Chart, bar chart

Description automatically generated

**Figure 1. Heatmap of normalized gene expressions for the 5 selected genes in all samples identified by the REFS algorithm (algorithm 1).** The heatmap legend displays a color gradient range where -2 denotes the lowest gene expression and 4 the highest gene expression. Merely from visual inspection, samples can be differentiated into two groups: responders and non-responders to omalizumab treatment.

Chart, line chart

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**Figure 2. ROC curve over all 8 classifiers from REFS** **to validate the identified 5-gene signature.** The ROC curve shows the binarization threshold from 0 (all moderate-to-severe asthma patients as omalizumab responders and both the TPR and FPR =1; upper right corner of ROC) to 1 (all moderate-severe asthma patients classified as non-responders to omalizumab and both TPR and FPR=0; lower left corner of ROC). The AUC is the area in the plot which stays under the ROC curve. The Passive aggressive classifier which produced the blue ROC curve shows the best predictive accuracy as it covers a larger area compared to the straight ROC curve with the random classifier (red dashed line).

A picture containing timeline

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**Figure 3.** **Summarized results of the two algorithms predicting treatment responsiveness of omalizumab in moderate-to-severe asthma.** Whole blood mRNA expression profiles in samples collected day 0 (1 week before the start of the treatment) were used for the REFS analysis (algorithm 1). In total 40 moderate-to-severe asthmatic patients, n= 30 responders, and n=10 non-responders were included. For LEN analysis (algorithm 2), n=17 healthy controls were also included. With REFS, five independent responsiveness-predictive genes are identified, whereas rule-based LEN identified three gene groups that predicted responsiveness. Comparing both approaches an overlap of four genes was found. The relationship between responder status (R/NR) is shown in the heatmap. The mRNA expression of responders compared to healthy controls is shown in the table.