Current research in human health, plants, and animals points to an important role for the microbiome in a vast array of biological systems.

The unique multi-omics approach to microbiome research offered by DHMRI enables not only precise characterization of these microbial populations, but can also give you deeper insights into their role in the health and development of humans, companion animals, livestock, and plants.

Exploring the Effects of the Microbiome on Human Health

The latest research suggests that the microbiome can have a substantial impact on human health, affecting everything from mental health to development of cancer, and the absorption of therapeutics. To enhance your research in these important areas, DHMRI offers expertise in range of advanced techniques:

- Metagenomic analyses, including chromosome capture technology (Hi-C) for functional characterization of the human microbiome.

- Taxonomic characterization with metagenomics or 16S/ITS profiling for identification of microbial taxa present in different bodily systems.

- Targeted, untargeted, or custom metabolomic panels for accurate measurement of microbial metabolites associated with disease states or changes in lifestyle and environment.

- Bioinformatic analyses that use large metagenomic and metabolomic datasets to reveal novel associations between the microbiome and human health.

Monitoring the Plant Microbiome

Increasing our understanding of plant-microbiome interactions provides us with opportunities to engineer crops with higher resistance to disease and stress and improve yields and nutrition. The multi-omics approach offered by DHMRI can provide detailed insights into these interactions:

- Advanced metatranscriptomic analyses for accurate profiling of plant microbiota from regions such as the rhizosphere – revealing important information on plant health and productivity.

- Metagenomic techniques to provide functional data regarding the role of plant microbiomes in ecological processes such as nitrogen and phosphorus cycling.

- Targeted and un-targeted metabolomics panels to help reveal more about the myriad of messengers that facilitate host-microbiome communication and contribute to plant homeostasis.

- Intelligent bioinformatics techniques that enable accurate assembly of metagenomes for precise characterization of individual plant microbiome species.

Assessing the Diverse Roles of the Microbiome in Animals

Studying the microbiome could bring us closer to unravelling the complex factors affecting the health of livestock and companion animals. DHMRI's advanced analytic capability can help with:

- Metagenomic analyses to reveal previously unknown capabilities of microbiomes and provide insights into how they adapt to environmental changes.

- Metatranscriptomic data that enables a detailed insight into gene expression of microbial communities found in animals.

- Advanced NMR and mass spectrometry platforms for metabolomic analysis, detailing how complex host-microbiome interactions affect characteristics like companion animal health and milk protein yield in cattle.

- Comprehensive bioinformatic analyses for identification of microbiome organisms from different domains, including bacteria, viruses, and fungi.

Technology Platforms

Genomics:
DHMRI boasts one of the few genomics labs with both short- and long-read sequencing capability, thereby supporting all aspects of your genomics research. Platform technologies include:

- Illumina NovaSeq6000
- PacBio Sequel IIe
- 10X Chromium

PacBio Sequel IIe

Metabolomics:
With a world-leading NMR and MS facility, DHMRI can support you in biomarker discovery and metabolite profiling with:

- LC/LC-MS
- GC/GC-MS
- 950 MHz NMR
- 700 MHZ NMR
- 600 MHz NMR

Bruker Avance III 950 MHz