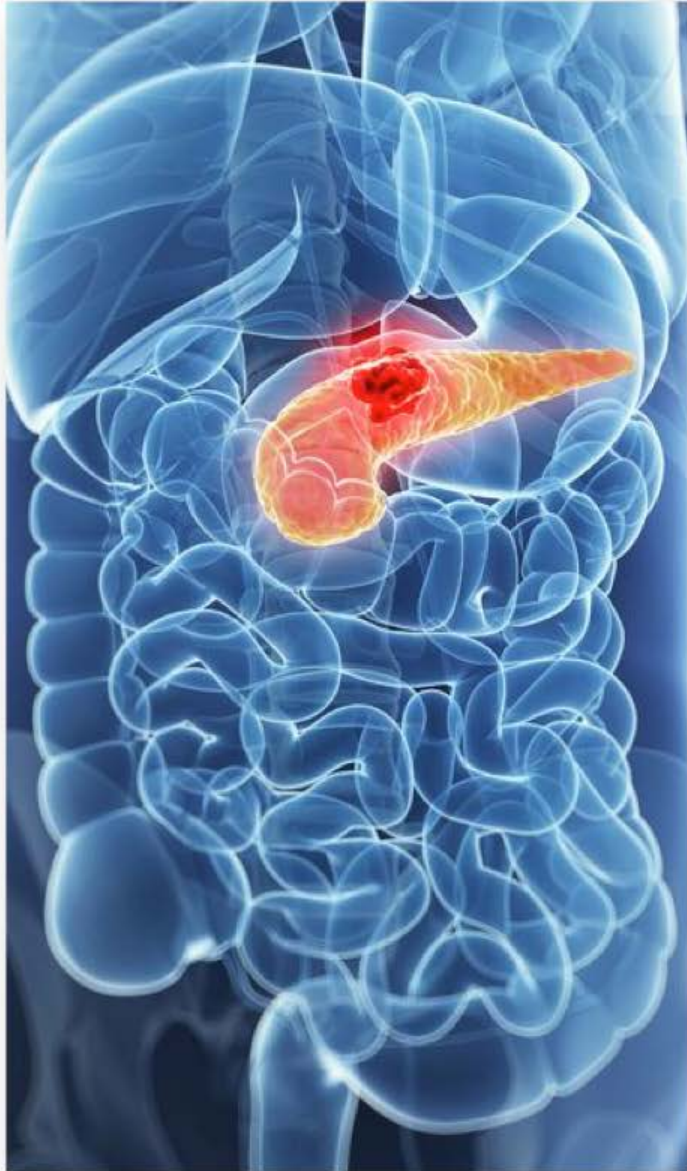
The meaning of Sachin Tendulkar

HOW SCIENCE GOES WRONG

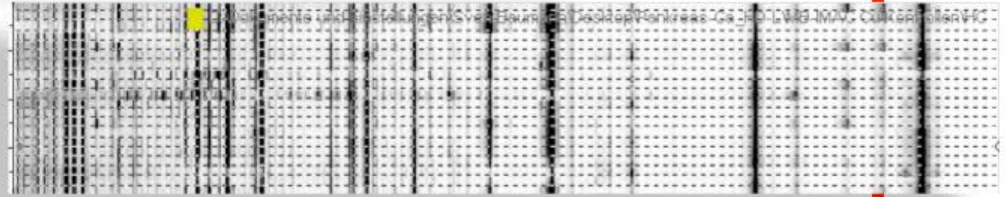
99
Einsteinium

19.10.2013

„Too many of the findings that fill
the academic ether are the result of
shoddy experiments or poor analysis.“

