
APPLIED RESEARCH IN BIOTECHNOLOGY

Prof. Heiko Zimmermann

Milano, November 27, 2017

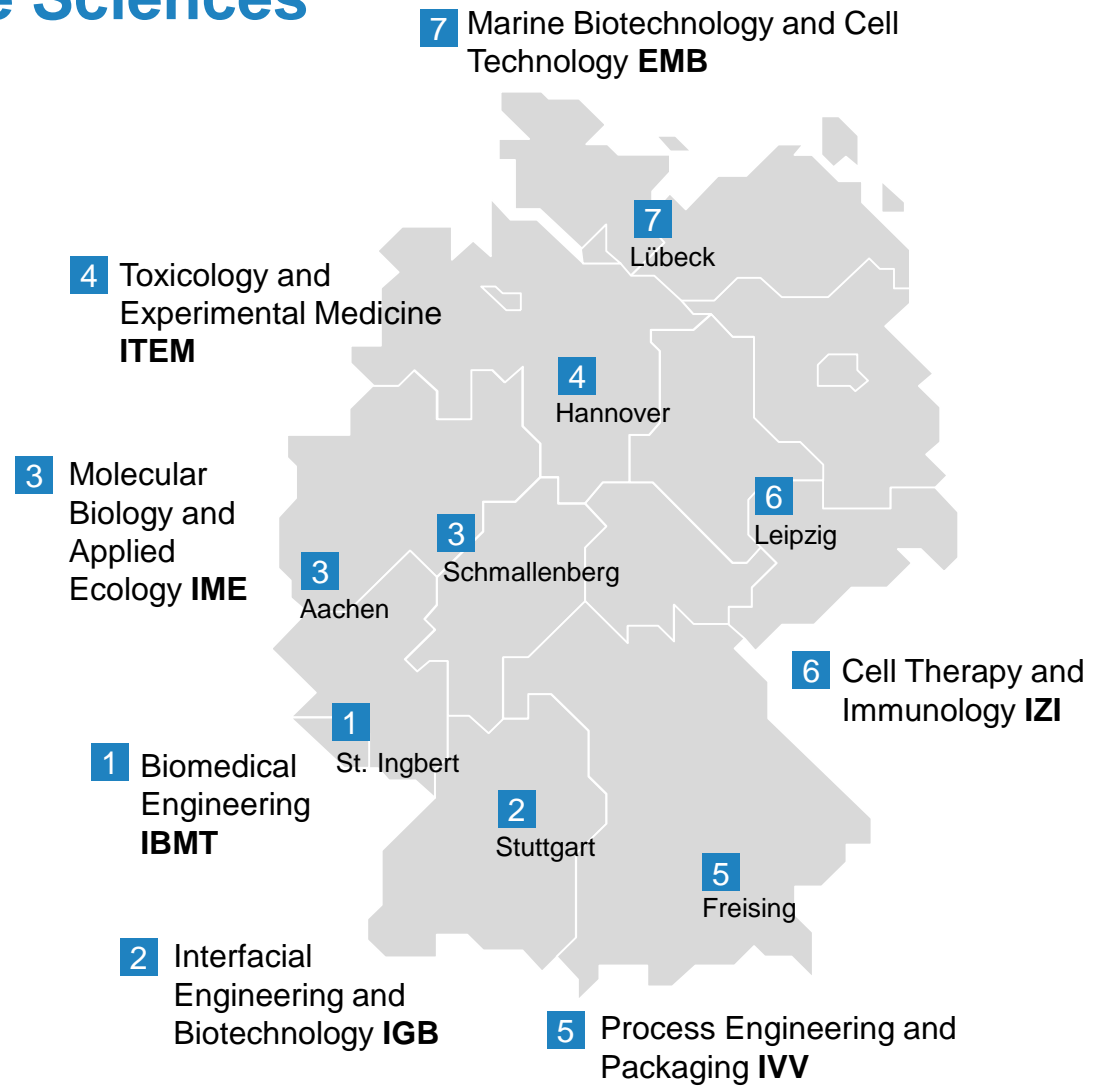


Fraunhofer Biomedical Research

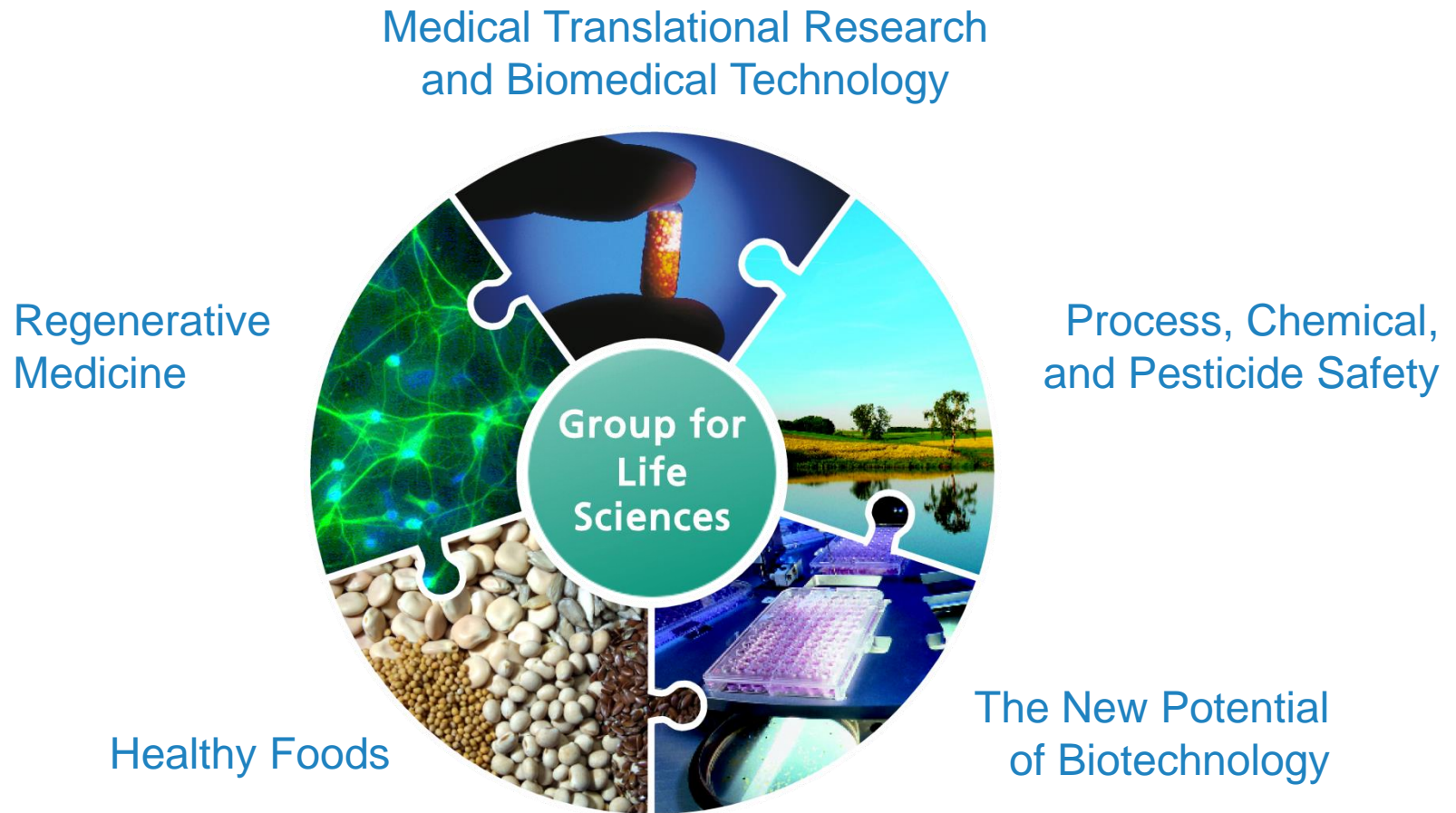
Fraunhofer Group Life Sciences

Key figures

