

NFDI4Microbiome

IT solutions and infrastructure for the microbiome research community

Koordinator:

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Bioinformatics, Systems biology, Microbiology, Interspecies interactions

Beschreibung des Vorhabens:

A large fraction of existing microorganisms is associated with plants, animals, and human beings, where they typically exert essential functions, however, the complexity of these microorganisms (and their symbiotic interactions) is yet poorly understood. Microbiota (including viruses) have a strong impact on many aspect of human life, starting from health to ecological balance. Furthermore, many of the - in particular - uncultured species are very precious study subjects for the identification of compounds relevant to biotechnology and medicine, and still need to be explored in detail. The biggest challenge in the understanding of microbiota lies in the complexity of numerous biotic interactions between the specific strain of a microbiota and its abiotic environmental factors. Mapping and deciphering those molecular interactions, i.e. the interactome and the metabolism, is the crucial step towards making the most out of these microbiota. Gathering sufficient data for the analysis of these interactomes and furthermore, the even more complex microbiomes is a very challenging task. Genomics information from different and maybe all bacterial strains has to be processed to decipher the functioning of individual species in the microbiome and the complexity of different microbiomes overall.

The NFDI4Microbiome consortium will collect and combine relevant data with the microbiome research community, provide the computational infrastructure and analytical tools for this community to compile, analyze and store numerous types of bacterial and microbiome data (following the FAIR principles) with the aim to decipher these interspecies interactions. NFDI4Microbiome enables efficient and reproducible use of metagenomes, metatranscriptomes, metaproteomes and metabolomic information as well as of data from single cell sequencing. It enriches this data by metadata (e.g., from literature and relevant databases). The NFDI4Microbiome consortium will comply with and contribute to available and new solutions (e.g., data reuse, sample registration, open standards) and collaborate with related initiatives such as NFDI4Life, NFDI4BioDiversity and NFDI4Health. The increased understanding of

microbiota interactomes and bacterial interspecies interactions will be beneficial for biotechnology, agriculture and medicine.