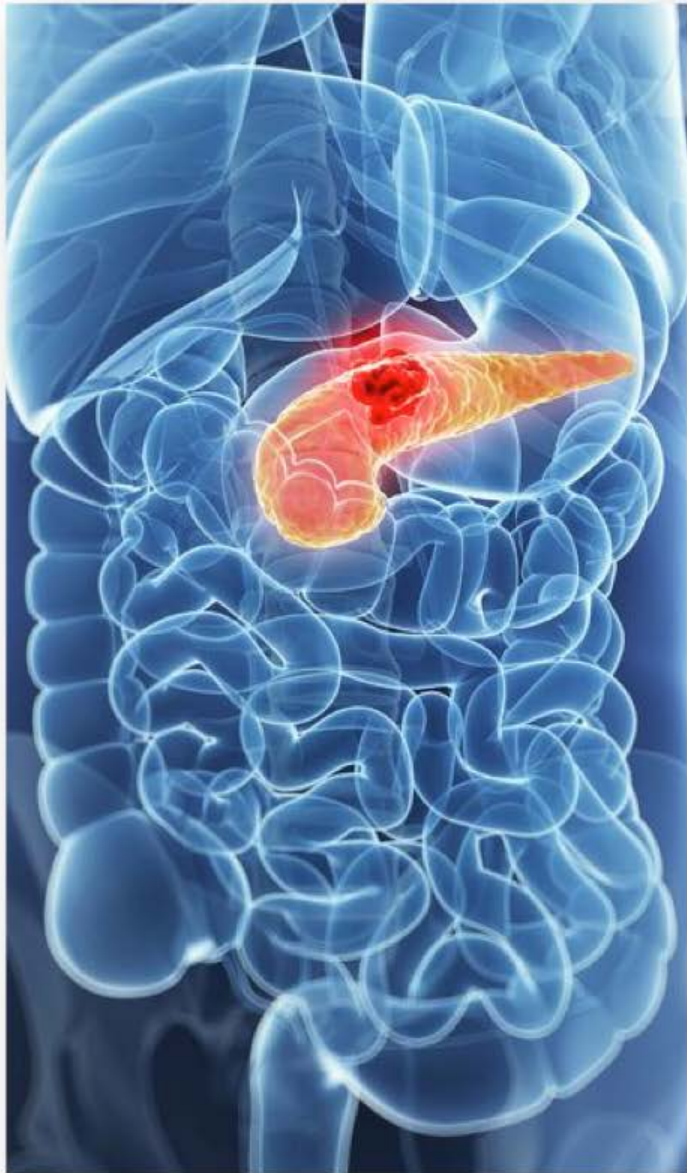


Universitätsspital A

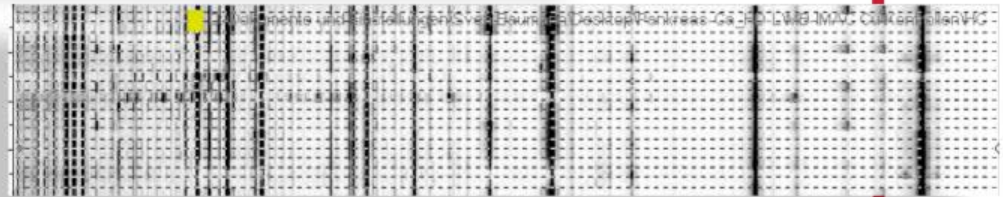


Controls

Pa-Cancer



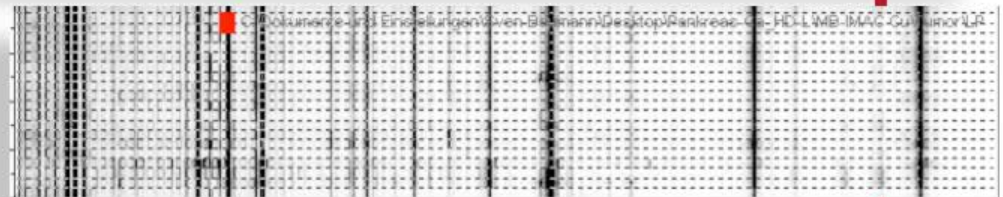
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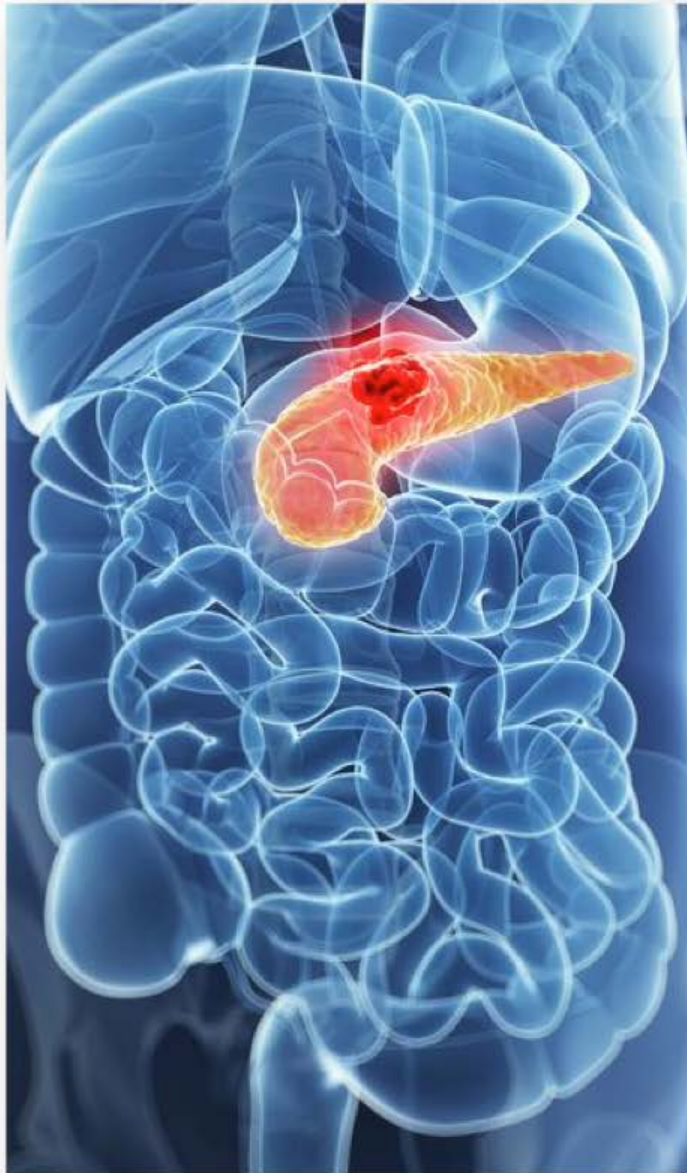
Pa-Cancer