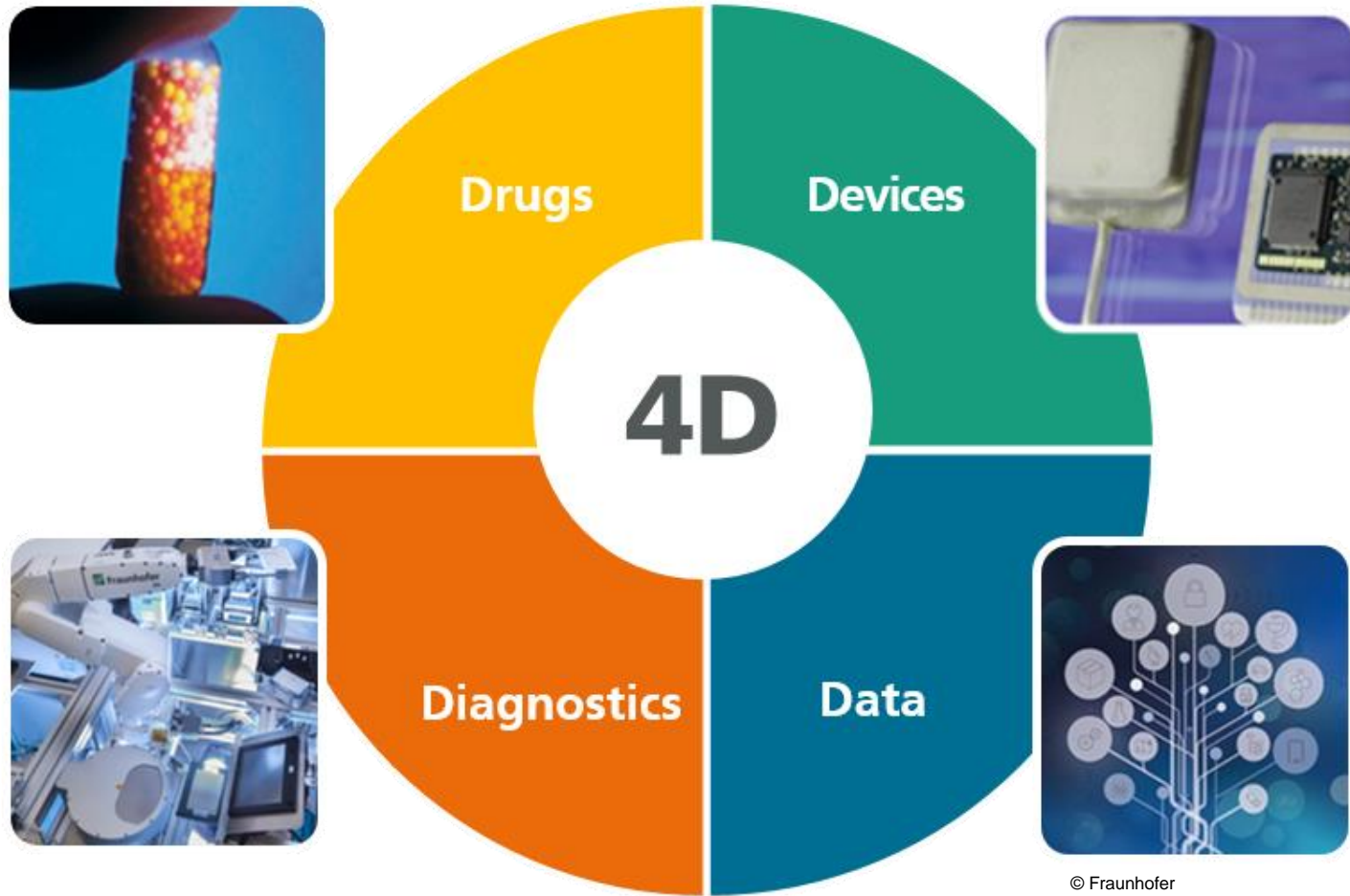
- Foundation in 2000
- 7 member institutes
- Scientific staff: 767
- Annual budget 2016: € 184 million
- Percentage of industrial revenues: 33.7%
- Chairman:
Prof. Dr. Langowski,
Fraunhofer IVV



