Statistics for Metabolomics — Normalization & Batch Correction — Hands-on

Turn noisy, heterogeneous metabolomics output into analysis ready datasets. This module focuses on data inspection, missingness, normalization and scaling, QC driven batch correction, and drift handling so that downstream statistics, biomarker discovery, and pathway analysis are built on stable, comparable feature matrices.

Statistics for Metabolomics — Normalization & Batch Correction

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Data QC, Missingness & Distributions

Structure of metabolomics feature matrices

samples vs features layout **intensity and area values** **log scale intuition**

Patterns of missingness in metabolomics data

biological zeros vs technical zeros **limit of detection effects** **feature and sample filtering rules**

Initial QC plots and distribution checks (concepts)

density and box plots | RLE style views | QC vs study samples comparison

Session 2

Fee: Rs 11800 Apply Now

Normalization & Scaling Strategies

Why normalization is needed in metabolomics studies

injection amount variation | instrument response shifts | sample specific factors

Common normalization methods and when to use them

total intensity and sum normalization | probabilistic quotient (PQN) | internal standard and housekeeping features

Transformations and scaling for downstream statistics

log and power transforms | autoscaling and pareto scaling | handling skewed features

Session 3

Fee: Rs 14800 Apply Now

Batch Effects, Drift & QC Based Correction

Recognizing batch effects and signal drift in metabolomics

principal component views | QC sample trajectories | run order patterns

Concepts of batch correction and drift modeling

batch indicator variables | signal vs noise separation | QC based regression ideas

Overview of QC based normalization and correction workflows

using interleaved pooled QCs | trend fitting across run order | pre and post correction QC checks

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Normalization & Batch Plan

Designing a normalization and batch correction strategy for a study

Theory + Practical

Comparing pre and post processing QC and distribution diagnostics

box and density plots before vs after | QC spread and drift reduction | impact on downstream PCA (concepts)

Deliverables: written processing SOP & processed feature matrix

normalization and batch SOP (PDF/HTML) | cleaned and processed table (CSV/TSV) | QC and distribution summary plots