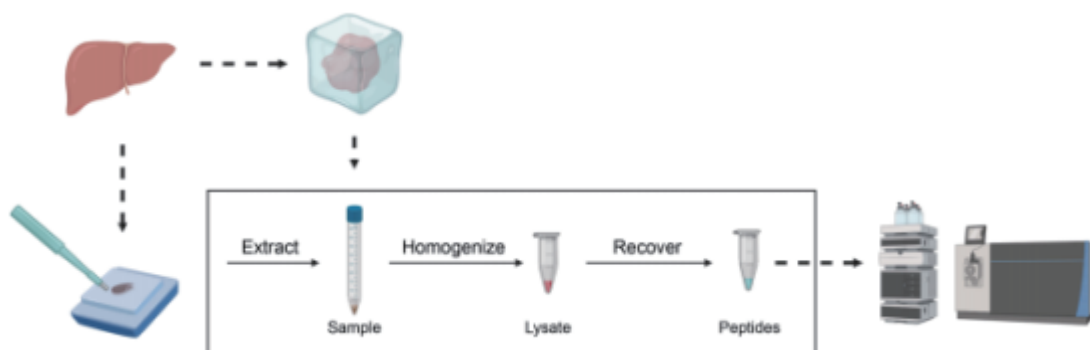


Service Description

Proteomics studies are usually based on proteins obtained from fresh tissues, body fluids or cultured cells in vitro. However, the number of fresh or frozen tissues that can be used in longitudinal studies over many years is very limited. With the advancement of medical research, there is a growing need for proteomics research into diseases that progress slowly or malignancies that have longer times between treatment and relapse.

Most samples in hospitals or tissue sample banks are formalin-fixed paraffin-embedded (FFPE) samples. The key advantage of FFPE samples is that they can be stored steadily for decades at room temperature. Billions of FFPE cancer samples have been collected and stored, and these are usually accompanied with long-term and detailed clinical follow-up information, such as clinical course, treatment response, recurrence and survival. This information is of key importance for the new classification of tumors, exploring disease mechanisms, finding new therapeutic targets and for understanding long term prognosis.



Schematic illustrating study design of FFPE samples prior to proteomic analysis

Marchione D M, et al., HYPERsol: High-Quality Data from Archival FFPE Tissue for Clinical Proteomics, (2020)

BGI has extensive experience in the field of FFPE proteomics for tumor heterogeneity research.

Common Challenges with FFPE Proteomics Studies



Quality issues around sample loss due to crosslinking with formaldehyde

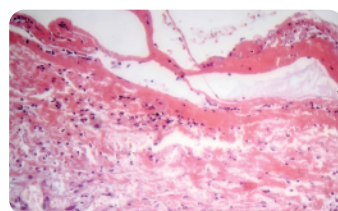
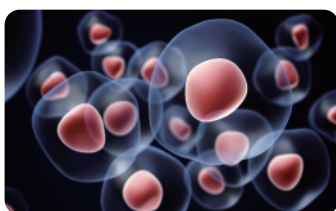


Inherent sensitivity issues with MS instrumentation



The computational complexity involved in identifying

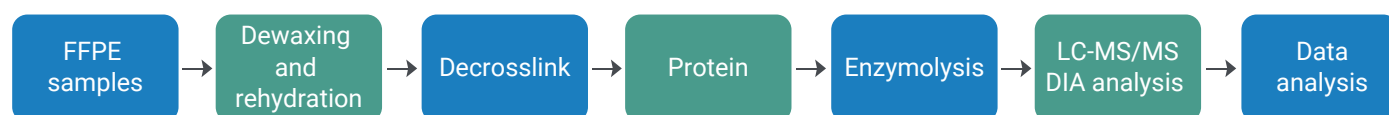
Research Applications



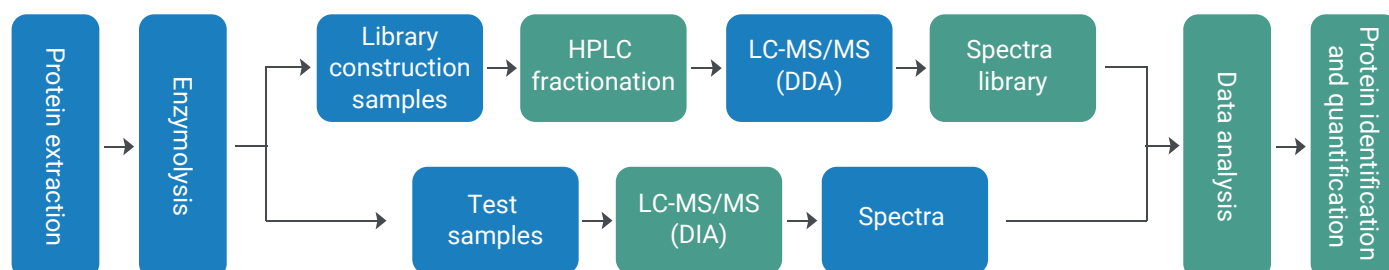
- Pathogenic mechanism studies of cancer cell or tumor tissues
- Disease biomarker research
- Target drug screening
- Subcellular structure research of tumor microenvironments