Business Units of the Fraunhofer Group Life Sciences

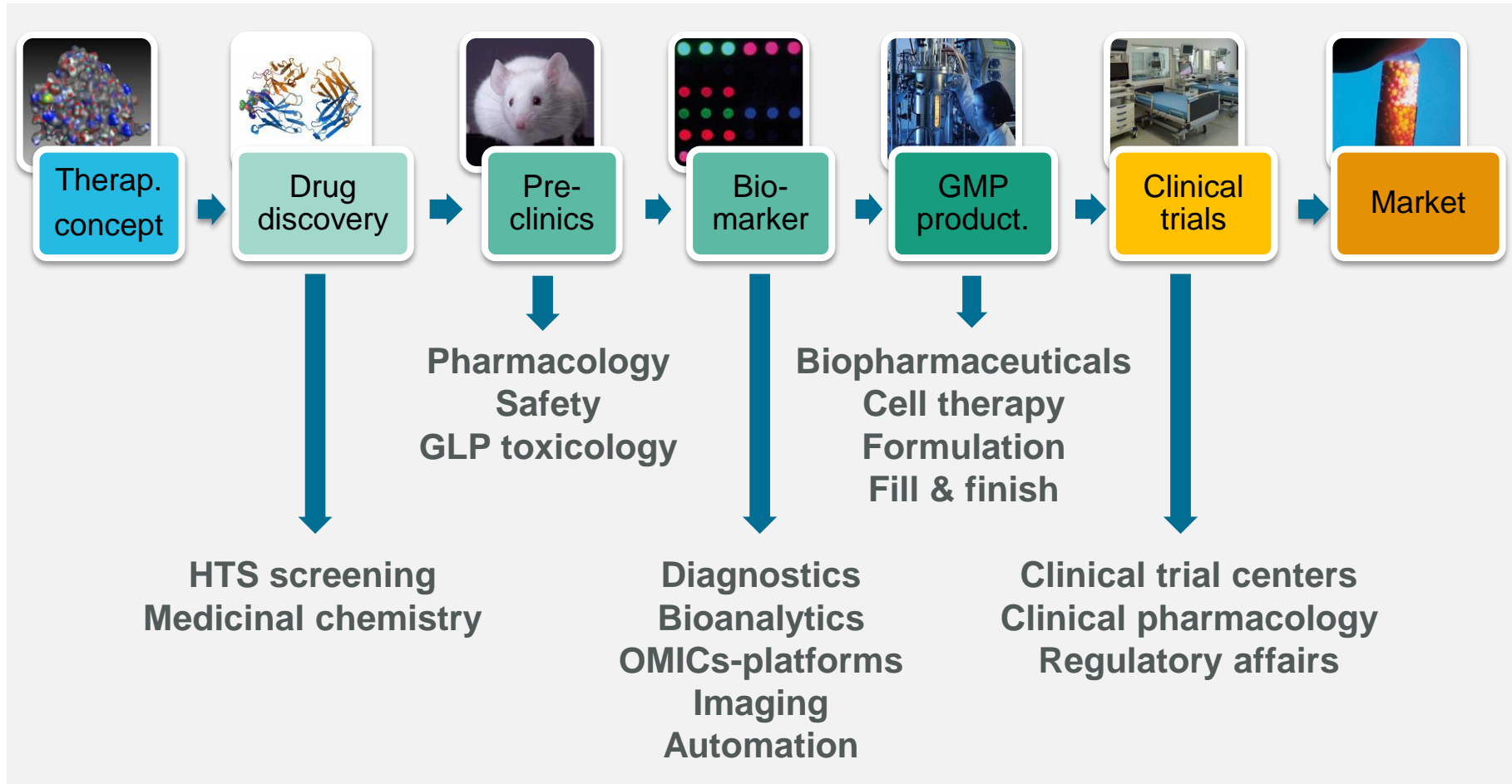


Fraunhofer Biomedical Research Special Focuses



Fraunhofer Biomedical Research

Drug Discovery and Development



Translation platform for the development of medicines and medical products



- ➔ Accelerated transfer of innovative ideas in the medical practice through a national cooperation across different organizations

Proof of Concept Platform

for the development of medicines and medical products

■ Current progress:

- Positive evaluation of the joint concept of Fraunhofer, HGF and university medicine in the [Forum Health Research](#) of BMBF (planned volume: € 50-60 million p.a.)
- Internal [pilot program](#) with HGF and university medicine started





Fraunhofer Biomedical Research

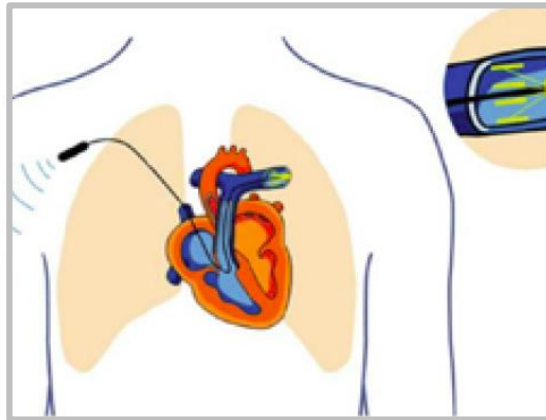
Fraunhofer Lighthouse Project

»Theranostic Implants«

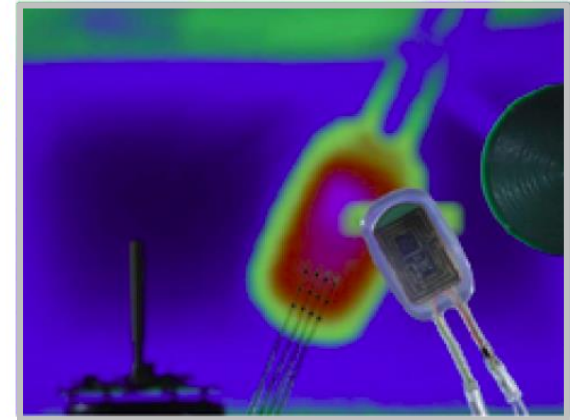
- **Active implants** combining smart sensor/actor systems
- **Interdisciplinary project** with 12 Fraunhofer Institutes form 6 groups (coordination: IBMT)



**Smart hip joint
endoprosthesis**



**Cardio vascular
implant**



**Myoelectric
hand control**

© Fraunhofer

Fraunhofer Biomedical Research

Biomarkers for Early Diagnosis of Disease

Diagnostics



Common diseases reduce quality of life and pose serious threats

- Early diagnosis improves therapeutic success for common diseases (e.g. cancer)
- Application of individually tailored therapy enhances effectiveness
- ➔ Requirement: Knowledge of disease-specific biomarkers (diagnostic and prognostic)

Fraunhofer project RIBOLUTION

- **Development of a systematic approach to the identification and validation of specific biomarkers**
- **Genome-wide search includes the previously neglected non-coding ribonucleic acids (»junk DNA«)**

