GLYCOLYSIS PATHWAY METABOLISM ASSAY

Glycolysis is a multi-step biochemical process that occurs in the cytoplasm of cells, breaking down glucose molecules into pyruvate. This pathway yields a modest amount of ATP and NADH, serving as a primary energy source in cells under anaerobic conditions. Moreover, glycolysis acts as a precursor for other vital metabolic pathways and is involved in the synthesis of various cellular building blocks. Analyzing glycolysis provides insights into cellular energy regulation, metabolic flux, and overall cellular health.

APPLICATIONS OF GLYCOLYSIS METABOLISM ANALYSIS

01 BIOMEDICAL RESEARCH

Disease Mechanisms:

- Investigate how glycolysis contributes to disease progression, especially in cancer and metabolic disorders.
- Understand the role of glycolysis in promoting cell proliferation and survival.
- Identify potential therapeutic targets within the glycolytic pathway.

Biomarker Discovery:

- Search for glycolysis-related biomarkers that can indicate disease presence, severity, or response to treatment.
- Validate candidate biomarkers for clinical applications.

Drug Development:

- Assess the impact of novel drugs on glycolytic activity in different cell types.
- Optimize drug design to target glycolysis for specific diseases.
- Predict potential side effects and interactions based on glycolysis modulation.

02 BIOTECHNOLOGY AND ENGINEERING

Metabolic Engineering:

- Design microbial strains with enhanced glycolytic flux for biofuel or bioproduct production.
- Optimize glycolysis-related genes to improve cellular productivity.

Synthetic Biology:

- Engineer glycolytic pathways for creating bio-based chemicals, materials, and pharmaceuticals.
- Construct artificial glycolytic circuits for customized metabolic functions.

03 PLANT SCIENCE AND AGRICULTURE

Crop Improvement:

- Investigate glycolytic regulation in plants for improved crop yield, stress tolerance, and nutrient content.
- Develop genetically modified crops with enhanced glycolysis for agricultural sustainability.

Metabolic Pathway Analysis:

- Understand glycolytic variations in different plant species and under various environmental conditions.
- Study how glycolysis influences plant growth, development, and response to stresses.

04 ENVIRONMENTAL SCIENCE

Microbial Ecology:

- Study glycolytic pathways in environmental microbes to understand their metabolic roles and interactions.

