

# Potential microRNA-mediated oncogenic intercellular communication revealed by pan-cancer analysis

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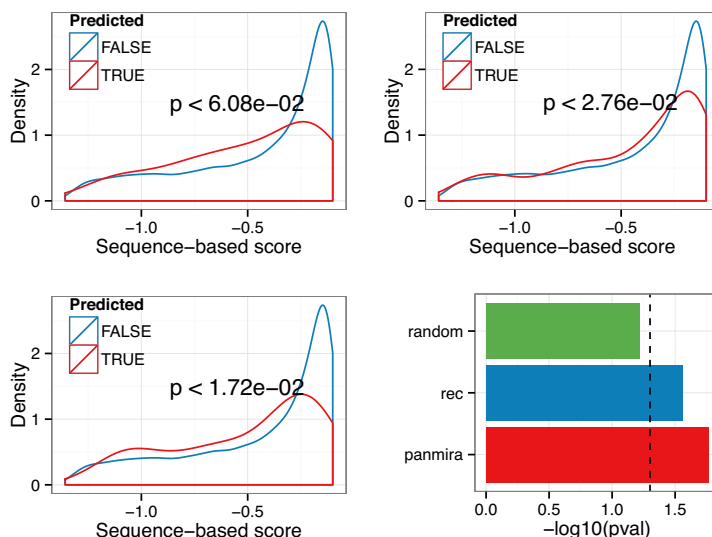
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# Supplementary Figures