RIBOLUTION

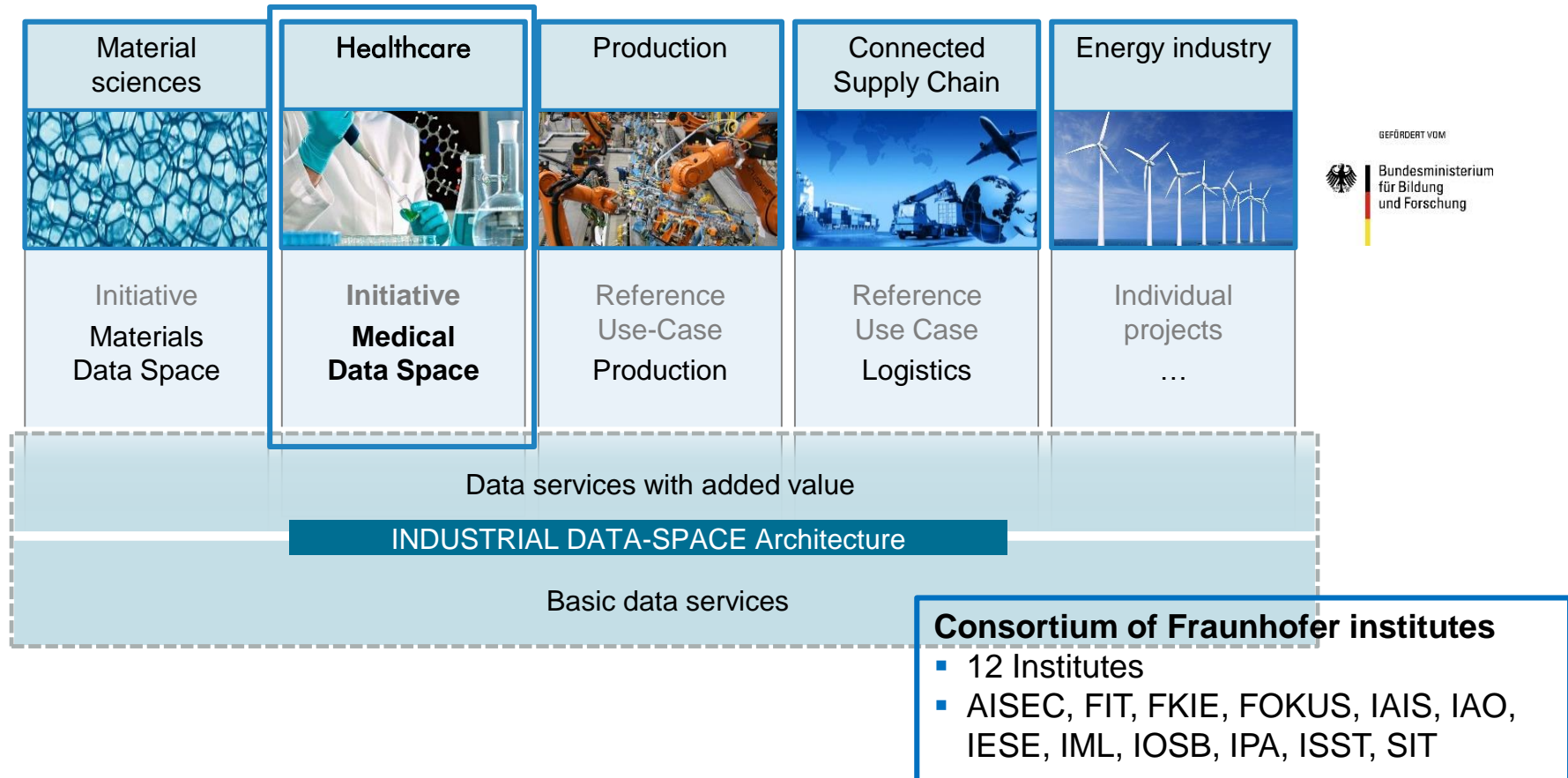


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Fraunhofer Biomedical Research

Industrial Data Space: Reference Architecture for Digital Sovereignty in Drivers Economic Sectors



© Pictures: Johns Hopkins University (2016), PublishYourArticle (2016), Siemens (2016), Seashell Logistics (2016), University of North Carolina (2016).

Labbag®

Bag-based cultivation, aggregate formation and cryopreservation of human stem cells

