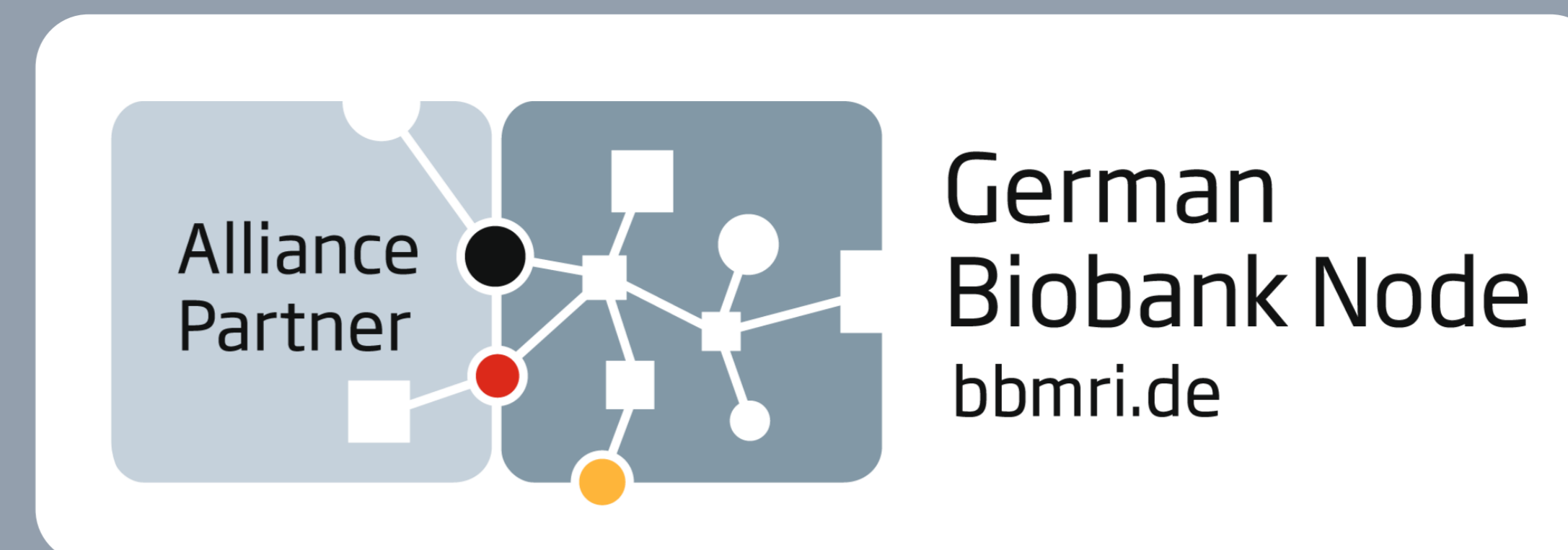


GBN TISSUE RING TRIAL: THE CONCEPT OF THE THIRD ROUND



BACKGROUND

The German Biobank Node (GBN) strives to harmonize biobanking processes by continuous improvement and hence to ensure high sample quality. Thus, the first national tissue-related biobanking interlaboratory comparison program was established by GBN in cooperation with the BioMaterialBank Heidelberg (BMBH) in 2017. Since then, two rounds have been successfully conducted in 2017 and 2019. Here, we present the concept of the third round considering a selected major outcome of the second round.

METHOD

Among other tasks, the second round included the extraction of RNA from human colon and porcine liver tissue using both, the respective individual in-house method and pre-defined method that involves the utilization of a commercial kit and is similar to the reference method.

RESULTS

Compared to extractions performed by a reference laboratory, where RNA was extracted from respective identical tissue samples, we found the participants to extract RNA of significantly reduced quality from colon tissue compared to the reference extraction upon both methods, kit and in-house. In feedback discussions, the participants reported about difficulties during the homogenization of the tissue, which resulted in a considerably elongated exposure of the tissue to room temperature and released highly abundant RNases. For the liver tissue, the results were comparable among the methods tested.

DISCUSSION

Results of preliminary analyses, where we compared the different homogenization methods, give rise that some methods should be favored in regards to higher RNA quality. Thus, we will address a harmonization of the RNA quality with respect to the homogenization method in the third round of our ring trial.

