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POSTER SESSIONS

Abstracts

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549: Lessons from the human microbiome field: Pre-analytical variables for reliable non-human biobanking and research

Authors:

Cornelia Stumptner, Diagnostic and Research Institute of Pathology, Medical University of Graz, Austria

Tanja Kostic, AIT Austrian Institute of Technology, Center for Health & Bioresources, Austria

MICROBE Consortium members, EU-project MICROBE No. 101094353

(https://www.microbeproject.eu/consortium)

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Presenter Name: Cornelia Stumptner

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Introduction

The pre-analytical phase is a vulnerable and decisive part of the laboratory testing process and samples/data reuse. For human microbiome samples, the SPIDIA4P-/BBMRI.atcontributed standard CEN/TS 17626 specifies pre-analytical requirements. By contrast, preanalytics in non-human microbiome fields (e.g., plants, soil, marine) are often underestimated. The more advanced human field can serve as a best-practice exemplar to support non-human biobanking.

Material & methods

Within the EU project MICROBE, we used CEN/TS 17626:2021 as an exemplar and combined a structured literature review with workshops involving EPSO and/or MICROBE experts. This approach delineated the pre-analytical workflows and defined sample-typespecific variables and metadata needs for plant, soil, and marine water specimens.

Results

We defined discrete pre-analytical steps from in-situ sampling through collection, intermediate storage, preservation, transport, laboratory processing, analyte isolation and storage. For each step we identified principal variables that can alter microbial community composition or biomolecule profiles: sampling location and timing, host characteristics (e.g., species, age), collection tools and techniques, time and conditions before preservation, preservation method, transport conditions, subsampling and homogenization, and analyte extraction method. Key variables include undesired microbial growth or loss, contamination with external cells/RNA/DNA, as well as differential lysis efficiencies, inhibitory compounds, and host RNA/DNA co-isolation during extraction.

Discussion & conclusion

Mapping these steps and variables provides a foundation for harmonized procedures and metadata collection and development of guidelines. Standardized documentation and processes are needed to reduce variability, improve reproducibility, and enable interoperable non-human microbiome biobanking that advance conservation, ecological restoration, and integrated One Health research.