Stable Isotope Tracing — 13C 15N & Labeling Designs — Hands-on

Learn how to design and execute stable isotope tracing experiments that reveal pathway usage and metabolic rewiring. This module covers tracer selection (13C, 15N and mixed labels), labeling schemes, sampling strategies, data structures and label pattern interpretation so that you can connect metabolomics measurements to metabolic flux and mechanism level insights.

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Help Desk · WhatsApp

Session Index

Session 1

Fee: Rs 8800 Apply Now

Tracer Concepts & Experimental Design

Foundations of stable isotope tracing in metabolism

13C and 15N tracers **positional vs uniform labeling** **tracing vs steady state metabolomics**

Designing tracer experiments for key pathways

glycolysis and TCA cycle tracers **anaplerosis and glutamine usage** **biosynthetic and nutrient routing**

questions

Pools, enrichment and labeling strategies

pulse, pulse chase and continuous labeling | isotopic enrichment fraction | choosing dose and duration

Session 2

Fee: Rs 11800 Apply Now

Labeling Protocols, Sampling & Data Structures

Practical aspects of tracer delivery and culture

cells, organoids and in vivo models | media formulation and tracer replacement | control conditions and natural abundance

Sampling, quenching and extraction for tracers

time course designs and end points | rapid quenching and metabolism arrest | parallel unlabeled and labeled samples

Data structures for isotopologue analysis

M+0 to M+n isotopologue intensities | correction for natural abundance | tidy tables for downstream modeling

Session 3

Fee: Rs 14800 Apply Now

Label Pattern Analysis & Biological Readouts

From raw signals to corrected labeling patterns

peak integration for isotopologues | isotopologue fraction and enrichment | natural abundance correction concepts

Interpreting labeling in central carbon metabolism

reading labeling of lactate and TCA intermediates | anaplerotic vs oxidative flux signatures | cross checking with pathway maps

Summarizing tracer data for flux modeling tools

mean enrichment and time courses | constraints and measured flux surrogates | exporting formats for EMU or COBRA workflows

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Tracer Study Plan & Reporting Template

Designing a tracer experiment for a real use case

cancer, immunity, microbiome or bioengineering context

Planning sampling, controls and analysis pipeline

time point selection and replicates | instrument and method summary | analysis and quality control steps

Deliverables: tracer study design sheet & methods text

study overview and tracer scheme diagram | table for planned measurements | ready to edit methods and reporting template