Metabolic Network Reconstruction & COBRApy Workflows — Hands-on

Learn how to build, curate, and simulate metabolic network models from pathway and genomic information. This module covers core steps in reconstruction, from reaction and metabolite definition to gene protein reaction rules, biomass formulation, and constraint specification, followed by practical flux balance analyses using COBRApy and community standard resources.

Metabolic Network Reconstruction & COBRApy Workflows

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Drafting Metabolic Networks & Model Components

Metabolic network concepts and scope definition

organism and compartment choices | **biomass and objective ideas** | **exchange and transport overview**

From pathway databases to reaction lists

KEGG and BiGG reactions | **metabolite identifiers and charges** | **gene protein reaction rules**

Toolchain for early stage reconstruction

BiGG and ModelSEED portals | spreadsheet templates | Escher style pathway maps

Session 2

Fee: Rs 11800 Apply Now

Genome Scale Reconstruction & Curation

Draft to curated genome scale metabolic models

gene genome annotation mapping | gap detection and gap filling concepts | biomass reaction design basics

Quality checks and model diagnostics

mass and charge balance checks | dead end metabolites and blocked reactions | leak tests and thermodynamic sanity

Implementation toolkit for curation workflows

MEMOTE style reports | SBML and JSON model formats | version control for models

Session 3

Fee: Rs 14800 Apply Now

COBRApy Workflows, FBA & FVA

Constraint based modeling and COBRApy basics

S v = 0 steady state equation | flux bounds and media constraints | objective functions and growth

Flux balance analysis and flux variability analysis

running FBA in COBRApy | FVA for range of feasible fluxes | single and double gene knockouts

Implementation toolkit and reporting patterns

Python and COBRApy notebooks | LP solvers (GLPK style) | flux maps and summary tables

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Reconstruct & Simulate a Metabolic Model

Build and curate a small metabolic model for a chosen system

Theory + Practical

Run FBA, FVA and knockout analyses with interpretation

growth and flux distribution plots | essential genes and reactions | simple what if scenario testing

Deliverables: model files, notebook & report

SBML or JSON model | COBRApy analysis notebook | PDF/HTML results summary