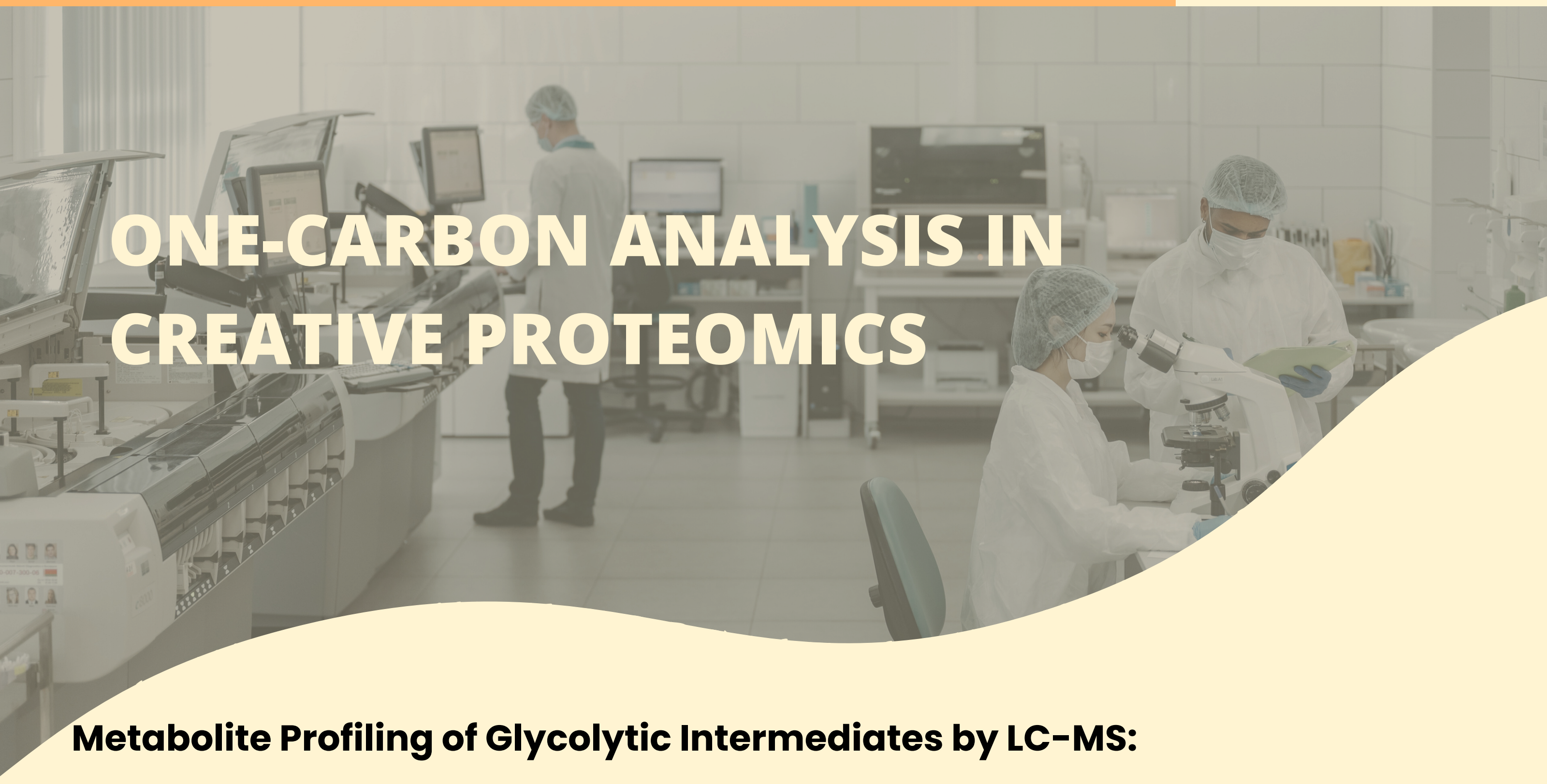
Bioremediation:

- Explore glycolysis-related metabolic pathways for enhancing the microbial degradation of pollutants.

05 NUTRITIONAL SCIENCE

Dietary Effects:

- Study the impact of different diets and nutrients on glycolytic activity.
- Correlate glycolysis with metabolic health and obesity-related conditions.



ONE-CARBON ANALYSIS IN CREATIVE PROTEOMICS

Metabolite Profiling of Glycolytic Intermediates by LC-MS:
Using the Thermo Scientific Q Exactive HF-X Hybrid Quadrupole-Orbitrap Mass Spectrometer, we perform liquid chromatography-mass spectrometry to identify and quantify glycolytic intermediates. This provides a comprehensive view of glycolysis pathway dynamics.

Stable Isotope Labeling Analysis for Glycolytic Flux Quantification:
Employing the Agilent 6550 iFunnel Q-TOF LC/MS System, we utilize stable isotope-labeled substrates to trace metabolite flux through glycolysis. This enables the quantification of metabolic turnover rates.

Targeted Metabolomics of Glycolysis-Associated Compounds by GC-MS:
Using the Shimadzu GCMS-TQ8050 Triple Quadrupole Mass Spectrometer, we perform gas chromatography-mass spectrometry to quantify specific glycolytic metabolites. This allows precise measurement of metabolite concentrations.

Metabolic Pathway Mapping of Glycolysis Metabolites by LC-QQQ:
Leveraging the Waters Xevo TQ-S Micro Triple Quadrupole Mass Spectrometer, we map out glycolytic pathways by analyzing related metabolites. This approach reveals connections and crosstalk between glycolysis and other metabolic pathways.

Quantitative Analysis of Glycolysis-Linked Metabolites via MALDI-TOF/TOF:
Utilizing the SCIEX TOF/TOF™ 5800 System, we quantify glycolysis-associated metabolites using matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) mass spectrometry. This allows high-throughput quantification of metabolite levels.

Metabolite Flux Analysis using LC-QQQ with Multiple Reaction Monitoring (MRM):
With the AB SCIEX QTRAP 6500 System, we employ targeted multiple reaction monitoring (MRM) to measure glycolysis-related metabolites and their fluxes. This technique provides precise insight into metabolic changes.