FFPE Sample Analysis and Detailed DIA Analysis Workflow

FFPE Sample Analysis:



DIA Analysis:



BGI Service Advantages

01 We can process projects with low initial sample amounts of only 1 slice of FFPE

02 We have extensive experience across a huge range of sample types with high project success rates

03 Repeatability and stability of up to 90% enables reliable proteome research of large cohort samples

04 We have participated in quantitative performance assessment as well as standardization and harmonization of Multi-National DIA proteomics analysis supporting precision medicine studies

Bioinformatics Analysis Standard Workflow

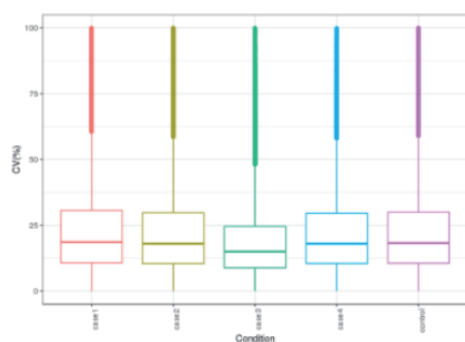
Standard:

01 Project overview	02 Data quality control	03 Protein identification and quantification list
04 Differential proteins data statistics and volcano plot	05 Principal component analysis (PCA)	06 Expression pattern cluster analysis
07 Time series analysis	08 Protein GO/COG/KOG/Pathway annotation	09 Protein-protein interaction analysis
10 GO/COG/KOG enrichment analysis of differential proteins	11 Repeatability analysis	12 Protein subcellular localization analysis

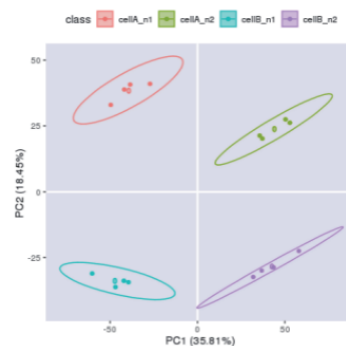
Customized Solutions:

Proteome and transcriptome/RNA-seq correlation analysis

Examples of Data QC Analysis - Stability and Repeatability

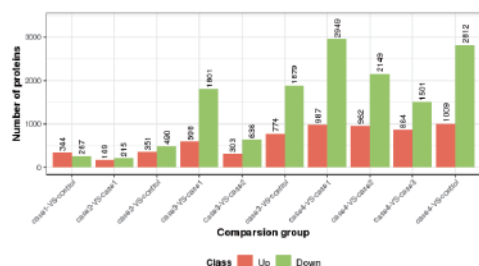


CV Distribution

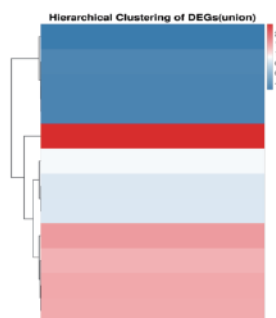


PCA Analysis

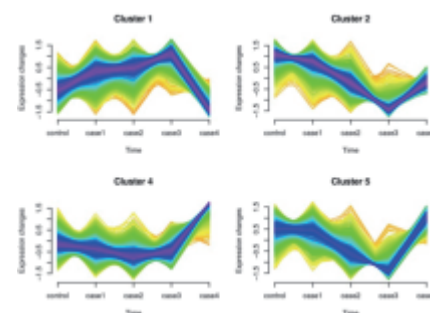
Examples of Protein Quantification Analysis



Quantification Statistics



Cluster Analysis



Time Series Analysis

General Sample Requirements

SAMPLE TYPE		AMOUNT	NOTE*
Library construction samples	Fresh samples of relevant tissue	> 5 mg	Results effect ranking: Fresh tissue > FFPE tissue block > FFPE slice
	FFPE tissue block	> 1 mg	
	FFPE slice	Minimum: 150 mm ² ; 3 slices, thickness of 10 µm, > 50 mm ²	
		Recommend: 500 mm ² ; 10 slices, thickness of 10 µm, > 50 mm ²	
DIA analysis samples	FFPE slice	≥ 1 slice, thickness of 10 µm, > 50 mm ² ; non-staining or hematoxylin-eosin staining	FFPE samples transport at room temperature; Fresh tissue samples transport with dry ice
	FFPE tissue block	> 1 mg; non-staining	
	LCM FFPE (Laser capture microdissection)	Cells > 5000; non-staining or hematoxylin-eosin staining	

* For samples which have been stored for more than one year, it is recommended that customers send 1-2 samples for pre-experiment to evaluate the samples. Test Samples analysis can also be carried out by LC-MS/MS DDA analysis if there are no suitable library construction samples.

Turn Around Time

Sample size: 1-25, 5-6 weeks

To Learn More

To learn how your research can benefit from BGI's extensive experience in FFPE Proteomics, visit www.bgi.com, write to us via info@bgi.com or contact your local BGI office.

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