Carolin Wedel^a, Dörthe Kieslich de Hol^b, Esther Herpel^{b,c} and Sabrina Schmitt^a

GBA TISSUE RING TRIAL: THE SECOND ROUND WITH AN EXTENDED CONCEPT



German **Biobank Node** bbmri.de

ABSTRACT

Pre-analytical tissue-related processes such as transportation, tissue handling and storage potentially have a great impact on sample quality. A useful tool to assess this impact and to identify associated critical conditions is the accomplishment of interlaboratory comparisons. The collected data and derived conclusions are valuable resources that allow a harmonization and a refinement of tissue-related processes to ensure consistent high sample quality.

In order to assess the *status-quo* of tissue-related processes within biobanks, GBA established in cooperation with the BioMaterialBank Heidelberg (BMBH) a ring trial program and successfully conducted the first round in 2017. Based on the promising results we extended the concept in the course of the second round performed in June 2019.

After analysis, measures of individual improvement and harmonization will be derived based on the results of both, the first and the second round.

extraction of (DNA and) RNA +

- determination of

quantity + quality of RNA

- extraction of **RNA** (incl.

quantity + quality)

IBBL:

isolates

+ cryo

sections

RNA EXTRACTION

RNA from porcine liver tissue (A) and human colon (B) tissue were extracted according to a kit provided by GBA (RNeasy Mini Kit) and the local standard method (in-house). Upon determination of RNA quantity and quality cryo sections were sent to a reference laboratory and a reference extraction was performed. To assess both, a potential improvement of performance and an impact of storage on sample quality, the result of both rounds were compared (C).



WORKFLOW

Heidelberg:

- rough dissection of porcine liver tissue
- shipping of porcine liver tissue at 4 °C

participating biobanks:

- documentation
- dissection according to instructions
- snap-freezing of the tissue
- slicing of cryo sections of porcine liver and human colon

HE staining - histology

Heidelberg:

- evaluation of
- histology
- documentation
- path. anatom. examination



dissection of human colon tissue and shipping at -80°C

pathological anatomical examination of digitally provided sections

using in-house method and kit provided by GBA

Schematic trial ring workflow combined for 2017 2019. and Changes and additions in 2019 are highlighted in petrol.

The in-house extraction methods are as efficient as the reference extraction.

The participants increased the RNA yield in 2019 compared to 2017.



Heidelberg + indiv. biobank: feedback discussions

Extraction methods conducted by participants deliver RNA of lower quality compared to the reference extraction.

The assessed storage time did not have an influence on RNA quantity and quality.

HISTOLOGY

Technical, as well as pathological aspects were evaluated according to a scoring system.



- very good/ non-existent
- good/ little
- 2 moderate
- poor/ severe 3





Exemplary HE stained cryo section of porcine liver tissue prepared by the same participant in 2017 (left panel) and 2019 (right panel).

participants improved their All performance in comparison to 2017.

CONCLUSION

The results of the second round demonstrate an improvement of performance for each participant for both, histology and RNA extraction. Furthermore, we conclude that the storage time did not (yet) have an impact on sample quality. The analysis of the pathological anatomical examination provided satisfiving and consistent results.



PATHOLOGICAL ANATOMICAL EXAMINATION

of digitally provided sections

The evaluation was based on the mean and standard deviation calculated from the values submitted by all participants and conducted according to a scoring system.

evaluated parameter: tumor of total tissue [%], vital [%], devitalized [%], stroma [%]





Improvement potential and outlook:

A "best practice" HE staining protocol will be developed, which will be verified in future ring trials.

While the in-house methods tested here provide equal amounts of RNA compared to the reference extraction, the RNA quality was notably reduced. To improve RNA quality, the optimisation of the homogenisation method will be assessed.

SPONSORED BY THE

Federal Ministry of Education and Research



^a BioMaterialBank Heidelberg at the Institute of Pathology, Heidelberg University Hospital, Germany ^b Tissue Bank of the National Center for Tumor Diseases (NCT) Heidelberg, Germany ^c Institute of Pathology, Heidelberg University Hospital, Germany

ר10

Contact GBN

Central Office German Biobank Node Charité – Universitätsmedizin Berlin Campus Virchow Klinikum (CVK) Augustenburger Platz 1, D-13353 Berlin

National Coordinator Prof. Michael Hummel michael.hummel@charite.de

Executive Director Dr. Cornelia Specht cornelia.specht@charite.de

www.bbmri.de