## a. miRanda-mirSVR



## b. TargetScan

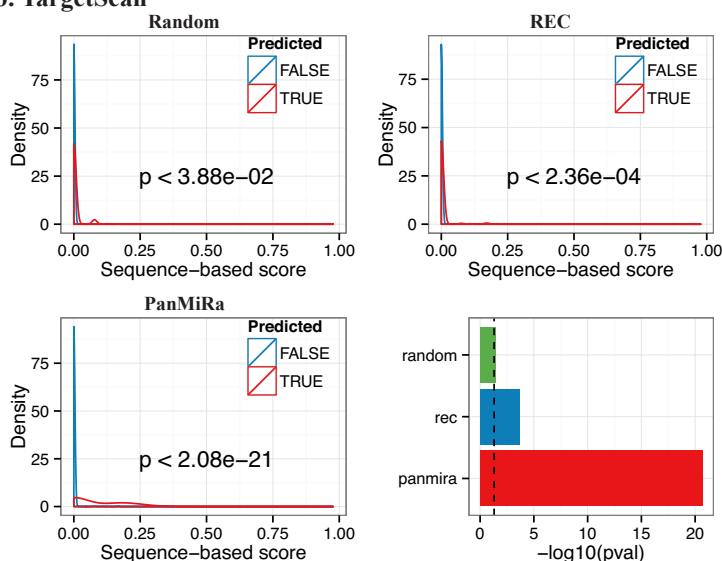


Figure S1: **Sequence-based score comparison.** The distributions of the sequence-based scores from (a) miRanda-mirSVR and (b) TargetScan probability of conserved targeting (PCT) were compared between the positive recurrent interactions