

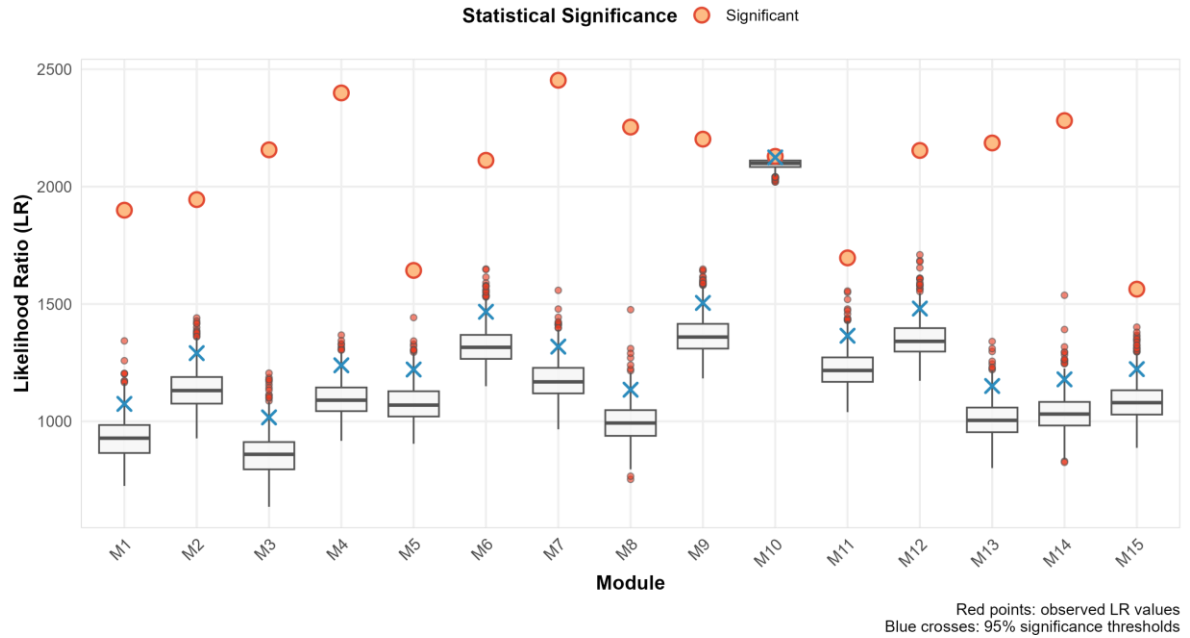


Figure S2. Statistical Significance Testing of Module Likelihood Ratios via Permutation Test.

This figure presents the results of a permutation test used to evaluate the statistical significance of the Likelihood Ratio (LR) statistic for individual modules. The boxplots depict the null distribution of LR values generated from permuted data, representing the range of values expected under the null hypothesis of no association. The solid circular points represent the observed LR values from the actual (non-permuted) data, colored by their significance status (red: significant, teal: non-significant). The blue "X" symbols indicate the 95% significance threshold derived from the upper quantile of each module's permutation distribution. A module is deemed statistically significant ($p < 0.05$) if its observed LR value (solid point) exceeds the blue threshold value, indicating that the observed association is unlikely to be due to random chance alone.