4 institutes
1 new product

Fraunhofer-Institut für Schicht- und
Oberflächentechnik IST, Braunschweig

Fraunhofer-Institut für Verfahrenstechnik und
Verpackung IVV, Freising

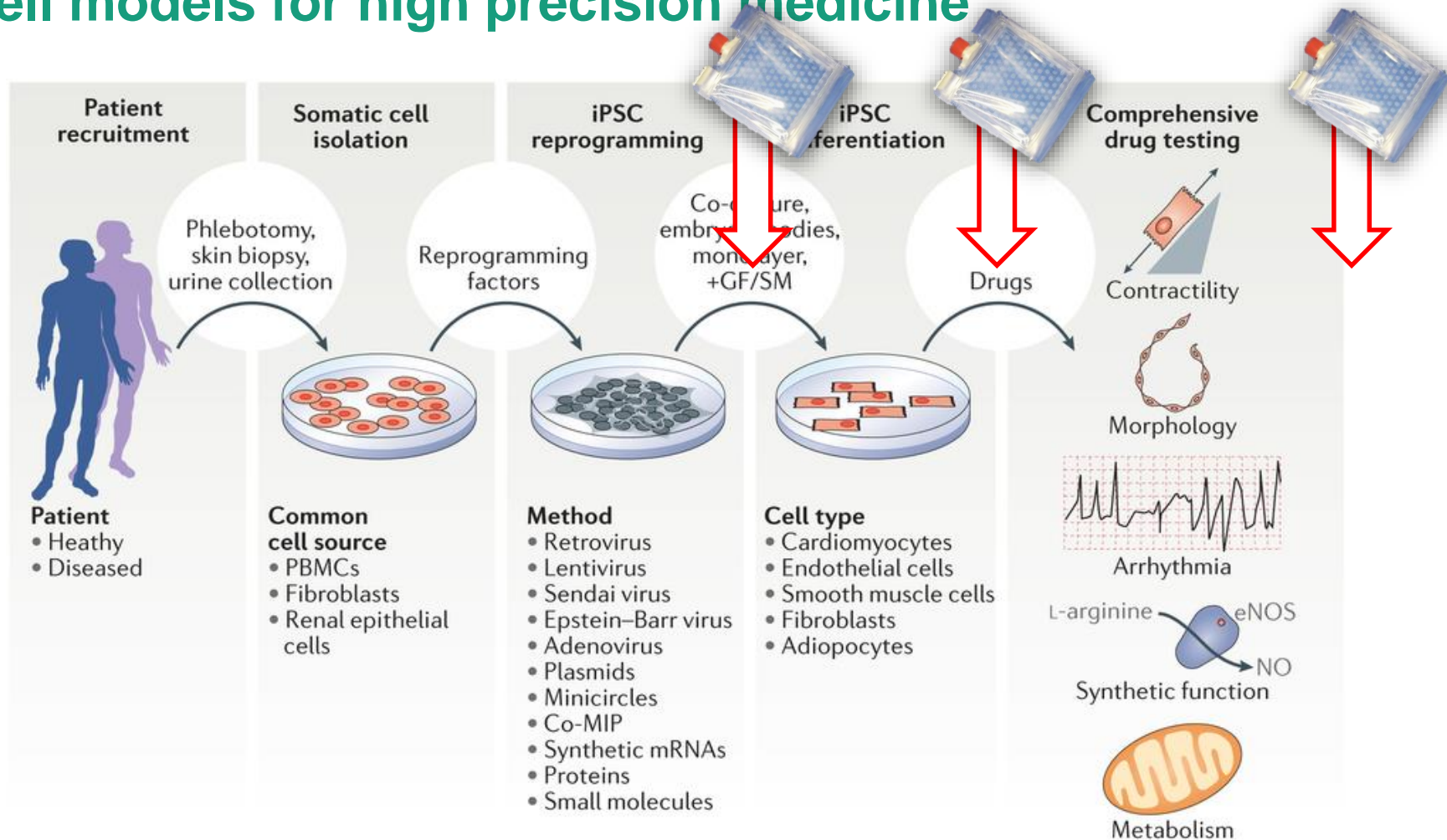
Fraunhofer IVV, Dresden

Fraunhofer-Institut für Biomedizinische Technik
IBMT, St. Ingbert

Project: 01/2014 → 07/2017

Rationale

Cell models for high precision medicine

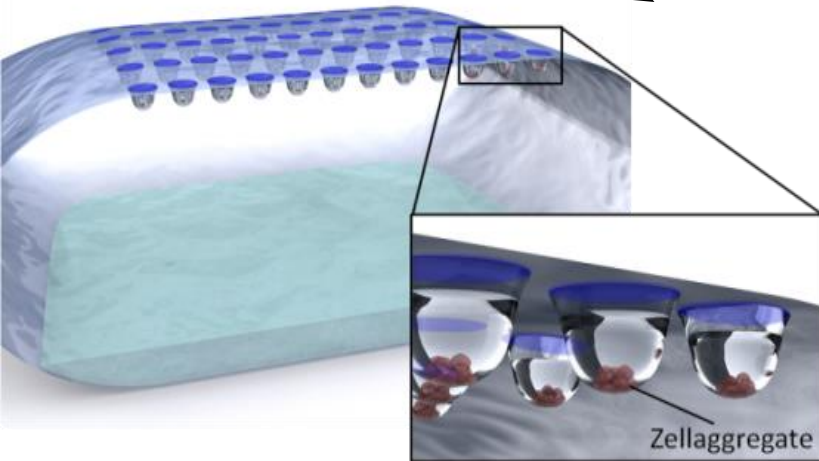
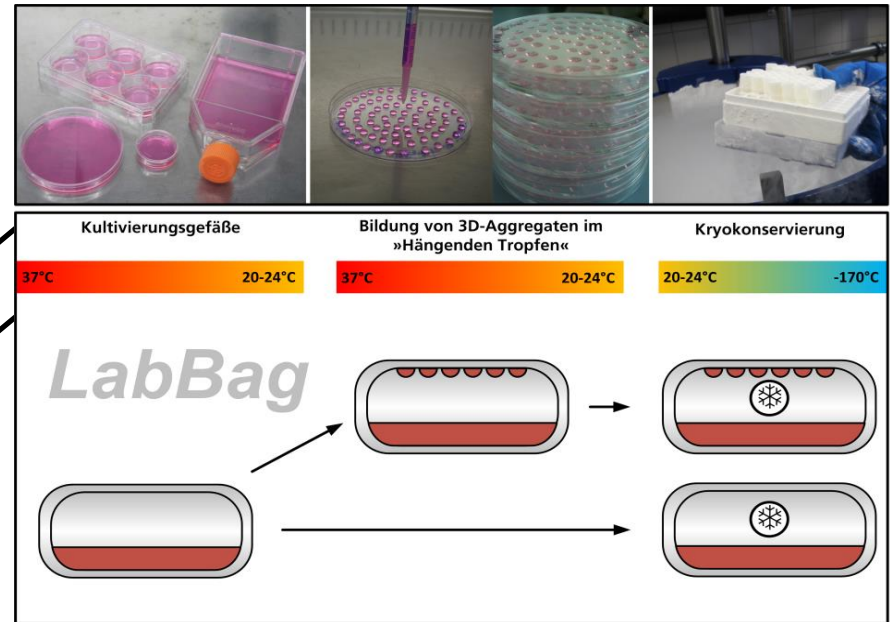


→ Need for innovative cell culture vessels

Nature Reviews | Cardiology

Idea

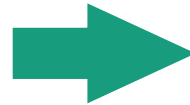
Moving all relevant process steps in one closed bag-system that can be monitored from outside



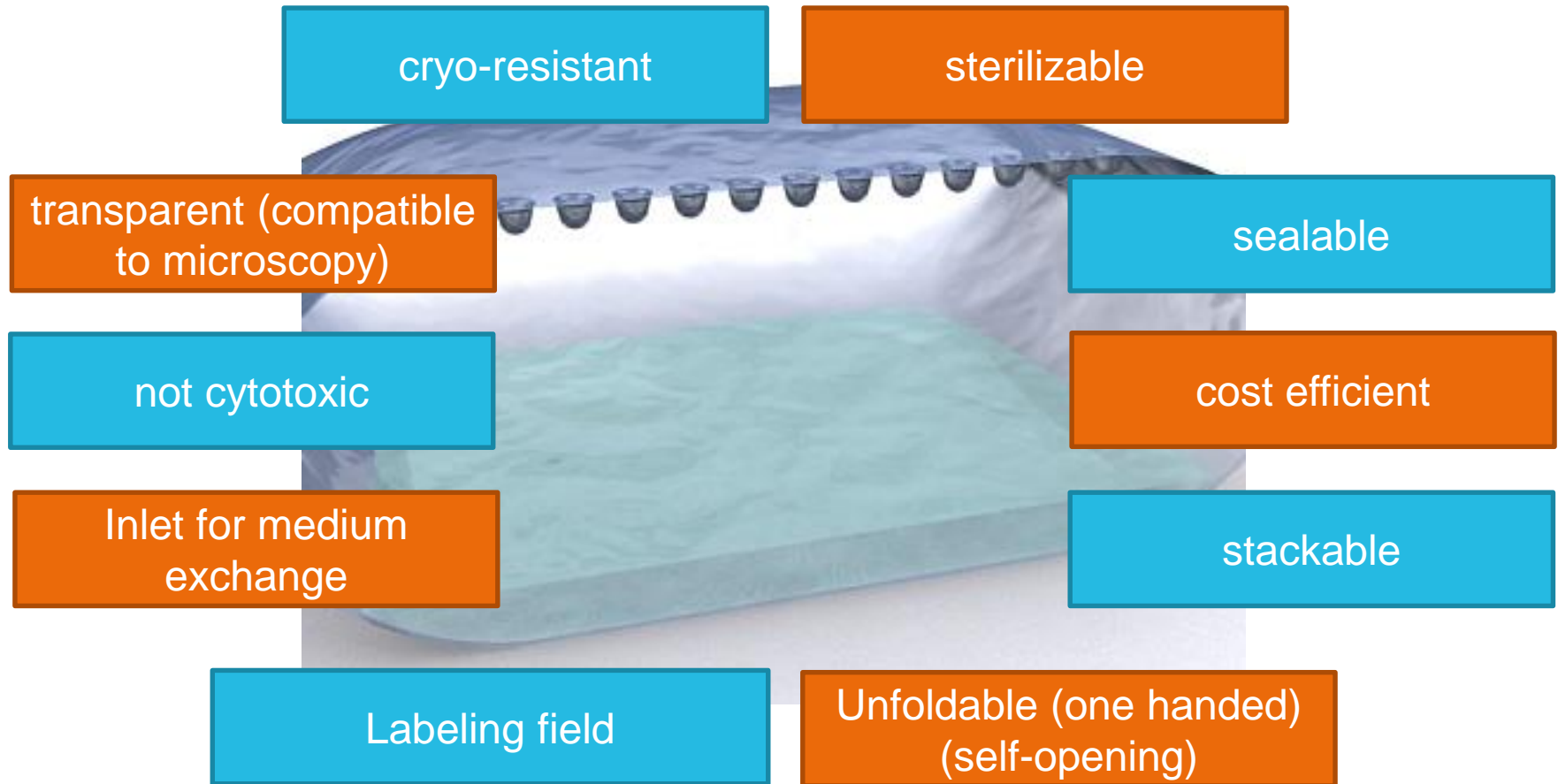
Aim: Generation of up to 1000 homogenous drops inside of a bag within a few seconds