predicted by PanMiRa and the remaining pairs. The same test were performed for the interactions detected by randomly shuffled posteriors and REC with -1 as the cutoff. For miRanda-mirSVR (TargetScan PCT), the more negative (positive) the scores the stronger implication of a true interaction based on the sequence-based features. P-values indicated above were computed by one-sided Wilcoxon rank-sum test. The resulting significance levels in terms of  $-\log_{10}(\text{p-value})$  are compared among the three methods. The dash line indicates the standard cutoff of  $\text{p-value} = 0.05$ .

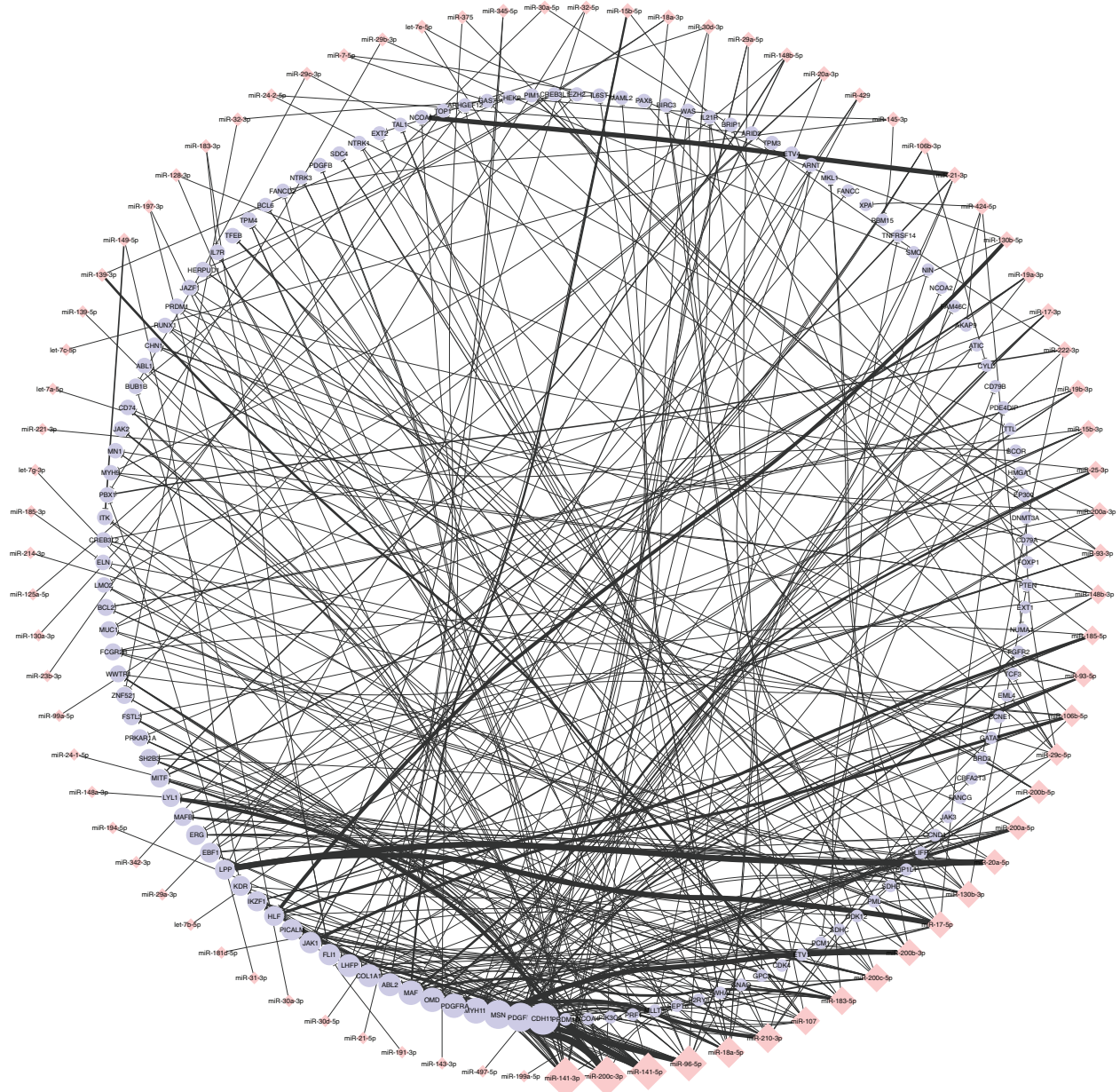
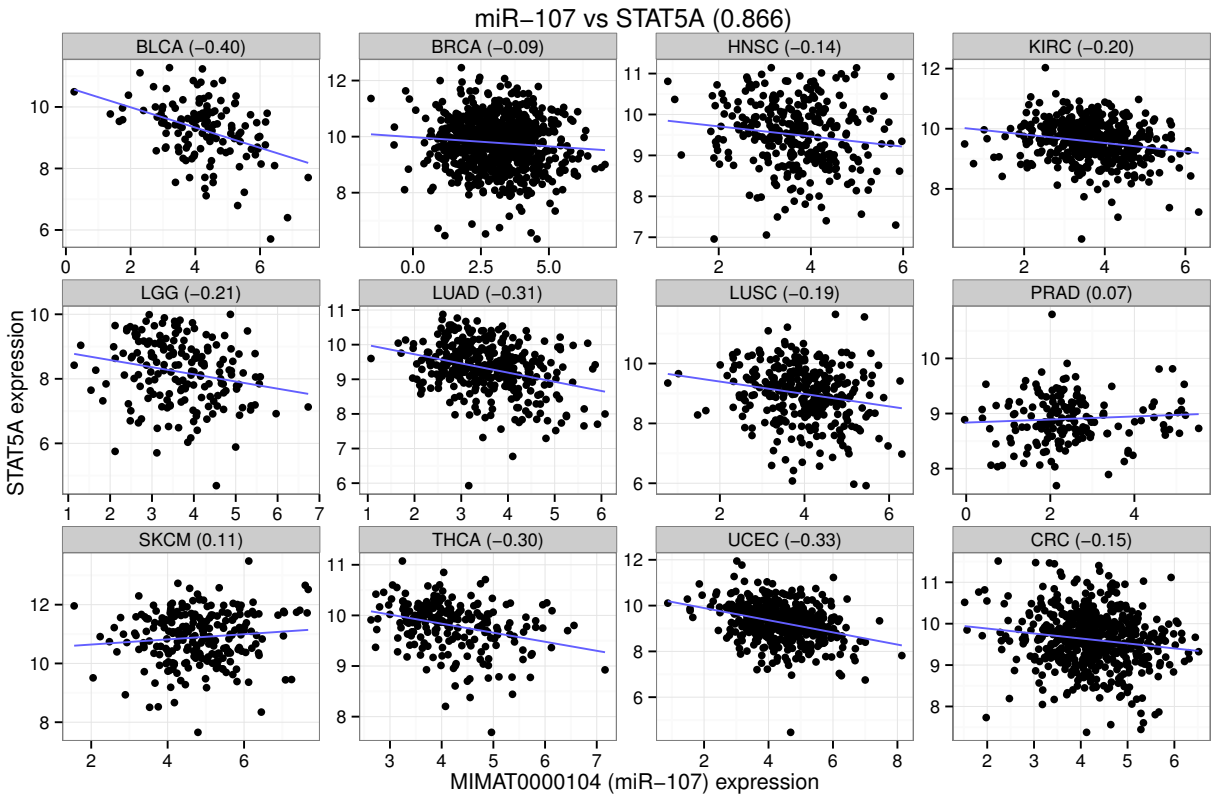
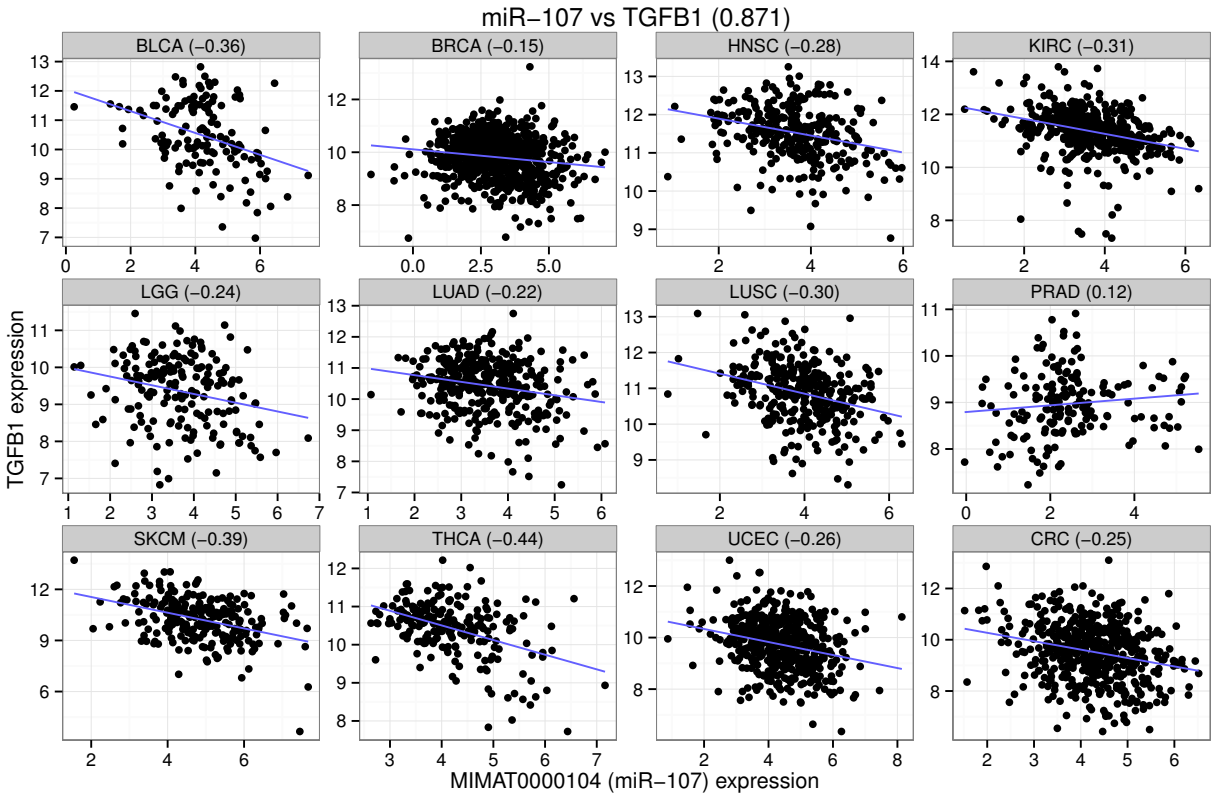
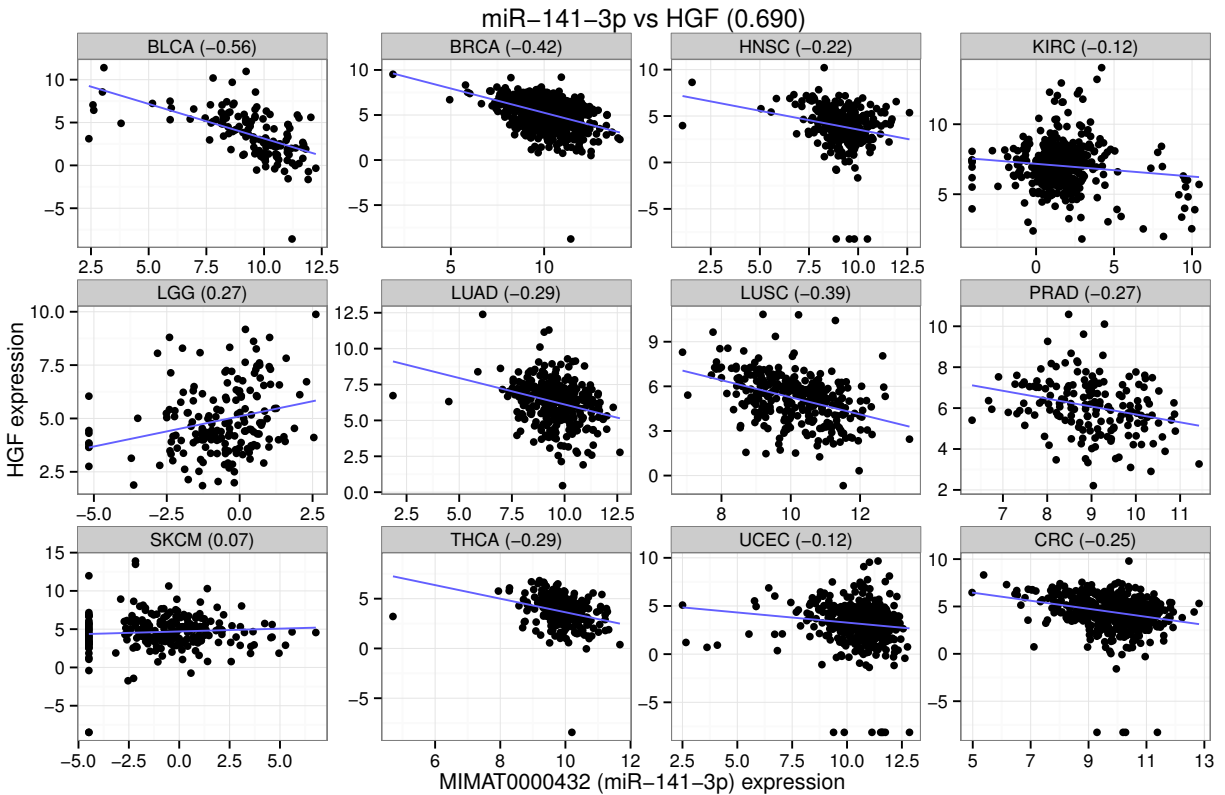
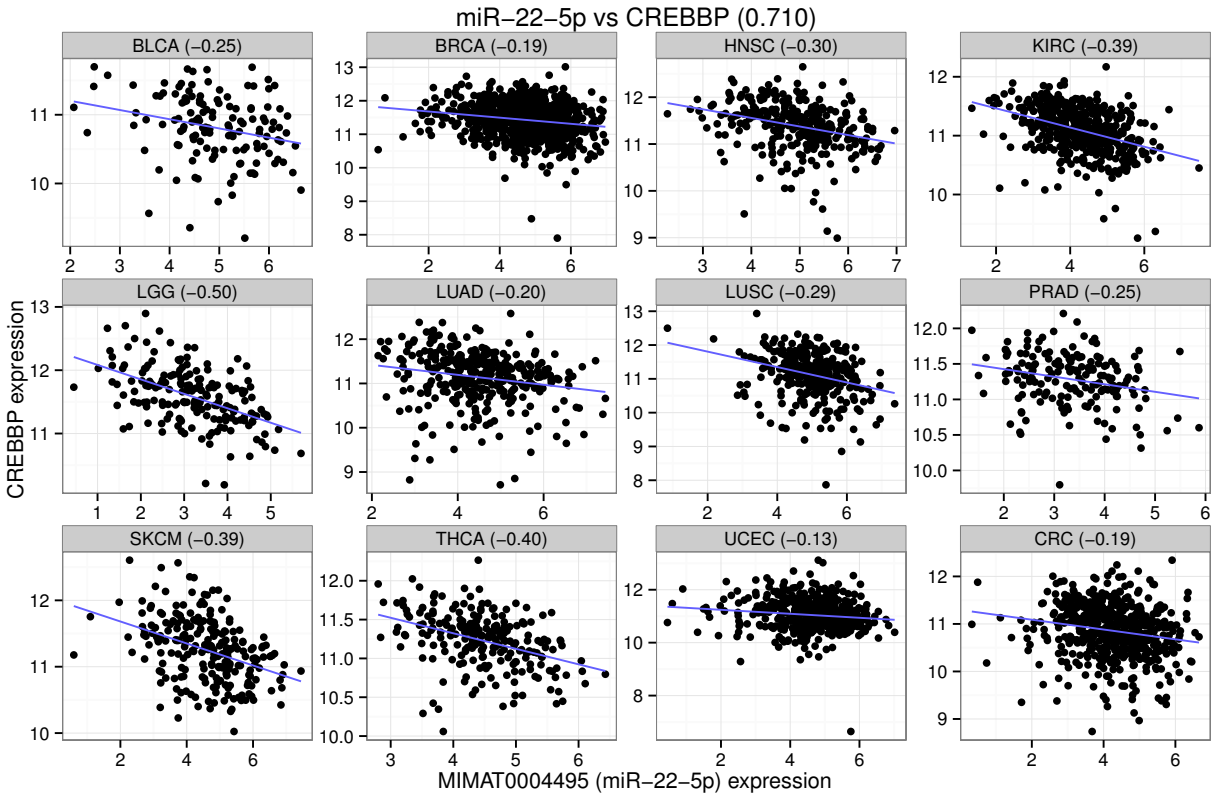
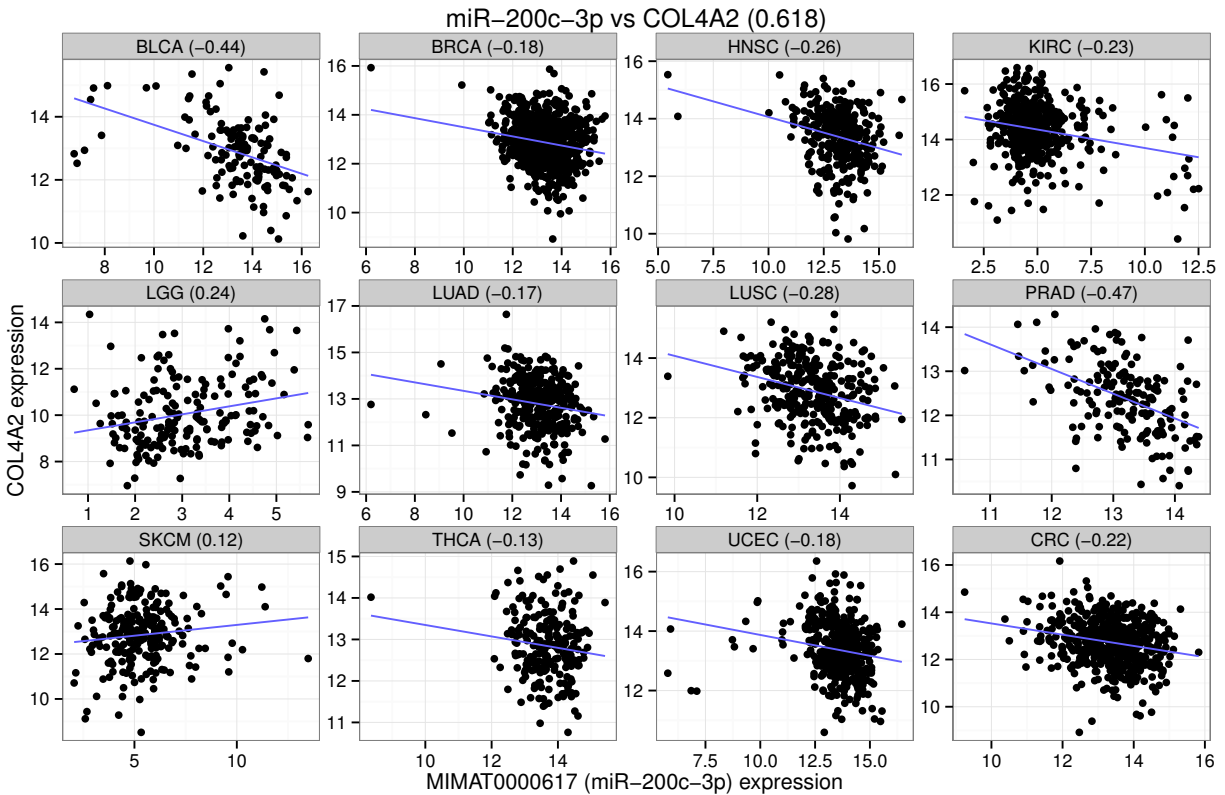
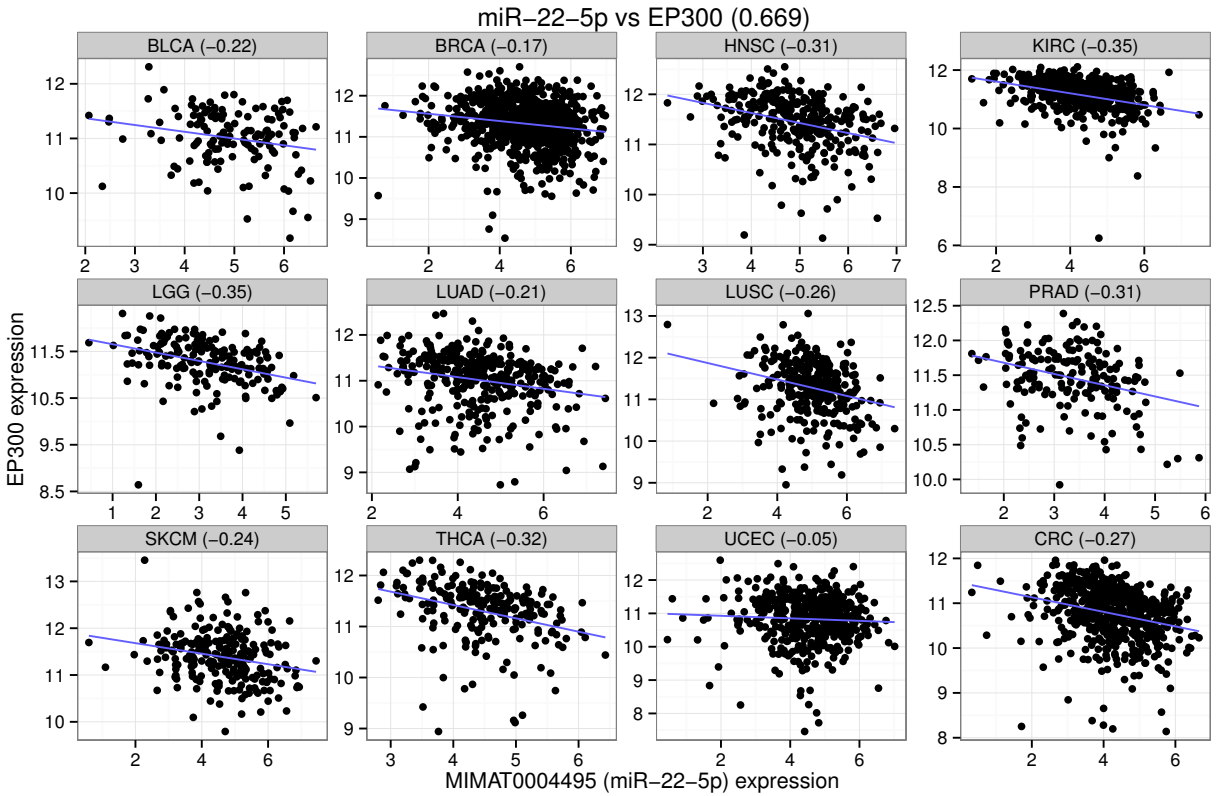