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Controls

Pa-Cancer



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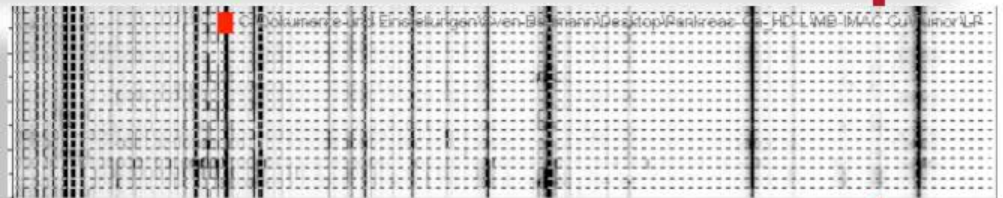


Probenqualität?

Controls

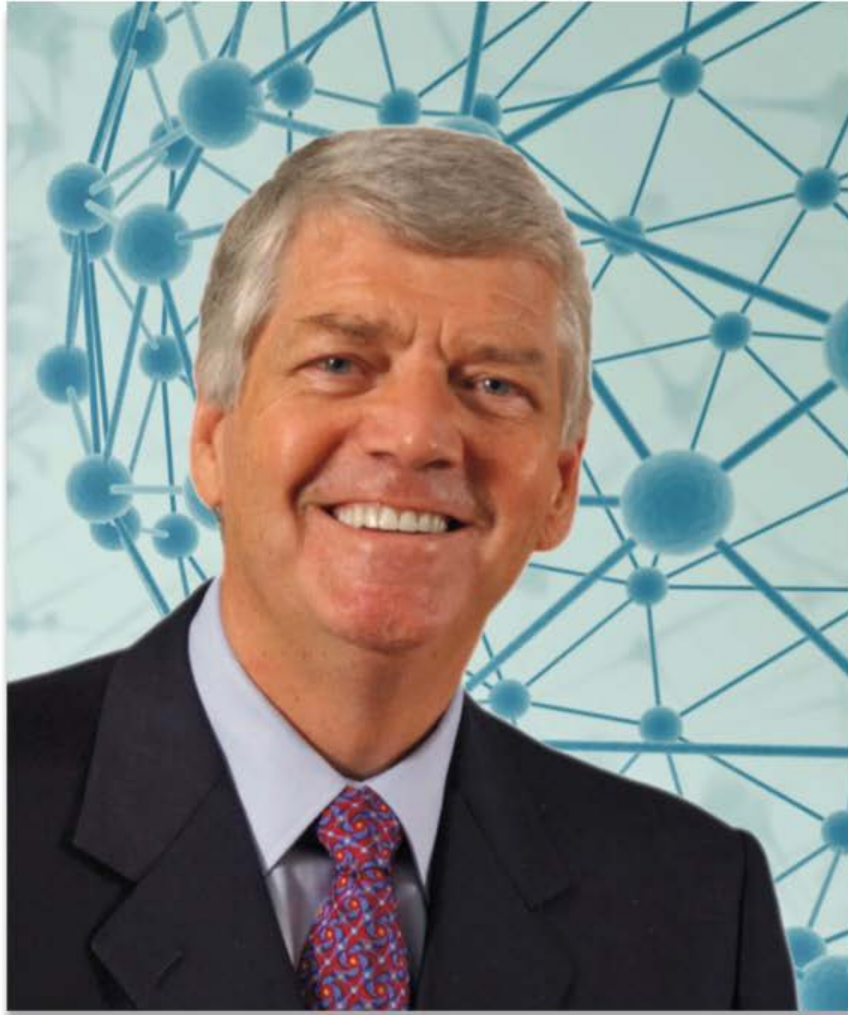
Pa-Cancer

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Controls

Pa-Cancer



George Poste

Chief scientist at the complex adaptive systems initiative,
Regents professor of health innovation
Arizona State University

“A major impediment to progress in the hunt for biomarkers is the **lack of standardization** in how **specimens are collected** and **stored.**”