Aim: Labbag® - »Mini-GMP-Lab«

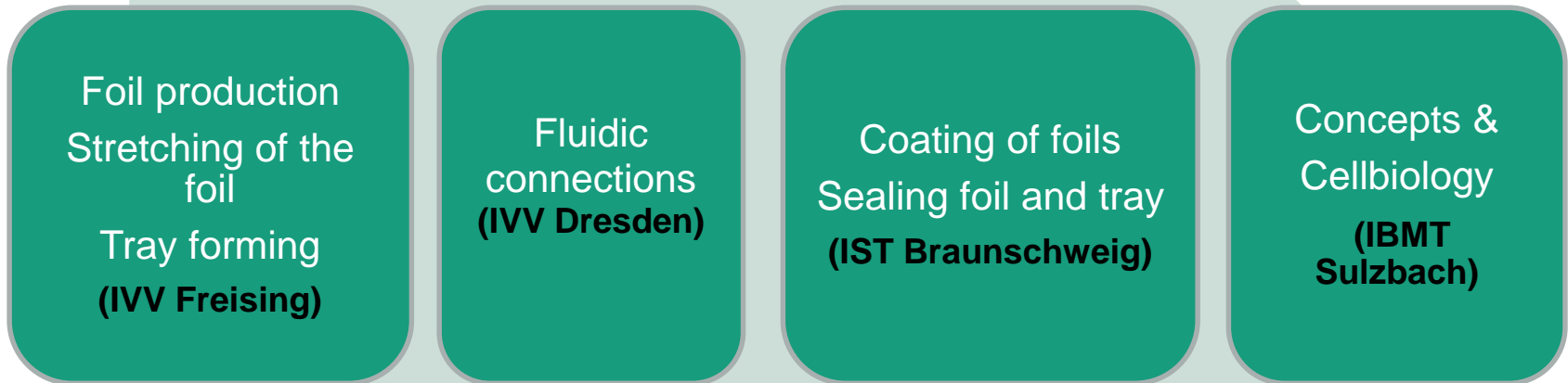
Providing high quality 3D-cell models



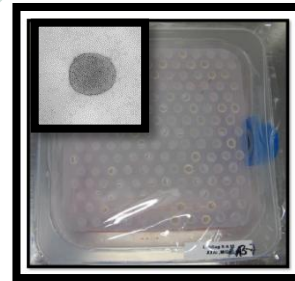
Concept Labbag® Requirements



Process & responsibilities

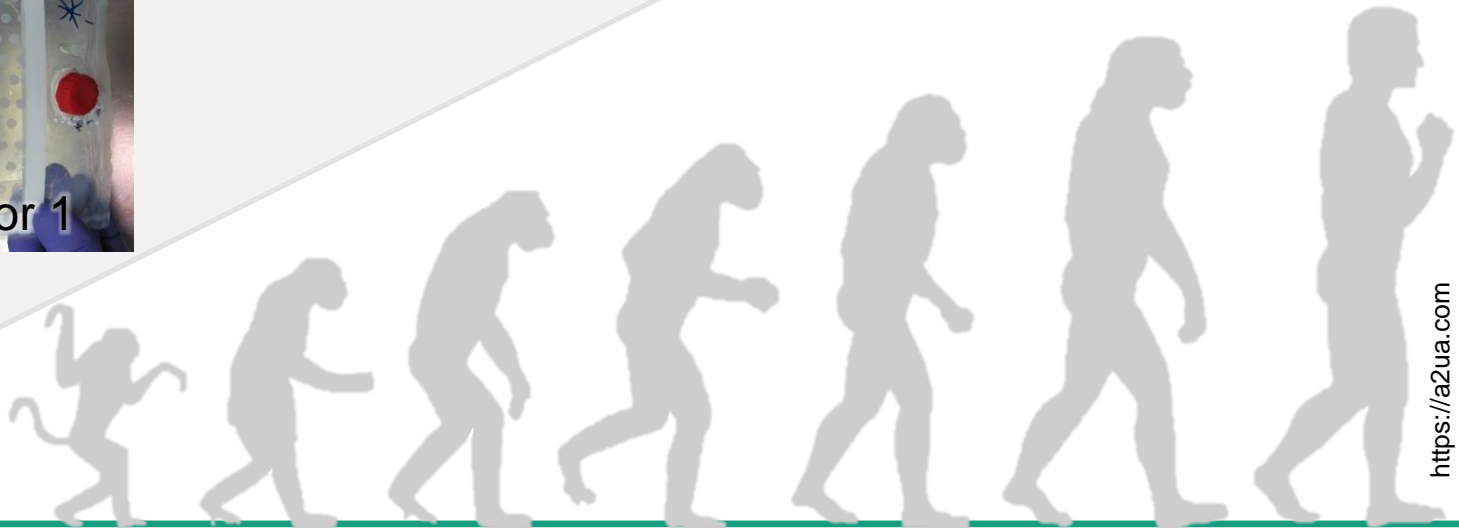
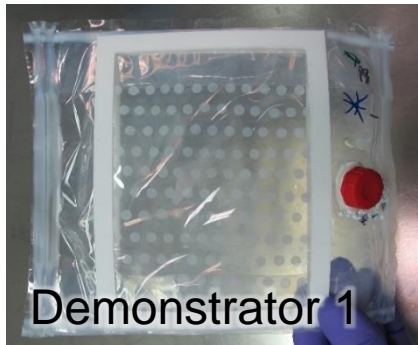