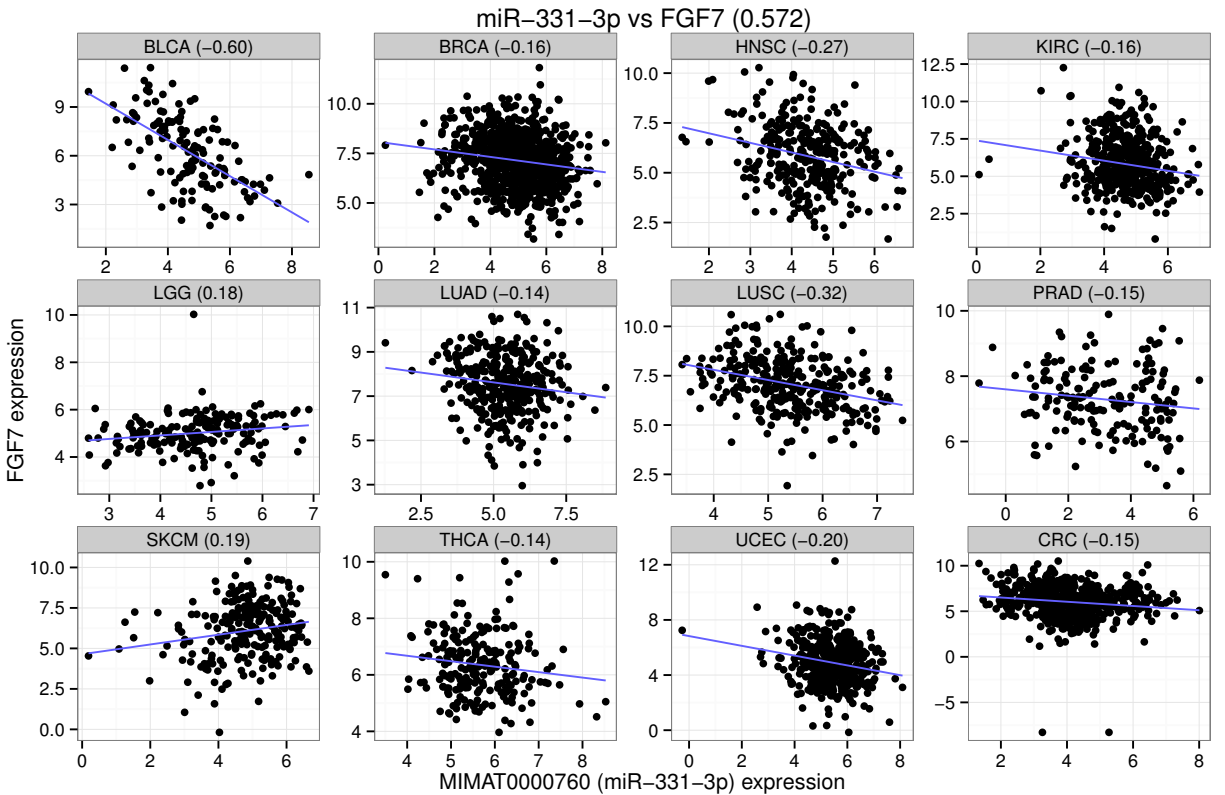
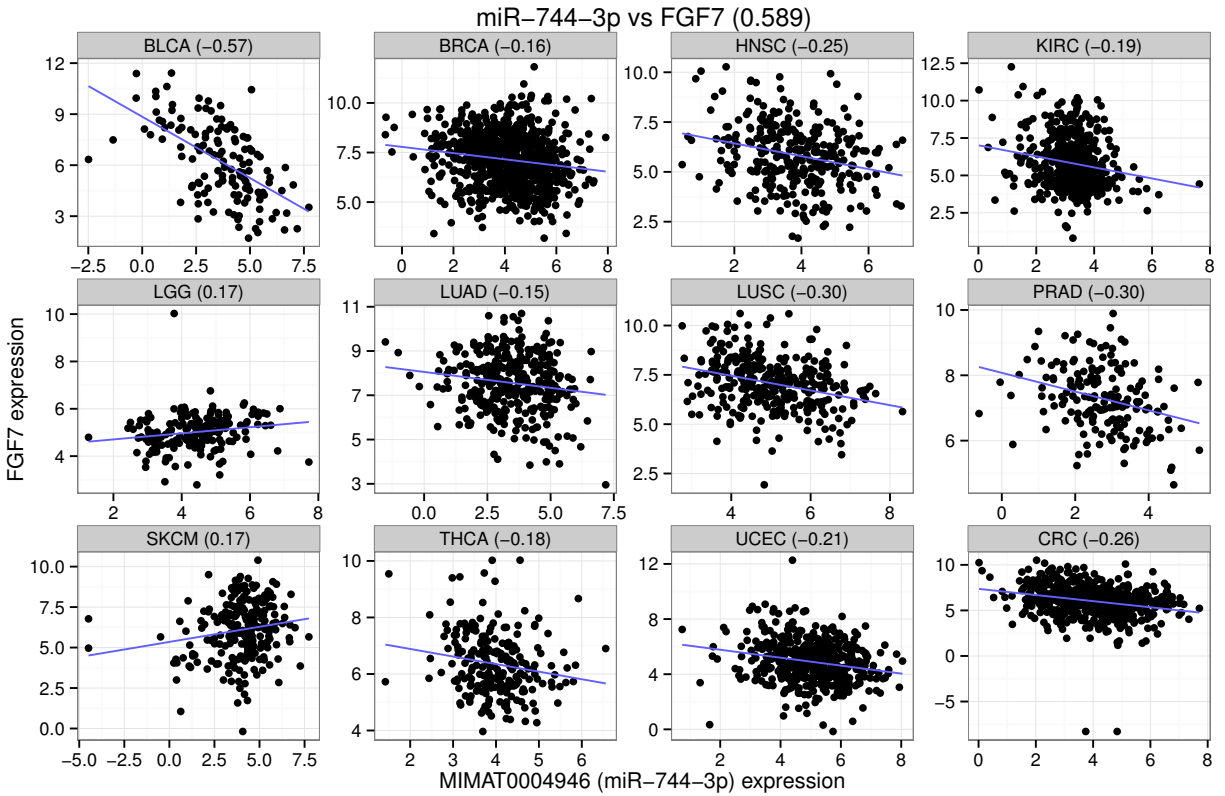


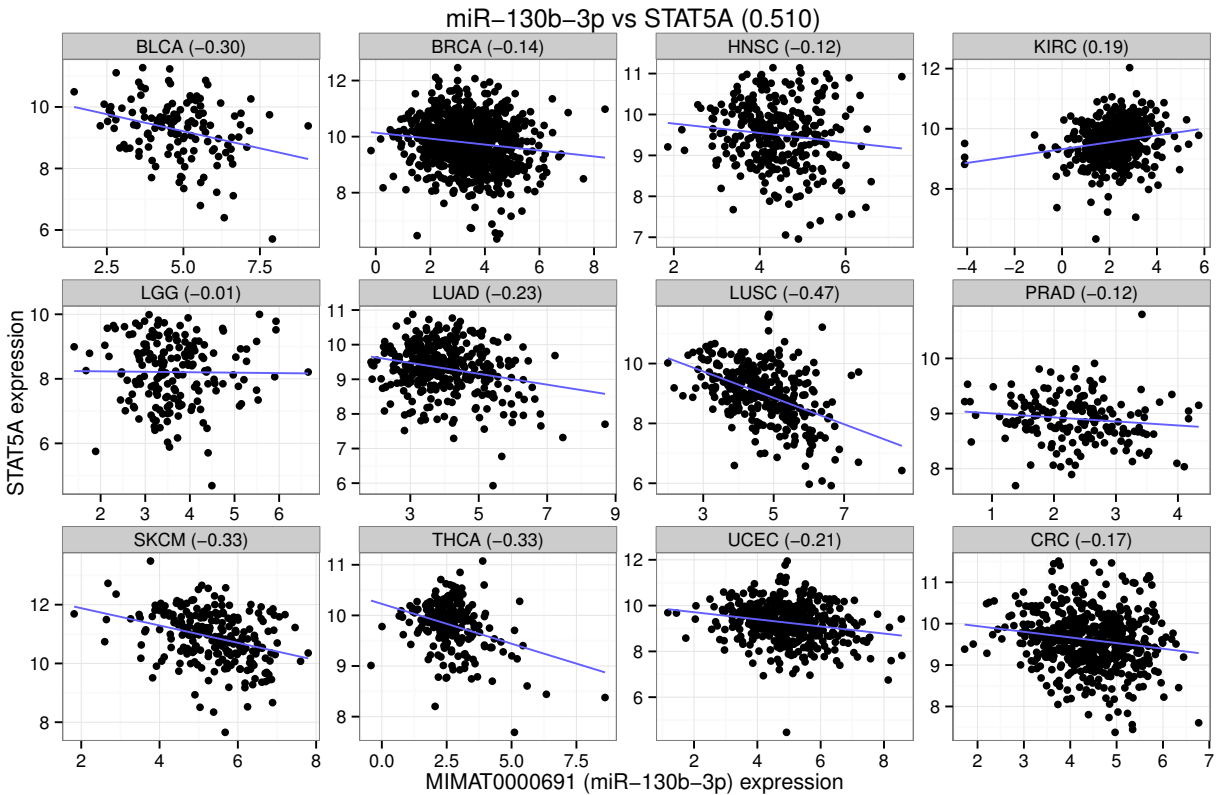
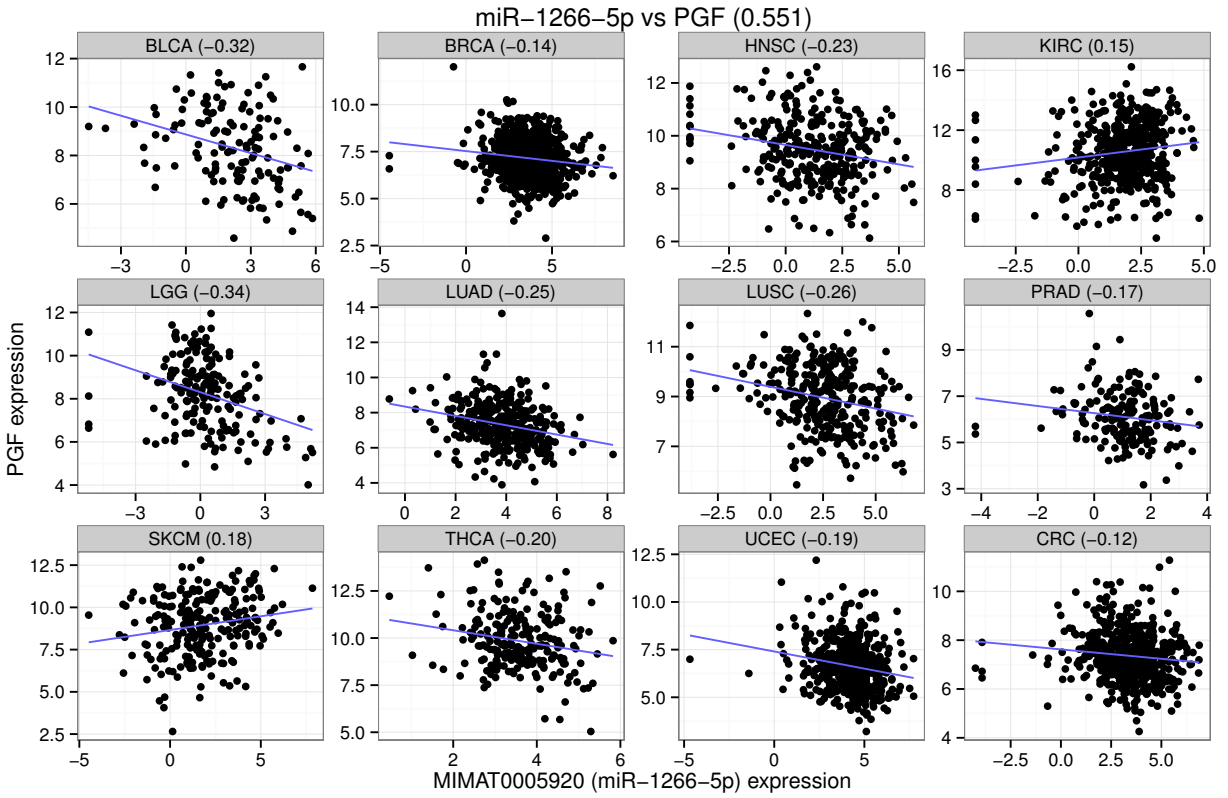
Figure S2: **Full oncomir-oncogene cancer network.** We filtered the the positive recurrent interactions by the miRNAs and target genes that are in known oncomirs [1, 2] and oncogenes [3], respectively. Then, we generated the oncomir-oncogene pan-cancer network and analyzed it under Cytoscape [4]. Node size and the edge width are proportional to the in/out-degree and recurrence posterior in the overall oncogene-oncomir network, respectively.



