

RWTH centralized Biomaterial Bank - a Treasure Trove for Biomedical Research in the Field of Liquid Biopsy Diagnostics and Cancer

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RWTH centralized Biomaterial Bank at the Institute of Pathology, University Hospital RWTH Aachen

Introduction

RWTH centralized BiomaterialBank (RWTH cBMB) is the central biomaterial bank of the University Hospital RWTH Aachen. It had been selected by the **BMBF** as one of five biobanking sites in Germany that got considerable funding from the "Nationale Biomaterialbanken Initiative" over the last five years. The **biomaterial collections of RWTH cBMB** mirrors the areas of scientific expertise of the local **Medical Faculty**, i.e. especially (but not limited) to the fields of Clinical Neurosciences, Inflammation, Cancer Research, Medicine and Technology and Cardiovascular Research. RWTH cBMB stores a wide variety of **different biomaterial types**. Besides solid tissues (e.g. diseased and matched healthy controls), especially the growing **field of Liquid Biopsy** research can be supported by RWTH cBMB (e.g. by

providing blood, plasma, serum, liquor, buffy coats, vital-sterile cells and urine). In addition, FFPE tissues (e.g. tumor/control) are available as well. RWTH cBMB provides systems for **pseudonymization, sample management, research-focused databases** and **sample order logistics**. In cooperation with the Hospital's IT-department, a **data warehouse** has been set up to enrich samples with associated data from the clinical information systems. The RWTH cBMB-Team supports in-house and external researchers with medical and molecular pathological background in **scheduling their projects** to increase the likelihood of a successful outcome.

Main Elements of the RWTH cBMB

Sample Management:

- Biomaterial is accepted in the pre-analytical laboratory
- Completeness of the documents enclosed is verified
- Samples are processed according to **standard operating procedure (SOP)**
- Patient data is directly encoded: the given pseudonym is generated by our **pseudonymization software (ID-Tool)**
- The **Laboratory Information Management System (STARLIMS)** ensures a chain of custody for each sample and monitors long term storage

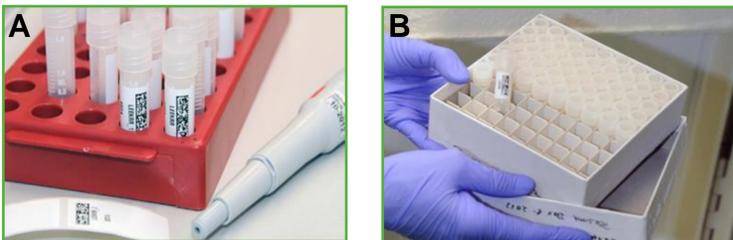


Figure 1: Current sample processing and storage via cryo tubes
(A) With pseudonym labeled cryo tube (B) Final storage in a cryo-box

Automated Liquid Handling:

- Sample containers are currently changed to **SBS rack system**, sample localization is documented in STARLIMS
- **Advantages:**
 - Efficient sample storage
 - Smaller sample volume
 - Digital sample registration, automated tracking of samples
 - Compatible with further applications for robotic workstation
 - High sample quality and minimization of hands-on time