Nature; 469: 156-57, 2011



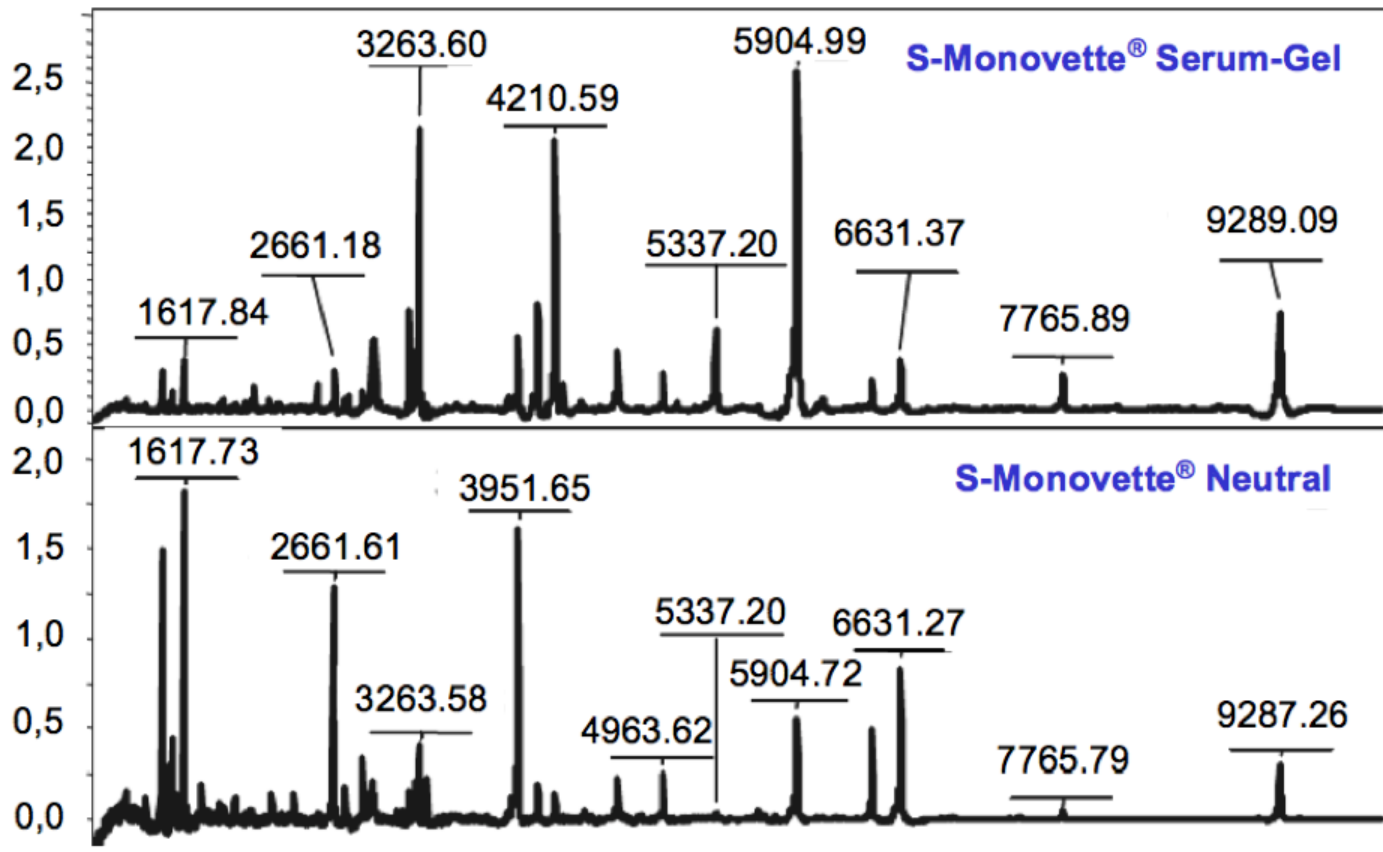
Keine präanalytischen Standards

- Probengewinnung?
- Transport?
- Lagerung?
 - *Material?*
 - *Temperatur?*
 - *Einfrier-, Auftauzyklen?*

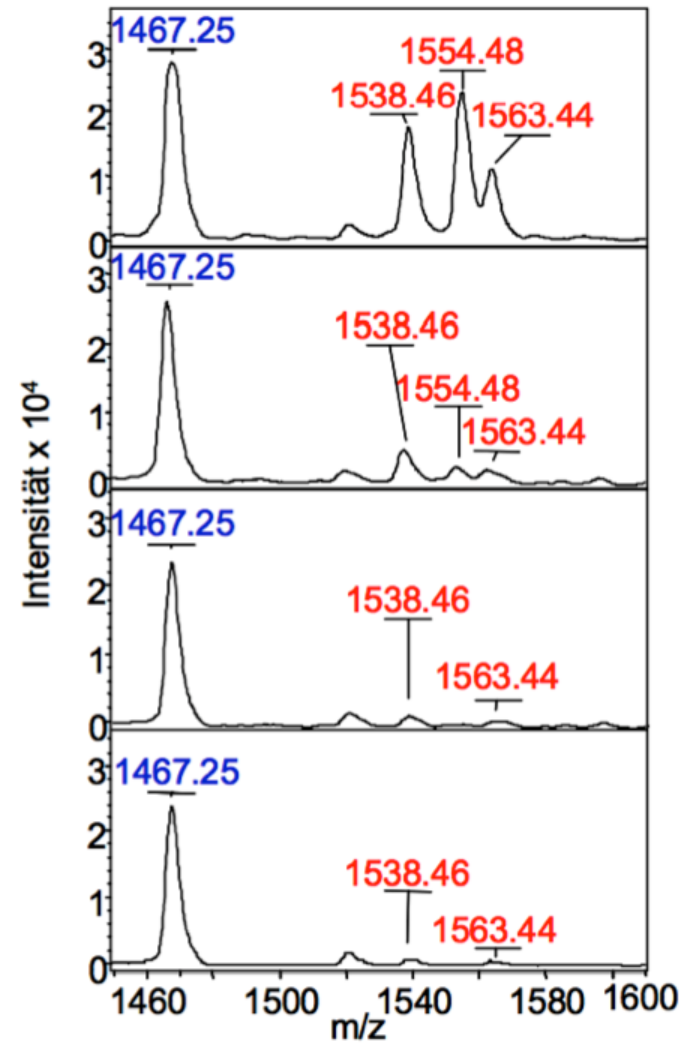
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Einfluss verschiedener Blutentnahmeröhrchen



