Network Medicine, Disease Modules & Comorbidity Graphs — Hands-on

Learn how to apply network medicine concepts to real world omics and clinical data. This module covers disease module detection, comorbidity graphs and multi omics clinical integration so that you can move from gene lists to mechanism anchored disease neighbourhoods and prioritised targets.

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Network Medicine Foundations & Disease Space

From single genes to network views of disease

disease neighbourhood and modules **interactome and diseaseome ideas** **topology based intuition**

Disease gene sets and phenotype resources

OMIM and GWAS Catalog basics **ClinVar and disease annotations** **HPO and phenotype mappings**

Representing diseases in network contexts

disease projection on PPI networks **bipartite disease gene graphs** **disease disease similarity links**

Session 2
Fee: Rs 11800 Apply Now

Disease Module Detection & Comorbidity Graphs

Disease module definition and detection strategies

seed expansion and random walk based ideas **community detection in disease subnetworks** **enrichment and significance checks**

Building and analysing comorbidity graphs

ICD based co occurrence networks **shared genes and pathways links** **network structure of multimorbidity**

Relating disease modules to comorbidity patterns

overlapping modules and shared hubs **risk propagation on disease graphs** **implications for patient trajectories**

Session 3
Fee: Rs 14800 Apply Now

Multi Omics & Clinical Integration in Network Medicine

Overlaying omics data on disease modules

differential expression and mutations **proteomics and phospho overlays** **metabolomics and pathway shifts**

Using EHR and cohort data with network views

mapping codes and labs to phenotypes **cohort level comorbidity analysis** **stratifying patients by module burden**

Prioritising mechanisms, biomarkers and targets

central nodes inside disease modules | cross disease shared targets | biomarker panels from modules

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Disease Module & Comorbidity Map

Define a disease of interest and build its module

Theory + Practical

Construct a small comorbidity graph and link to the module

select major comorbid conditions | overlay shared genes and pathways | visualise the disease neighbourhood

Deliverables: network files, metrics tables and short report

Cytoscape session and layouts | CSV of module nodes and scores | interpretation and hypothesis notes