WORKFLOW

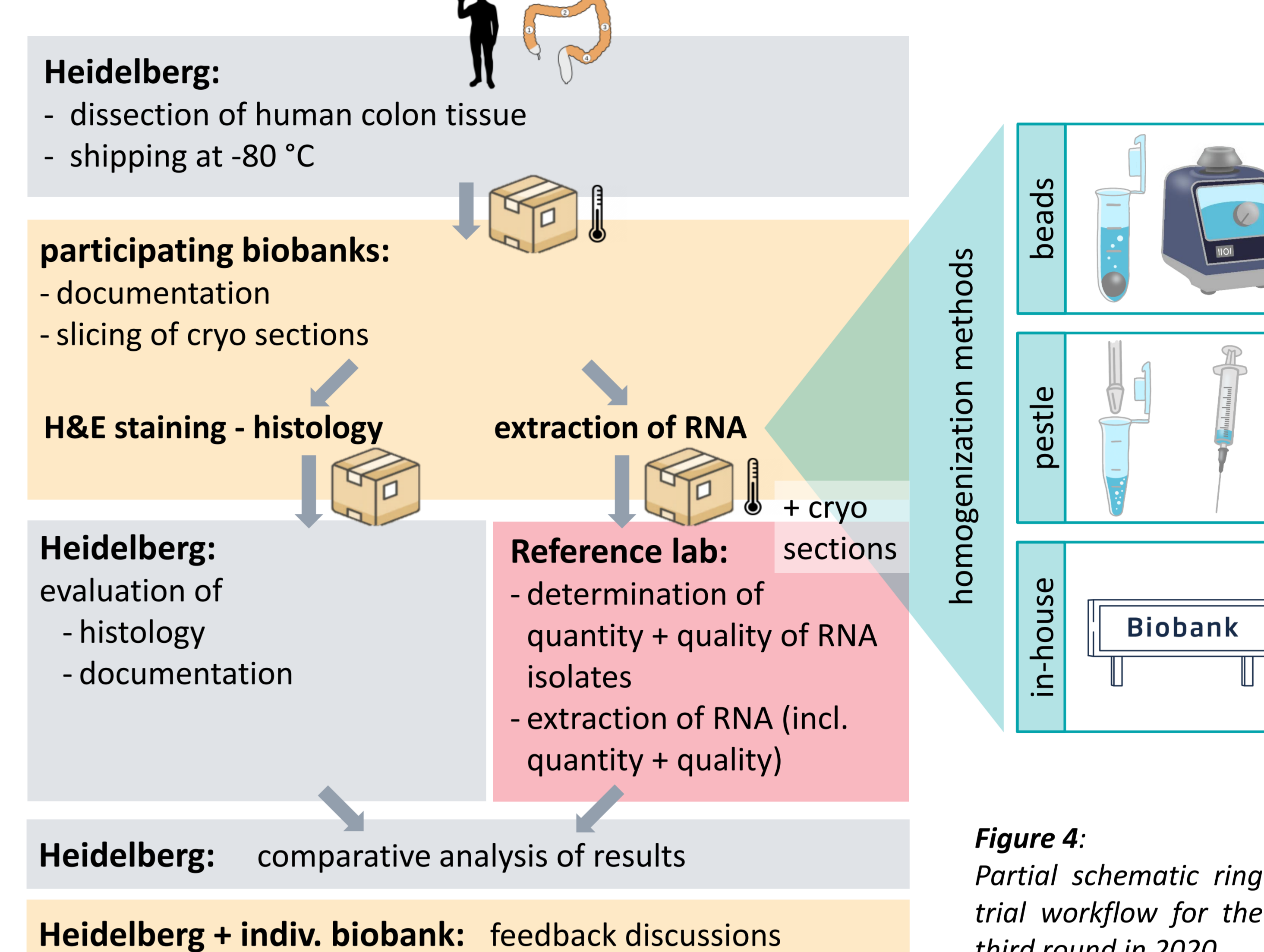


Figure 4: Partial schematic ring trial workflow for the third round in 2020.

RESULTS OBTAINED FROM THE PREVIOUS ROUND

Extraction methods conducted by participants result in a significant reduction of RNA quality compared to the reference extraction.