Einfluss von Einfrier- und Auftauzyklen

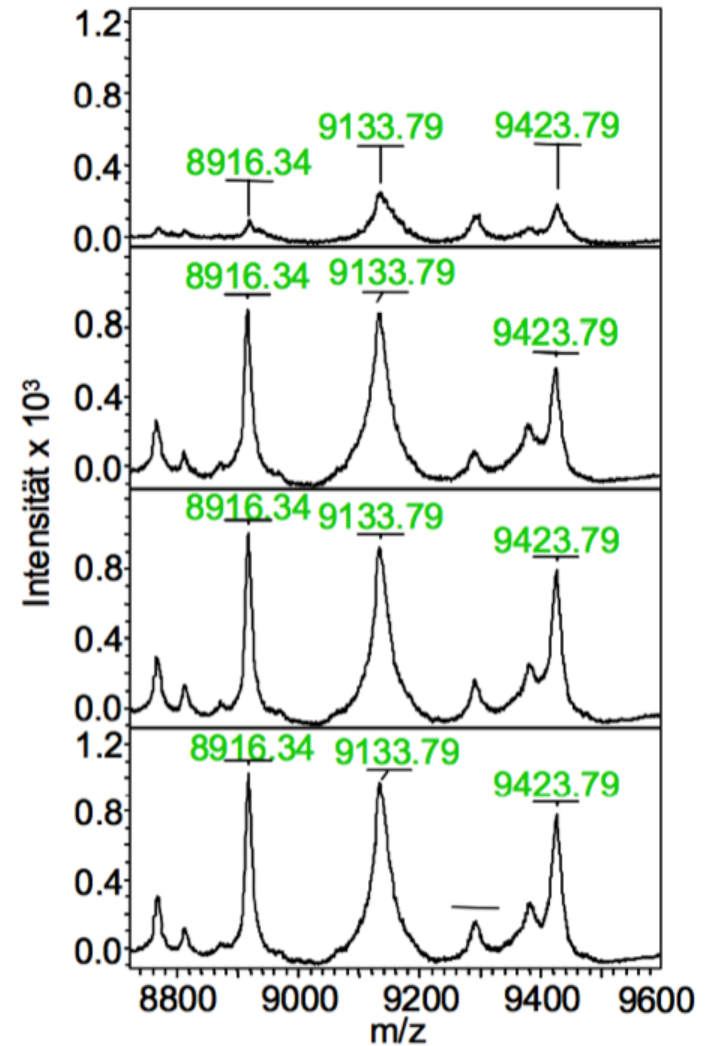


Raumtemperatur

1 Einfrier-/Auftauzyklus

3 Einfrier-/Auftauzyklen

5 Einfrier-/Auftauzyklen



LETTERS

Nature 457|2009

Metabolomic profiles delineate potential role for sarcosine in prostate cancer progression

Arun Sreekumar^{1,2,3,4}, Laila M. Poisson^{5*}, Thekkelnaycke M. Rajendiran^{1,3*}, Amjad P. Khan^{1,3*}, Qi Cao^{1,3}, Jindan Yu^{1,3}, Bharathi Laxman^{1,3}, Rohit Mehra^{1,3}, Robert J. Lonigro^{1,4}, Yong Li^{1,3}, Mukesh K. Nyati^{4,6}, Aarif Ahsan⁶, Shanker Kalyana-Sundaram^{1,3}, Bo Han^{1,3}, Xuhong Cao^{1,3}, Jaeman Byun⁷, Gilbert S. Omenn^{2,7,8}, Debashis Ghosh^{4,5,11}, Subramaniam Pennathur^{2,4,7}, Danny C. Alexander¹², Alvin Berger¹², Jeffrey R. Shuster¹², John T. Wei^{4,9}, Sooryanarayana Varambally^{1,3,4}, Christopher Beecher^{1,2,3} & Arul M. Chinnaiyan^{1,2,3,4,9,10}

Running before we can walk

European Urology 58 (2010) 12-18

available at www.sciencedirect.com
journal homepage: www.europeanurology.com



European Association of Urology



Platinum Priority – Prostate Cancer

Editorial by Jack A. Schalken on pp. 19–20 of this issue

Sarcosine in Urine after Digital Rectal Examination Fails as a Marker in Prostate Cancer Detection and Identification of Aggressive Tumours

Florian Jentzmik^a, Carsten Stephan^a, Kurt Miller^a, Mark Schrader^a, Andreas Erbersdobler^b, Glen Kristiansen^c, Michael Lein^{a,d}, Klaus Jung^{a,d,*}


^aDepartment of Urology, University Hospital Charité, University Medicine Berlin, Germany

^bInstitute of Pathology, University Hospital Charité, University Medicine Berlin, Germany

^cDepartment of Surgical Pathology, University Hospital Zurich, Zurich, Switzerland

