Biomarker Discovery, Verification & Panel Design — Hands-on

Build end to end biomarker workflows using metabolomics and lipidomics data. You will move from discovery signatures to verification, learn to evaluate performance with ROC style metrics, optimise cut offs, combine features into panels and document results in a way that is suitable for publications and translational studies.

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Biomarker Concepts & Study Design

What makes a good biomarker or panel

diagnostic, prognostic, predictive roles | **clinical relevance and effect size** | **biological plausibility and pathways**

Study design for biomarker discovery and verification

case control and cohort designs | **training, validation**

and test sets | power and sample size considerations

From untargeted discovery to targeted follow up

screening wide feature space | prioritising candidates for verification | linking to targeted MRM or PRM assays

Session 2

Fee: Rs 11800 Apply Now

Feature Selection & Signature Building

Univariate and multivariate screening of candidates

effect size and adjusted p values | multivariate importance metrics | combining evidence across methods

Feature selection strategies and stability

filter and wrapper ideas | regularisation concepts (L1 style) | stability across resampling runs

Building candidate signatures and simple models

combining markers into risk scores | logistic/linear models for panels | avoiding overly complex signatures

Session 3

Fee: Rs 14800 Apply Now

Panel Performance, ROC & Cut Offs

Evaluating single markers and panels

sensitivity, specificity and accuracy | ROC curves and AUC interpretation | confidence intervals for metrics

Optimising thresholds and decision rules

Youden index and cost aware choices | PPV, NPV and

prevalence effects | calibration plots and Brier score intuition

Internal validation and verification cohorts

cross validation and bootstrapping | hold out and external validation sets | performance drift across subgroups

Session 4

Fee: Rs 18800 Apply Now

Translation, Reporting & Case Studies

From statistical significance to clinical usefulness

effect sizes and decision impact | net benefit style thinking | limitations and generalisability

Reporting biomarker panels in manuscripts and reports

clear description of cohorts and design | tables of markers, coefficients and metrics | visuals for ROC, calibration and subgroups

Case studies and reproducible biomarker workflows

worked metabolomics examples | sharing code, models and metadata | checklists for future biomarker projects