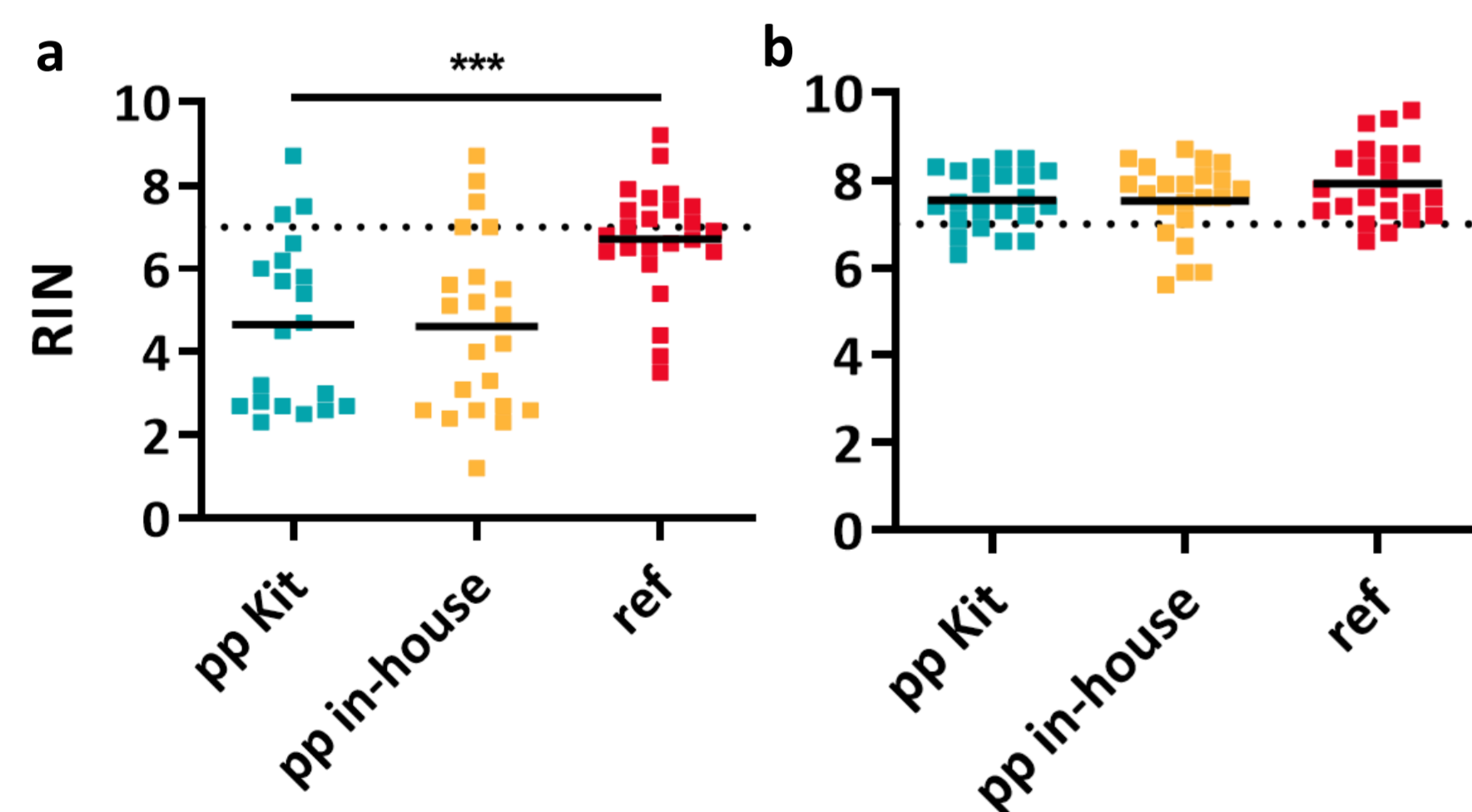
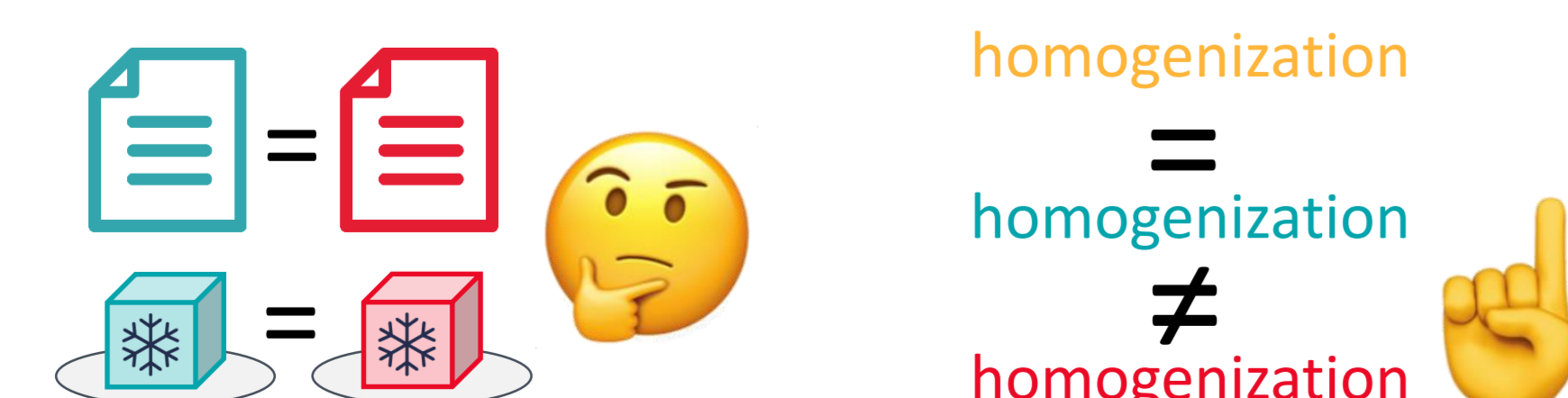