^dBerlin Institute for Urological Research, Berlin, Germany





"Die *Standardisierung* der Gewinnung, Handhabung und Lagerung von Patientenproben ist eine *absolute Voraussetzung* für klinische *-omics Studien.*"

Ransohoff, Nature Rev., 5: 142-49, 2005

„Neuer Biomarker des Pankreaskarzinoms“

Serum Peptidome Profiling Revealed Platelet Factor 4 as a Potential Discriminating Peptide Associated with Pancreatic Cancer

Georg Martin Fiedler,¹ Alexander Benedikt Leichtle,¹ Julia Kase,¹ Sven Baumann,¹ Uta Ceglarek,¹ Klaus Felix,⁴ Tim Conrad,³ Helmut Witzigmann,² Arved Weimann,⁵ Christof Schütte,³ Johann Hauss,² Markus Büchler,⁴ and Joachim Thiery¹

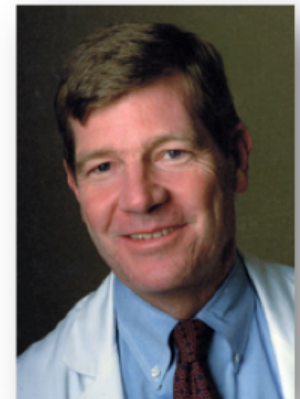
Clin Cancer Res, 15(11): 3812-9, 2009

Research Article

Serum Platelet Factor 4 Is an Independent Predictor of Survival and Venous Thromboembolism in Patients with Pancreatic Adenocarcinoma

Katherine E. Poruk¹, Matthew A. Firpo^{1,5}, Luke M. Huerter², Courtney L. Scaife^{1,5}, Lyska L. Emerson³, Kenneth M. Boucher^{4,5}, Kimberly A. Jones^{2,5}, and Sean J. Mulvihill^{1,5}

Cancer
Epidemiology,
Biomarkers
& Prevention



Mulvihill

Cancer Epidemiol Biomarkers Prev; 19(10); 2605-10, 2010

Biomarker-Pipeline

Biomarker-Entdeckung

Biomarker-Verifikation/
Validation

Assay-entwicklung

Klinische Validation

Präklinik

Klinik

Biomarker-... ..Pipeline

Biomarker-
Entdeckung

Biomarker-
Verifikation/
Validation

Assay-
entwicklung

Klinische
Validation

Wiss. Interesse / Funding
Anzahl der Biomarker

Notwendige Probenzahl
Zeitaufwand / Kosten

Annual Special Issue

TIME



10 IDEAS CHANGING THE WORLD RIGHT NOW

The global economy is being remade before our eyes. Here's what's on the horizon

- WHY YOUR JOB IS YOUR MOST VALUABLE ASSET
- REPURPOSING THE SUBURBS
- SURVIVAL-STORE SHOPPING
- BIOBANKS: SAVING YOUR PARTS
- NEED LAND? RENT A COUNTRY
- THE NEW CALVINISM
- ECOLOGICAL INTELLIGENCE
- AMORTALITY: FOREVER YOUNG
- AFRICA: OPEN FOR BUSINESS
- REINVENTING THE HIGHWAY

23. März 2009

First European Research Infrastructure projects funded
by the European Commission (EC)
> 280 associated organisations (largely biobanks)

