Systems Pharmacology & Drug–Target Network Analysis — Hands-on

Learn how to move beyond single target views and place drugs in their full network context. This module introduces systems pharmacology concepts, drug target and off target networks, pathway and disease module overlay, and network based strategies for efficacy, safety and repositioning using practical workflows in R, Python and Cytoscape.

Systems Pharmacology & Drug–Target Network Analysis

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Systems Pharmacology Foundations

From single targets to systems pharmacology views

drug action in networks **on targets and off targets** **pathways and disease modules**

Key resources for drug and target information

small molecule and biologic drug catalogs **target and pathway databases (concept level)** **safety and**

indication annotations overview

Network thinking for pharmacology questions

nodes as drugs, targets and diseases | edges as binding and associations | basic graph measures in context

Session 2

Fee: Rs 11800 Apply Now

Drug–Target Networks & Annotation

Building drug–target bipartite and projected networks

drug to target edges | target–target networks via shared drugs | drug–drug similarity via shared targets

Annotating networks with pharmacology attributes

indications and disease areas | mechanism of action style labels | safety, toxicity and black box style flags

Implementation toolkit for drug–target network construction

R and Python network building scripts | Cytoscape for layout and styling | tabular exports for downstream use

Session 3

Fee: Rs 14800 Apply Now

Network Pharmacology & Polypharmacology Analytics

Network based views of efficacy and safety (concepts)

targets in disease modules | off target positions in networks | pathway and tissue level overlays

Polypharmacology and repurposing style network patterns

drugs sharing targets and pathways | nearest neighbour disease modules | similarity and distance

metrics on networks

Implementation toolkit for network pharmacology analytics

R igraph and Python networkx usage | Cytoscape for module level visualisation | summary tables for candidate drugs and targets

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Drug–Target–Disease Network Case Study

Construct and analyse a drug–target–disease network for a case study

Theory + Practical

Highlight potential efficacy, risk and repurposing candidates

targets within disease modules | high risk off target neighbourhoods | drugs with promising repositioning signals

Deliverables: analysis notebook, network files & pharmacology summary

R or Python systems pharmacology notebook | Cytoscape network session and exports | PDF/HTML case study report