Figure 1: RNA quality upon extraction from (a) human colon and (b) porcine liver cryosections using different extraction settings. To discriminate RNA of high quality from low quality the threshold was set to 7 (dashed line). pp, performed by participant. Kit, RNeasy Mini Kit. ref, extraction by reference laboratory, $p < 0,001$.



INVESTIGATION OF HOMOGENIZATION METHODS

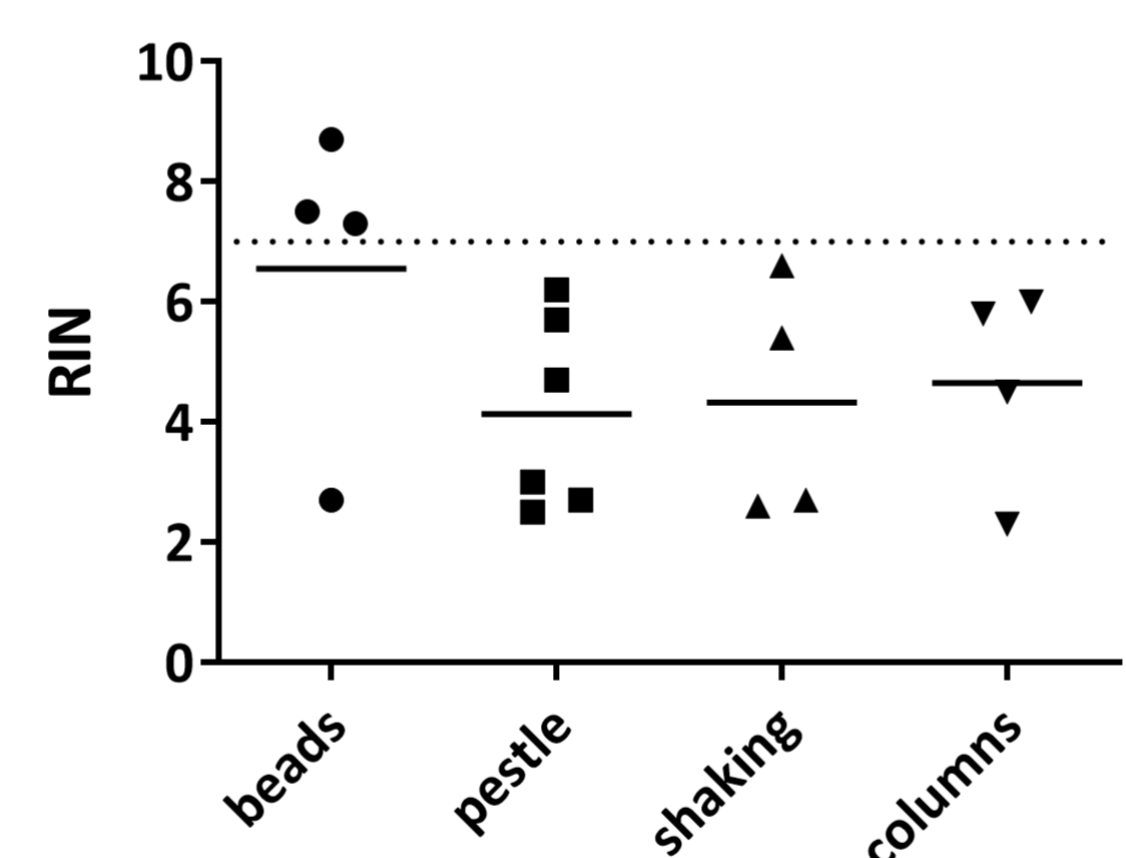


Figure 2: RNA quality upon extraction from colon tissue performed by the participants in 2018 and sorted according to the respective homogenization method.

RNA quality is reduced the least upon bead-based homogenization.

PILOT TEST FOR THE THIRD ROUND

For two of the homogenization methods protocols were developed and the feasibility was examined.



Figure 3: RNA quality upon extraction from human colon tissue and porcine liver (control) using bead- and pestle-based homogenization, resp. Both methods yield RNA of good quality.

CONCLUSION

In the course of the third round we will investigate if the RNA quality can be improved by utilizing a standardized method for tissue homogenization.

Additionally, these findings highlight that pre-analytical processes need careful adjustments when using different starting material due to individual characteristics of the sample.

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