Preparatory Phase: 2008-2011

Funding € 5 million

33 Countries

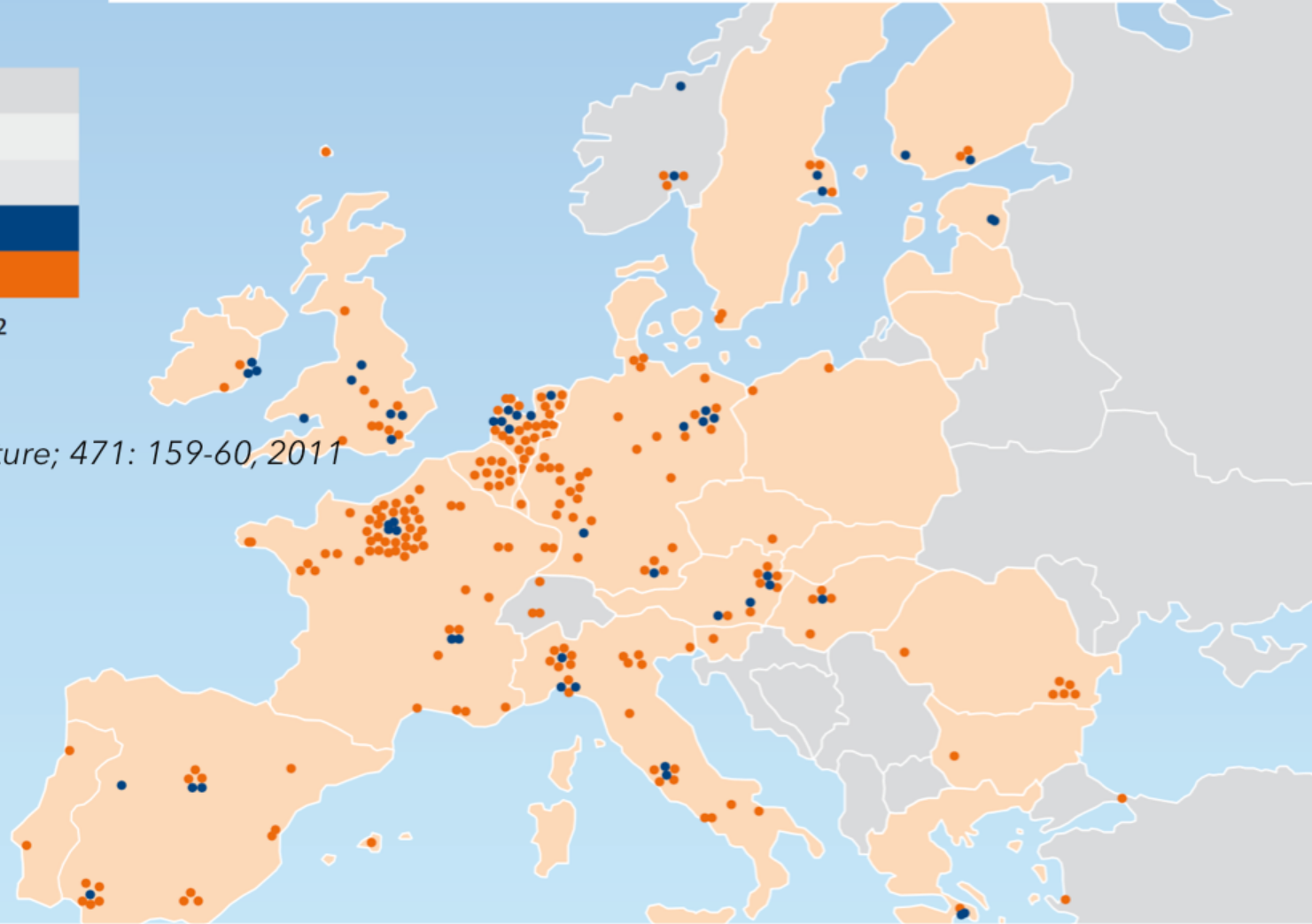
53 Participants

222 Associated Organizations

Construction/Operation Phase: 2012

www.bbMRI.eu

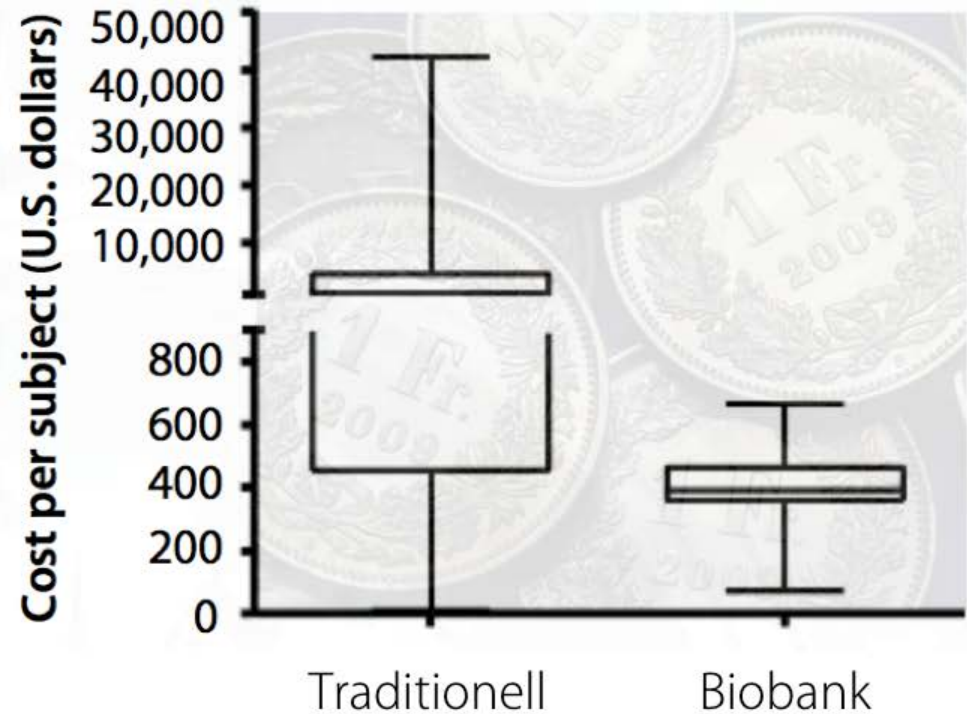
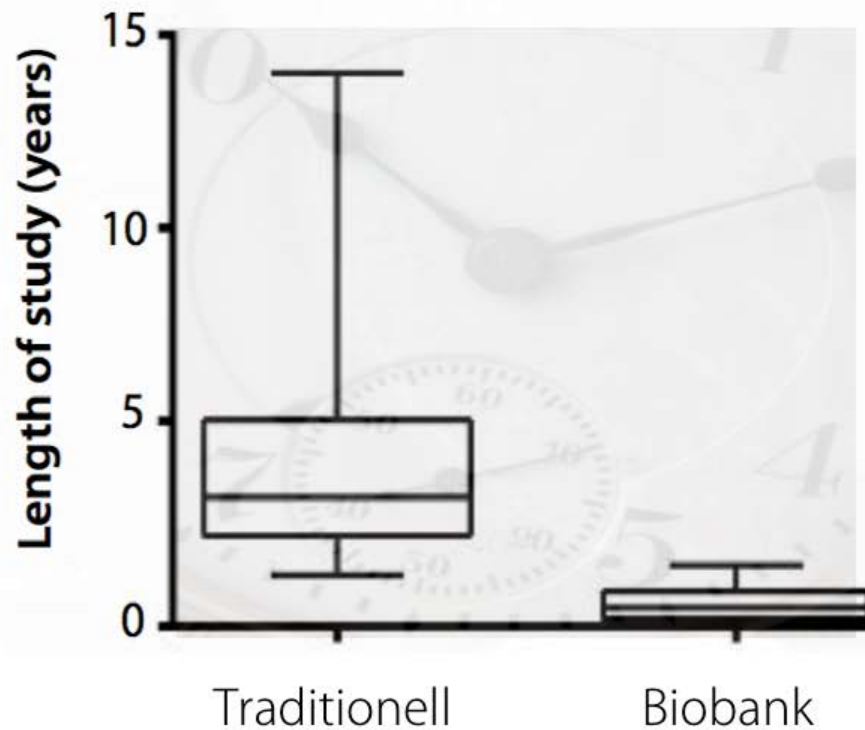
Gaskell and Gottweis, Nature; 471: 159-60, 2011



