

Supplementary Table S3. Leave-One-Dataset-Out (LODO) validation results.

In each LODO iteration, the remaining datasets were pooled as a combined training set restricted to 14,241 protein-coding HGNC genes shared across all seven datasets. The ENUXGB consensus panel was derived from this combined set and evaluated on the entirely held-out test dataset. GSE151648_TIME and GSE151648_IRI share identical expression matrices and patient samples; when either is the test set both are excluded from the training pool (n train = 5). AUC values colored green (≥ 0.80), amber (0.60–0.79), or red (< 0.60). PPV not defined (—) where sensitivity = 0.

Test dataset (held out)	Training datasets (pooled)	n train	Common genes	Panel genes	AUC	Sensitivity	Specificity	PPV	Balanced Accuracy	Macro F1
GSE112713	GSE276531; GSE12720; GSE14951; GSE15480; GSE151648_TIME; GSE151648_IRI	6	14,241	39	0.474	0.269	0.682	0.500	0.476	0.443
GSE276531‡	GSE112713; GSE12720; GSE14951; GSE15480; GSE151648_TIME; GSE151648_IRI	6	14,241	39	0.512	0.571	0.500	0.471	0.536	0.531
GSE12720†	GSE112713; GSE276531; GSE14951; GSE15480; GSE151648_TIME; GSE151648_IRI	6	14,241	40	0.678	0.190	1.000	1.000	0.595	0.516
GSE14951*†	GSE112713; GSE276531; GSE12720; GSE15480; GSE151648_TIME; GSE151648_IRI	6	14,241	40	0.880	0.000	1.000	—	0.500	0.333
GSE15480*†	GSE112713; GSE276531; GSE12720; GSE14951; GSE151648_TIME; GSE151648_IRI	6	14,241	38	0.993	1.000	0.000	0.500	0.500	0.333
GSE151648_TIME§	GSE112713; GSE276531; GSE12720; GSE14951; GSE15480	5	14,241	39	0.799	0.000	1.000	—	0.500	0.333
GSE151648_IRI§	GSE112713; GSE276531; GSE12720; GSE14951; GSE15480	5	14,241	39	0.492	0.000	1.000	—	0.500	0.298

* Exploratory dataset (n < 30); results not reliable.

† Degenerate classifier: sensitivity or specificity = 0 or 1.0, indicating majority-class collapse likely due to cross-platform batch effects in the absence of normalization rather than genuine transfer signal.

‡ Negative result dataset: GSE276531 yielded near-chance within-dataset performance and is included for completeness only.

§ GSE151648_TIME and GSE151648_IRI share identical expression matrices and patient samples; both are excluded from the training pool when either is the test set to prevent data leakage (n train = 5).