Service Description
Small RNAs are a type of non-coding RNA (ncRNA) molecule that are less than 200 nucleotides in length and which are often involved in post-transcriptional regulation through RNA interactions.

Small RNA sequencing captures the complete range of small RNA and miRNA types in a sample, and can detect and quantify thousands of small RNA and miRNA sequences with great sensitivity and a broad dynamic range. Unlike traditional miRNA profiling techniques such as microarrays analysis and RT-qPCR, a significant strength of NGS based sequencing is the ability to support the completion of the non-coding transcriptome, allowing the discovery of novel miRNA targets. Small RNA sequencing is also used to examine the differential expression of all small RNAs and to characterize variations with single-base resolutions.

Sequencing Service Specification
BGI RNA-Seq (Quantification) Sequencing services can be executed with the HiSeq 4000 or, alternatively, with the BGISEQ-500 sequencing system with the benefit of lower cost and turn-around-time.

Sample preparation and services
- 50bp Single-end sequencing
- Raw data and bioinformatics analysis are available in standard file formats
- Advanced and custom bioinformatics data analysis
- Cloud-based data storage and delivery system

Sequencing Quality Standard
- Q20 ≥90%
- Adaptor and null rate <10%
- Small RNA tag rate <20%
- Clean reads: no less than the quantity contractually specified

Turn Around Time
- For HiSeq Service: Typical 30 working days from sample QC acceptance to filtered raw data availability
- For BGISEQ-500 Service: Typical 25 working days from sample QC acceptance to filtered raw data availability
- Expedited services are available, contact your local BGI specialist for details.

Locations
BGI’s sequencing services are available from a variety of BGI service laboratory locations, including:
- Copenhagen, Denmark
- Philadelphia, USA
- Hong Kong, China

BGI also has a network of laboratories across mainland China.
Data Analysis

Besides clean data output, BGI offers a range of standard and customized bioinformatics pipelines for your small RNA sequencing project. Reports and output data files are delivered in industry standard file formats: .xls, .png.

### STANDARD ANALYSIS

- Filtering
- Summarize the length distribution of small RNA
- Analyze common and specific sequences between two samples
- Explore small RNA distribution across selected genome
- Identify rRNAs, tRNAs, snRNAs, snoRNAs etc.
- Identify repeat associated small RNAs
- Identify small RNA reads which could align to exon/intron
- Identify known miRNAs by aligning to designated part of miRBase
- Analyze the expression pattern of known miRNAs
- Annotate small RNAs into several categories based on priority
- Predict novel miRNAs and their secondary structures by Mireap and miRDeep from unannotated small RNAs
- Family analysis of known miRNAs

### AVAILABLE ADVANCED ANALYSIS

- Target genes prediction of novel known miRNA and miRNA
- GO annotation and KEGG pathway analysis of known miRNA and novel miRNA
- Target genes
- Base editing analysis of known miRNA
- Differential expression analysis of known miRNA
- Differential expression analysis of novel miRNA
- Target genes prediction of differential miRNA
- GO annotation and KEGG pathway analysis of differential miRNA
- piRNA annotation
- snoRNA annotation

### CUSTOMIZED ANALYSIS

Further customization of Bioinformatics analysis to suit your unique project is available: Please contact your BGI technical representative

### Sample Requirements

We can process your total RNA, blood, cell line, FFPE, fresh frozen tissue and single cell samples from a variety of species, with the following general requirements:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DNA CONCENTRATION</th>
<th>MINIMUM SAMPLE VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Samples</td>
<td>Intact genomic DNA ≥ 1µg, Concentration ≥ 15 ng/µl</td>
<td>15 µl</td>
</tr>
<tr>
<td>Low Input Samples</td>
<td>Intact genomic DNA ≥ 100 ng, Concentration ≥ 20 ng/µl</td>
<td>15 µl</td>
</tr>
</tbody>
</table>

For BGI's scientific publications relating to Small RNA Sequencing, sample shipping instructions or sample submission forms, please visit our website.

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