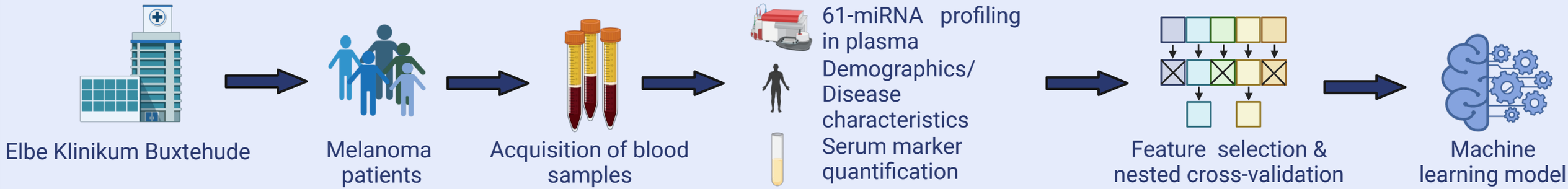
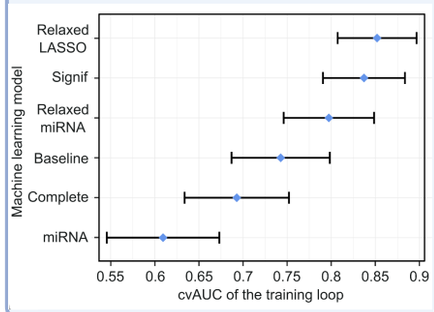
LASSO Logistic Regression Reveals a Mixed MiRNA and Serum-marker Classifier for Prediction of Immunotherapy Response in Liquid Biopsies of Melanoma Patients



Models tested

- *Baseline*: only serum markers
- *miRNA*: All miRNAs
- *Complete*: All features
- *Signif*: Significantly altered features
- *Relaxed miRNA*: miRNAs + LASSO feature selection
- *Relaxed LASSO*: All features + LASSO feature selection

Model comparison



Winning model

- *Relaxed LASSO* (cvAUC: 0.847)
- Seven features:
  - miR-30d, miR-137, miR-514a, age (therapy success)
  - LDH, prior BRAFi/MEKi, miR-197 (therapy failure)

Conclusion:

Feature selection by either usage of significantly changed covariates or penalized logistic regression (LASSO) yields high prediction accuracy in a nested-cross validation approach. The incorporation of diverse covariate types, including demographics, disease characteristics, miRNAs in plasma, and serum markers, amplifies model performance. Further potential lies in expanding this framework through the integration of proteomics, exploration of mutational burden, or exosome analysis.

Bender et al., 2024