Analytics of all process steps



LabBag demonstrators

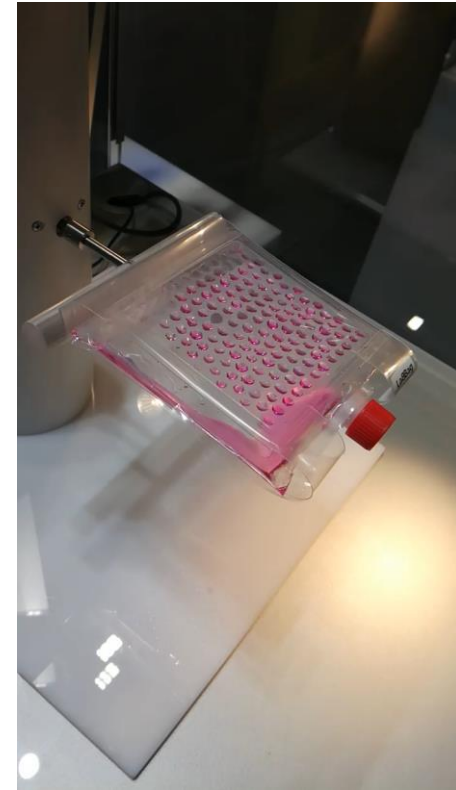
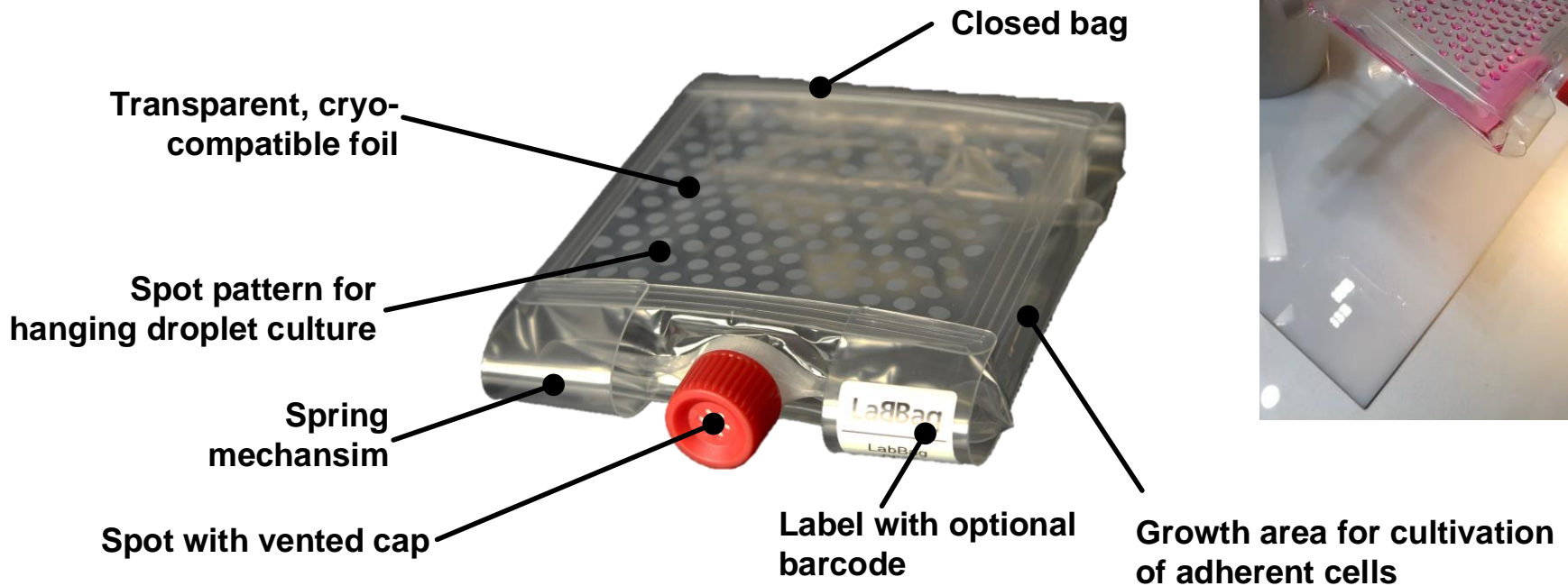
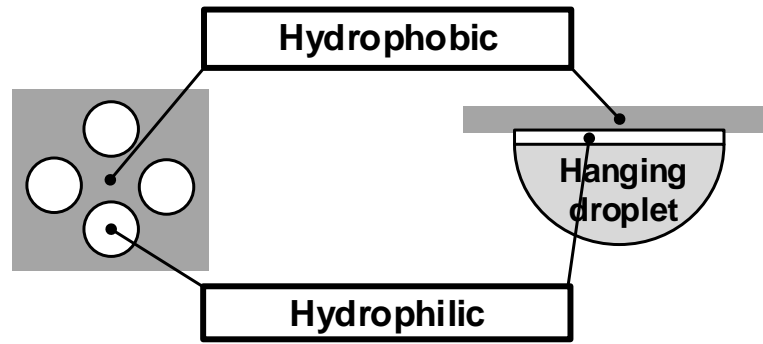
Evolution



<https://a2ua.com>

Final concept

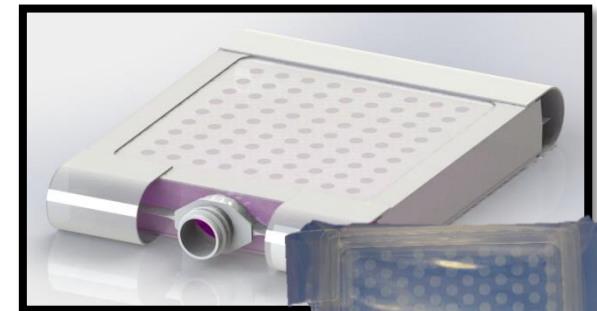
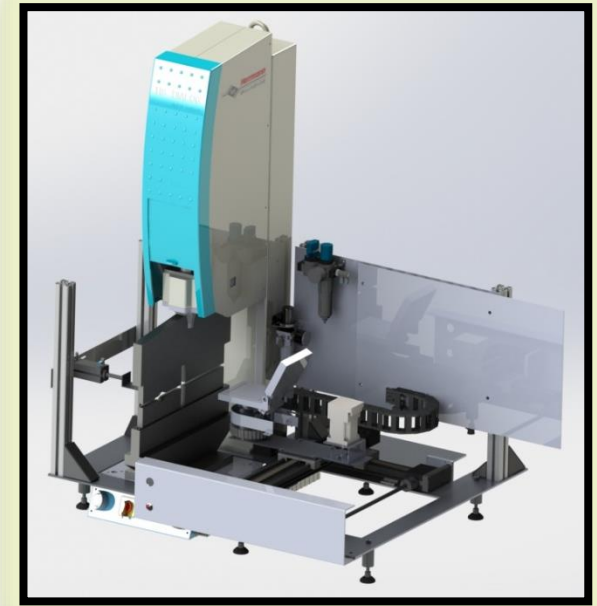
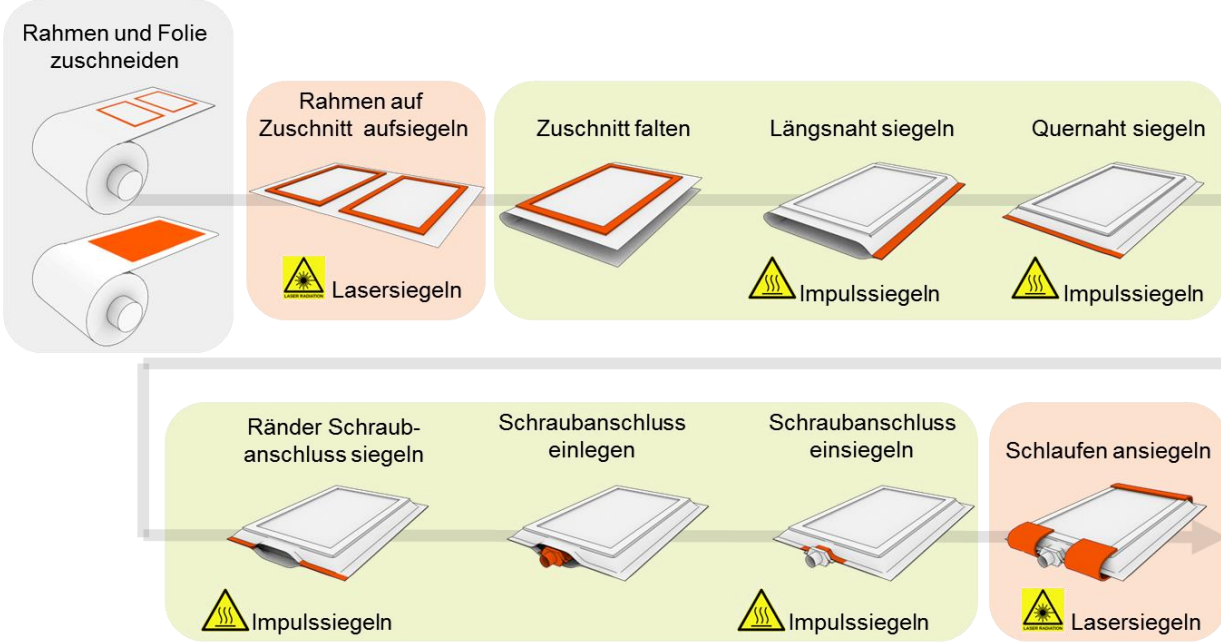
Features