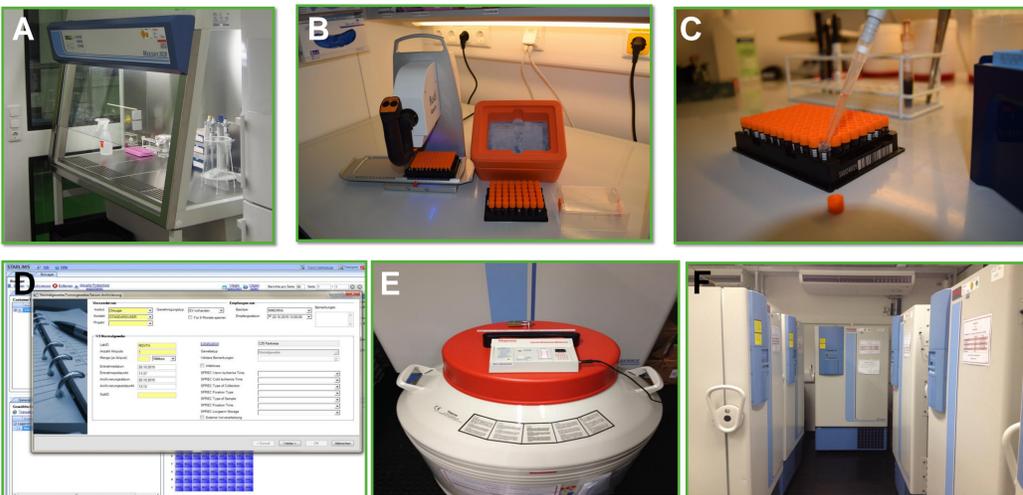


Figure 3: Equipment for liquid sample handling
(A) Safety workbench (B) Automatic capper/decapper, sample transportation box and SBS rack
(C) Coded tubes (D) Sample Documentation (E) Nitrogen container with level indication
(F) Biomaterial samples in -80°C freezers in centralized storage room.

Privacy Protection:

- Incoming samples are encoded by ID-Tool
- Only an external **data trustee** is able to decode the patient data, i.e. if the patient withdraws his consent
- Handling of personal data is amenable to the official guidelines of data protection of the UK Aachen
- Despite pseudonymization, clinical data is still associated with each sample
- Use of **Data Warehouse** allows gathering clinical information of different data bases like ID-Tool, STARLIMS, Medico, Swisslab and OpenClinica

Quality Management:

- **RWTH cBMBs accreditation** is intended as part of the reaccreditation in 2018
- All processes within the RWTH cBMB laboratory are strictly regulated by standard operating procedures (SOPs)
- Employees are regularly trained in quality management

Scientific Know-how:

- Qualified employees of the RWTH cBMB provide advice and technical assistance in planning **experimental research projects**
- Samples are requested by written **application** including a detailed **description of the scientific purpose** to the Scientific director of the RWTH cBMB
- Samples are provided after approval by an internal review process

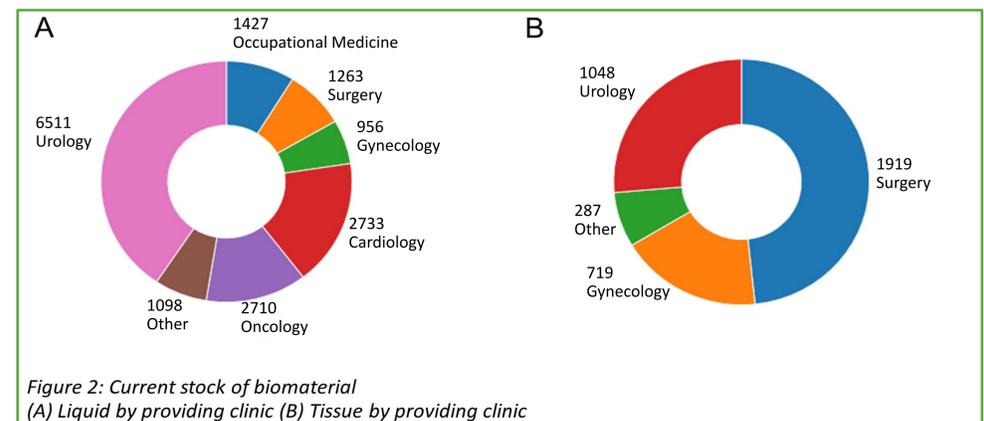


Figure 2: Current stock of biomaterial
(A) Liquid by providing clinic (B) Tissue by providing clinic

Outlook

The availability of high-quality biomaterial with associated clinical data is mandatory for **translational research** in academia and drug or diagnostics development in the biotech and pharmaceutical industry.

By providing high quality standardized human biomaterial, RWTH cBMB may constitute a **treasure trove for your biomaterial-associated research** or development projects.