

## Next Generation Sequencing (NGS)

### 16S Metagenomics

Microorganisms (bacteria, viruses, fungi) are everywhere, in our ecosystems and within our bodies. Microbiome research is a rapidly expanding discipline which includes exploring how microorganisms and their genes relate to human or animal health. The bacterial component of the microbiome can be investigated using a sequencing approach called 16S metagenomics. It can provide insight into what bacteria are present in an environmental or biological system and how their community structures change under different conditions.

16S metagenomic sequencing targets the bacterial 16S ribosomal RNA (rRNA) gene through polymerase chain reaction (PCR) amplification. Variable regions of DNA sequence within the 16S rRNA gene contain the genetic coding unique to specific bacteria. The amplified targets of these DNA regions are sequenced with a next generation sequencer. RPC scientists employ the Illumina MiSeq FGx NGS sequencing platform to produce 16S rRNA gene sequences for multiple samples at a time. Information on the bacteria in each sample is obtained by bioinformatic analysis which processes and compares the sequences to public bacterial DNA databases. A sample report is generated which lists the different bacterial groupings found and their relative abundance.

RPC NGS services has the following 16S variable region primer sets available for 16S metagenomics:

- Illumina V3-V4 region (341F-805R)
- Earth Microbiome Project V4 region primers (515F-806R)
- Universal V4-V5 primers (515F- 926R)
- Other regions may be requested

The Illumina MiSeq provides sequence files in the FASTQ format, these are made available through a direct link for download. RPC performs FASTQ QC assessment prior to release of data. We also provide bioinformatic analysis of 16S sequence results.

### Additional Next Generation Sequencing Support Services

Nucleic acid extraction:

- Microbial DNA can be extracted from tissues and complex environmental samples such as soils, aquatic sediments, or water samples, as well as swabs and fecal samples.
- Genomic DNA extraction for genomic projects on a wide variety of organisms.
- RNA Extraction services for transcriptomic projects
- Nucleic Acid quality assessment and quantitation through Nanodrop (spectrophotometric) and Qubit (fluorometric) systems
- Qubit RNA Integrity assessment using the RNA IQ assay kit

### Contact

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RPC's Quality Management System is registered to ISO 9001:2015.

