Metabolic Network Reconstruction & SBML — Hands-on

Learn end to end metabolic network reconstruction, from pathway curation and stoichiometric matrices to genome scale models that can be simulated using SBML and COBRA style toolchains. This module connects pathway databases with model standards and prepares you for downstream FBA and systems level metabolic analysis.

Metabolic Network Reconstruction & SBML

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Stoichiometric Networks and Pathway Maps

Metabolism as a network of reactions and metabolites

reactions and metabolites **compartments** **exchange and transport reactions**

Stoichiometric matrices and mass balance

S matrix concepts **mass and charge balance** **reversibility and directionality**

Pathway databases and identifiers

KEGG and MetaCyc reactions **BiGG models overview**

metabolite and reaction IDs

Session 2

Fee: Rs 11800 Apply Now

Draft Models, Gap Filling and Annotation

Building a draft metabolic model

genome annotation to reactions | gene protein reaction rules | medium and boundary conditions

Gap analysis and model repair

dead ends and blocked reactions | gap filling strategies | checking connectivity

Annotation and quality checks

cross references and ontology tags | GPR consistency basic quality scores

Session 3

Fee: Rs 14800 Apply Now

SBML, Tools and Simulation Setup

SBML for metabolic models

SBML core structure | species, reactions and parameters | annotations and notes

Toolchain overview for COBRA modeling

COBRApy basics | MATLAB COBRA mention | model import and checks

Preparing models for FBA style analysis

objective functions | bounds and constraints | media and uptake settings

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Build and Simulate a Metabolic Model

Select an organism or cell line and assemble a core model

Theory plus guided practical

Export SBML and run basic FBA style simulations

growth and uptake rates | single reaction knockouts | simple scenario comparisons

Deliverables: SBML model, notebook and short report

SBML file | Python or R notebook | PDF or HTML summary