Metabolomics Integration with Genomics, Proteomics & Transcriptomics — Hands-on

Learn how to connect metabolomics readouts with genomics, transcriptomics and proteomics to build coherent biological stories. You will practice mapping entities across omics layers, build joint statistical models, perform pathway and network level fusion, and prepare integrated figures and summaries for systems biology and precision medicine style projects.

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Omics Layers, IDs & Study Architectures

Overview of genomics, transcriptomics, proteomics and metabolomics

what each layer measures **timescales and dynamic ranges** **complementarity across layers**

Identifiers and feature spaces across omics types

genes, transcripts and proteins **metabolite IDs and**

pathway entities | reference databases and ontologies

Multi omics study designs and sampling strategies

matched samples versus separate cohorts | time course and longitudinal designs | batching and logistics across platforms

Session 2

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Data Harmonisation & Cross Layer Mapping

Pre integration quality checks for each omics type

normalisation and batch correction status | missingness patterns and filters | sample level QC and outliers

Harmonising matrices for integration

aligning sample IDs and groups | scaling and transformation choices | handling missing blocks across layers

Mapping features through pathways and annotations

gene transcript protein metabolite chains | using pathway and reaction databases | building cross reference tables for analysis

Session 3

Fee: Rs 14800 Apply Now

Joint Statistics, Pathways & Networks

Simple correlation and association based integration

pairwise correlations across layers | clustered heatmaps and modules | linking modules to phenotypes

Pathway level and module based multi omics views

aggregating signals per pathway | comparing direction across layers | highlighting convergent biology

Network style integration concepts for omics

bipartite and multi layer networks | edges from correlations and prior knowledge | subnetworks enriched for phenotype signals

Session 4

Fee: Rs 18800 Apply Now

Integrated Omics Stories & Reporting

Building coherent biological narratives from multi omics

connecting variants to transcripts to metabolites using pathways as scaffolds | highlighting key mechanisms and hypotheses

Figures and tables for integrated omics manuscripts

layered pathway diagrams | integrated heatmaps and network views | summary tables per pathway or module

Reproducible multi omics integration workflows

documenting mapping rules and parameters | saving intermediate and final data objects | sharing analysis packages with collaborators