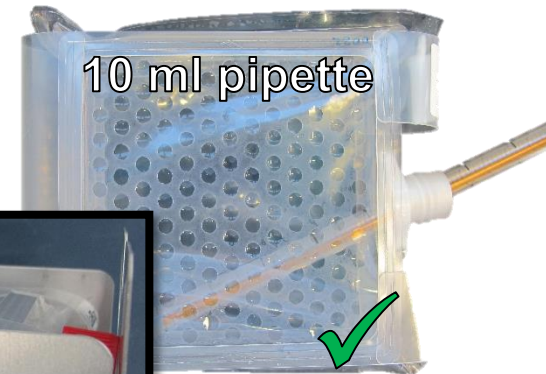
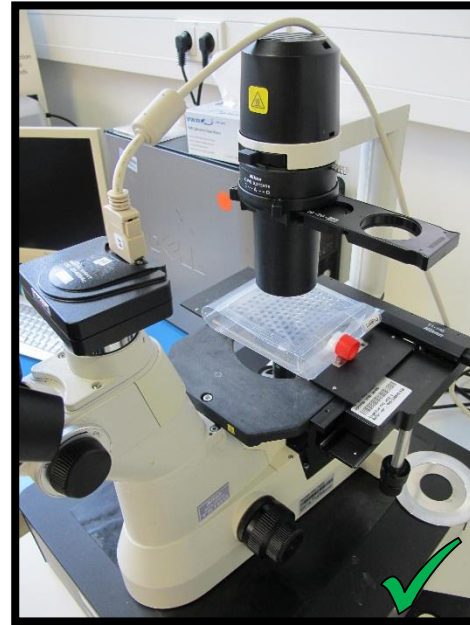
→ **Current version: 5mm spots, custom-specific dimensions possible**

Final demonstrator

Semi-automatic production



Demonstrator Handling



Cardiac cell models

Functionality

- hiPSC-derived cardiomyocytes (commercial) in Labbags contracted over 6 days



→ Contracting cardiac cell models in Labbag

→ Are these models functional (drug effect)?

ASKION C-LINE

Automated Biobanking platform for -196°C
„From photography to biotechnology“



Fraunhofer-Institut für Biomedizinische Technik
IBMT, St. Ingbert

 **ASKION**
engineering · production · service



ASKION C-LINE

transforming a company with Fraunhofer technology

Company



Philosophy

Development

Production

Certification

Company History

Competences

GTC

Downloads



We offer information on our web sites as PDF files. To open them, you need the free software

Company History

Month / Year

Event

1935-1990

Carl Zeiss

1991-2004

AGFA Gevaert AG / AGFA-Laborgeräte GmbH

12 / 2004

Foundation of ASKION as a MBO having 56 employees

06 / 2006

successful certification according to EN ISO 9001 and EN ISO 13485

02 / 2007

ASKION focus its performance on the fields of medical engineering and bioanalytics, optoelectrical moduls and assemblies and start of the development of own products parallel to the OEM business

03 / 2007

Start of the development of own products parallel to the OEM business

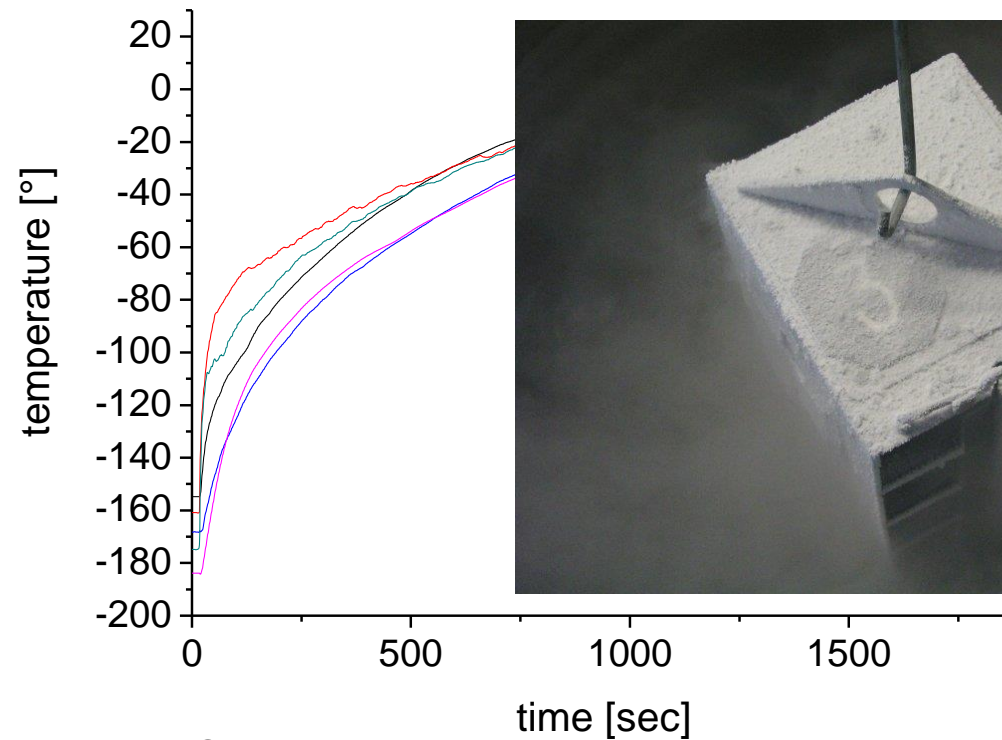
05 / 2009

Sales of the first own products of ASKION C-line®, a system for the cryo- storage of biological material

Cryo storage in Biotechnology

lab standard

- Effects of storage conditions and thermal fluctuations



→ **Temperature increases to -60°C within few minutes!**

Cryo storage in Biotechnology

new automated biobank for liquid nitrogen



Licensed by Fraunhofer.

Cryo storage in Biotechnology

new automated biobank for liquid nitrogen

Coming 2018.

Licensed by
Fraunhofer.