BBMRI will form an interface between specimens and data (from patients and European populations) and top-level biological and medical research.

Biobanken beschleunigen die Durchführung klinischer Studien und senken die Kosten

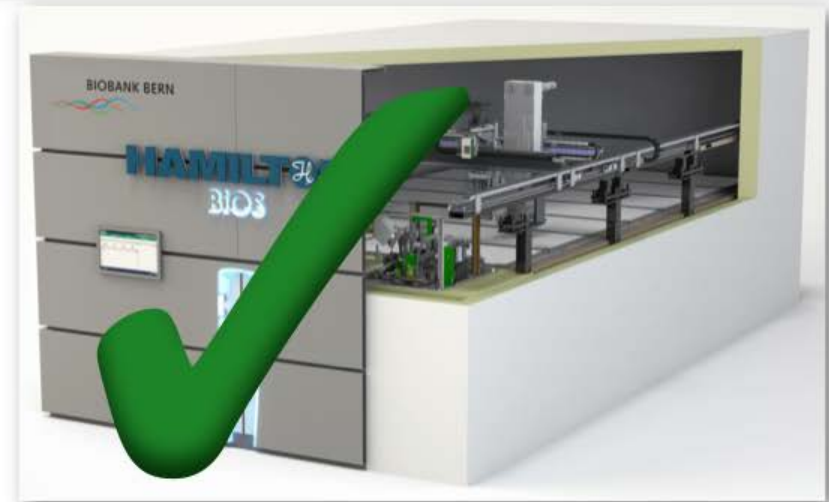
(Beispiel pharmakogenetische Studien)



Bundesgesetz über die Forschung am Menschen (Humanforschungsgesetz, HFG vom 30. September 2011)

Art. 43 Aufbewahrung

¹ Wer biologisches Material oder gesundheitsbezogene Personendaten zu Forschungszwecken aufbewahrt, muss sie durch geeignete technische und organisatorische Massnahmen gegen unbefugten Umgang schützen sowie die betrieblichen und fachlichen Anforderungen erfüllen.



Biobanken schaffen
Rechtssicherheit

Healthcare Integrated Research

Omics-
Technologies
(komplexe Analysedaten)

Bioinformatics
(Big Data)



Biobanking
(standardisierte Proben)

Klinische Datenbanken
(Patienten Informationen)

Healthcare Integrated Research



Omics-
Technologies

Bioinformatics
(Big Data)

Translation

Scientific Networks

Biobanking

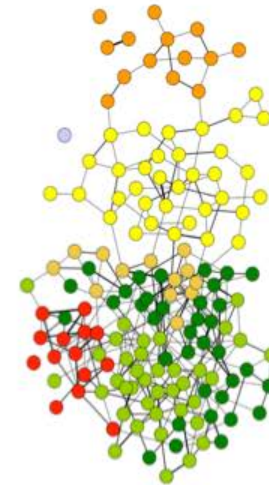
Klinische
Datenbanken

Knowledge

Perspektivenwechsel in der Medizin

Ein-
dimensional

Multi-
dimensional



Krankheit
im Fokus

Krankheits-
assoziierte
Einzel-Marker

Krankheits-
spezifische
Signaturen

Prädisposition und
Reaktion des
Gesamtorganismus



Moderne Biobanken...

- ... schaffen die Voraussetzung (Probenqualität) für die Nutzung moderner Omics-Technologien und damit für eine qualifizierte Tumorforschung
- ... bilden ein exzellentes Reservoir für zukünftige klinische Studien, beschleunigen damit die Entwicklung und Validierung neuer Biomarkern und Therapien und senken die Kosten für die klinische Forschung
- ... verbessern die Rechtssicherheit



Herzlichen Dank