Disease Network Omics & Multi-Scale Integration — Hands-on

Learn how to represent diseases as network modules and multi scale systems, from genes and proteins to pathways, tissues and patients. This module focuses on constructing disease centric networks, detecting disease modules, and integrating omics and phenotype layers into multi scale maps that support mechanism discovery, comorbidity analysis and precision stratification.

Disease Network Omics & Multi-Scale Integration

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Disease Network Omics Foundations

From single gene markers to disease networks and modules

diseases as network perturbations **disease modules in interactomes** **co morbidities and shared mechanisms**

Data layers for disease network omics (concept level)

disease gene associations and GWAS style hits **PPI,**

pathway and regulatory networks | clinical and phenotype descriptors

Toolchain for basic disease network representations

R / Python for graph data structures | design of node and edge attributes | simple disease neighbourhood plots

Session 2

Fee: Rs 11800 Apply Now

Disease Modules & Network Construction

Constructing disease centric networks in interactomes

mapping disease genes onto PPIs | expanding modules via neighbours | combining multiple disease gene sets

Disease module detection and neighbourhood analysis (concept level)

community and cluster style approaches | distance and proximity measures | disease overlap and comorbidity patterns

Implementation toolkit for disease module workflows

R igraph and Python networkx usage | Cytoscape layouts for disease modules | tables and figures for module summaries

Session 3

Fee: Rs 14800 Apply Now

Multi-Scale Integration: Genes to Patients

Connecting molecular modules with pathways and tissues

enriching disease modules in pathways | tissue and cell type context overlays | linking to organ and system level effects

Integrating omics and clinical layers around disease networks

expression and variant data around modules **patient clusters and endotypes (concept level)** **comorbidity and drug mapping onto networks**

Implementation toolkit for multi scale integration views

R / Python for multi layer summaries **Cytoscape visual styles for multi scale nodes** **simple patient by network heatmaps**

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Disease Network & Multi-Scale Map

Build a disease network and module map for a chosen indication

Theory + Practical

Overlay omics, pathways and clinical features in a multi scale view

module level enrichment and scores **patient or subgroup level summaries** **hypothesis statements on mechanisms**

Deliverables: analysis notebook, network files & multi scale report

R or Python disease network notebook **Cytoscape session / network exports** **PDF/HTML disease network omics summary**