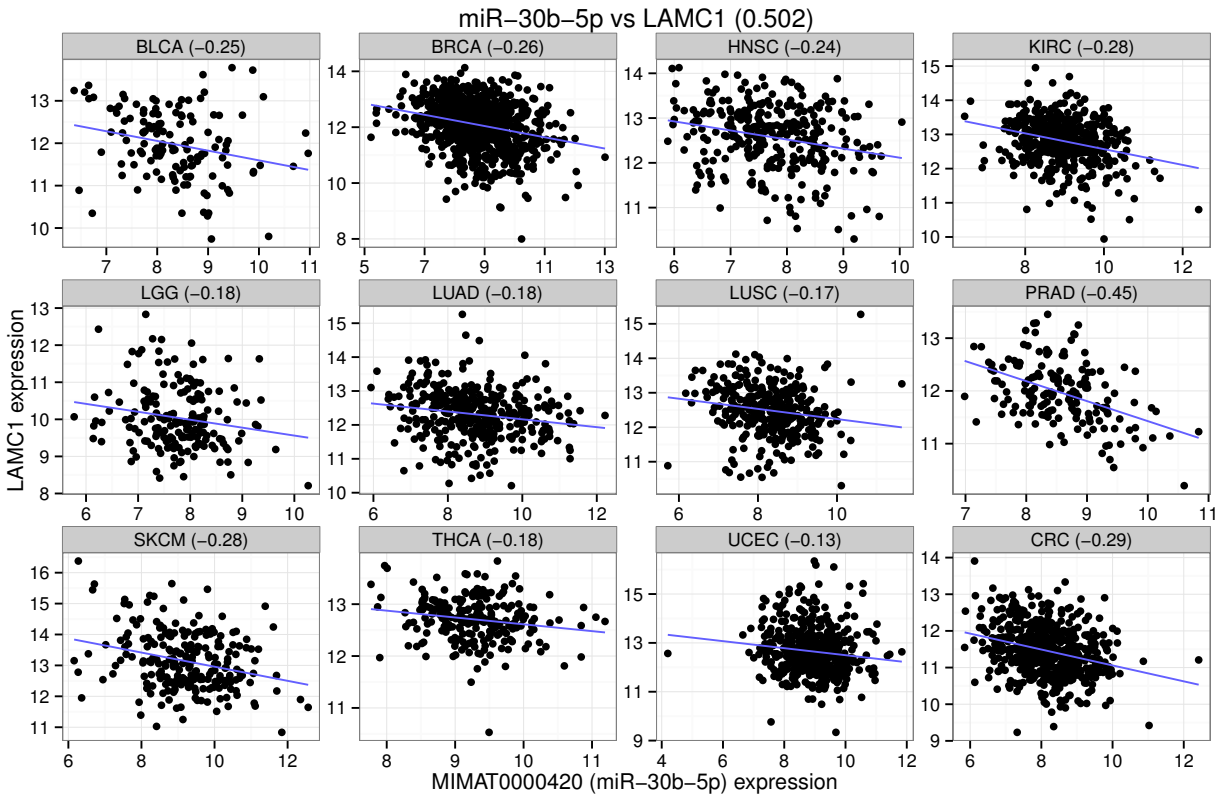
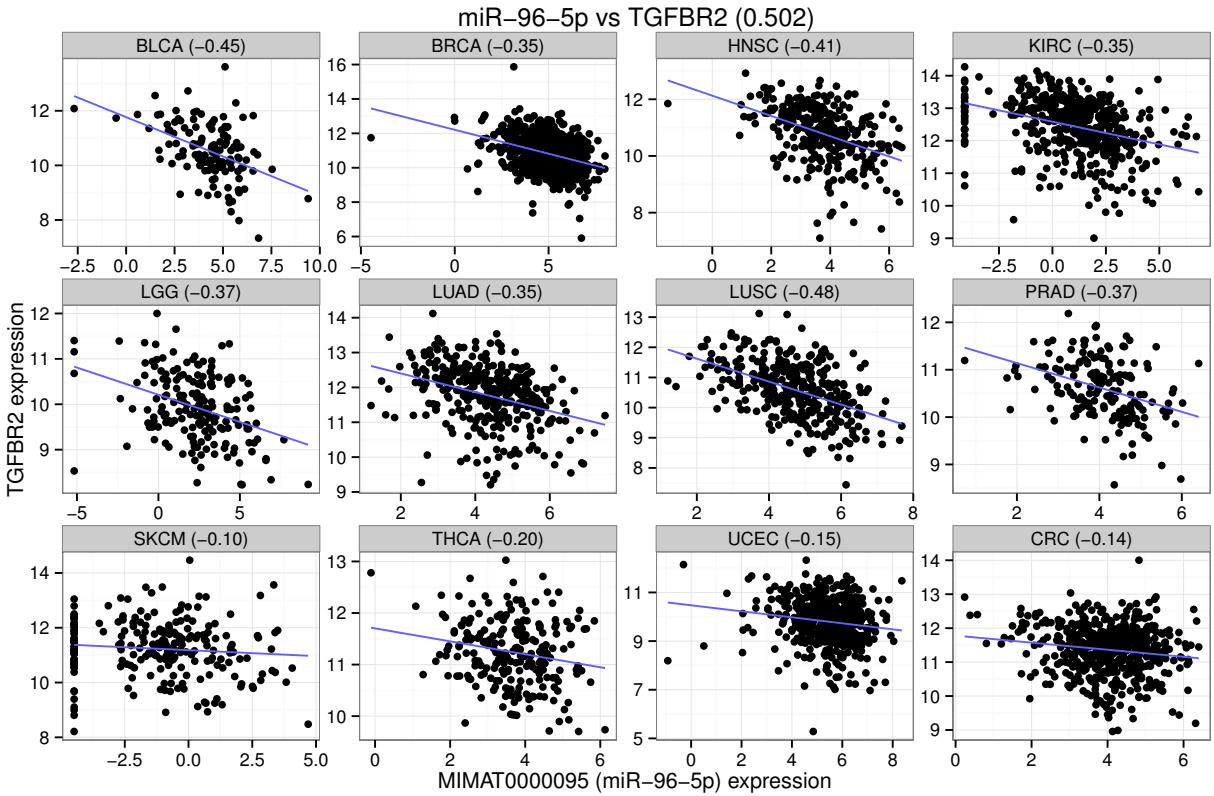


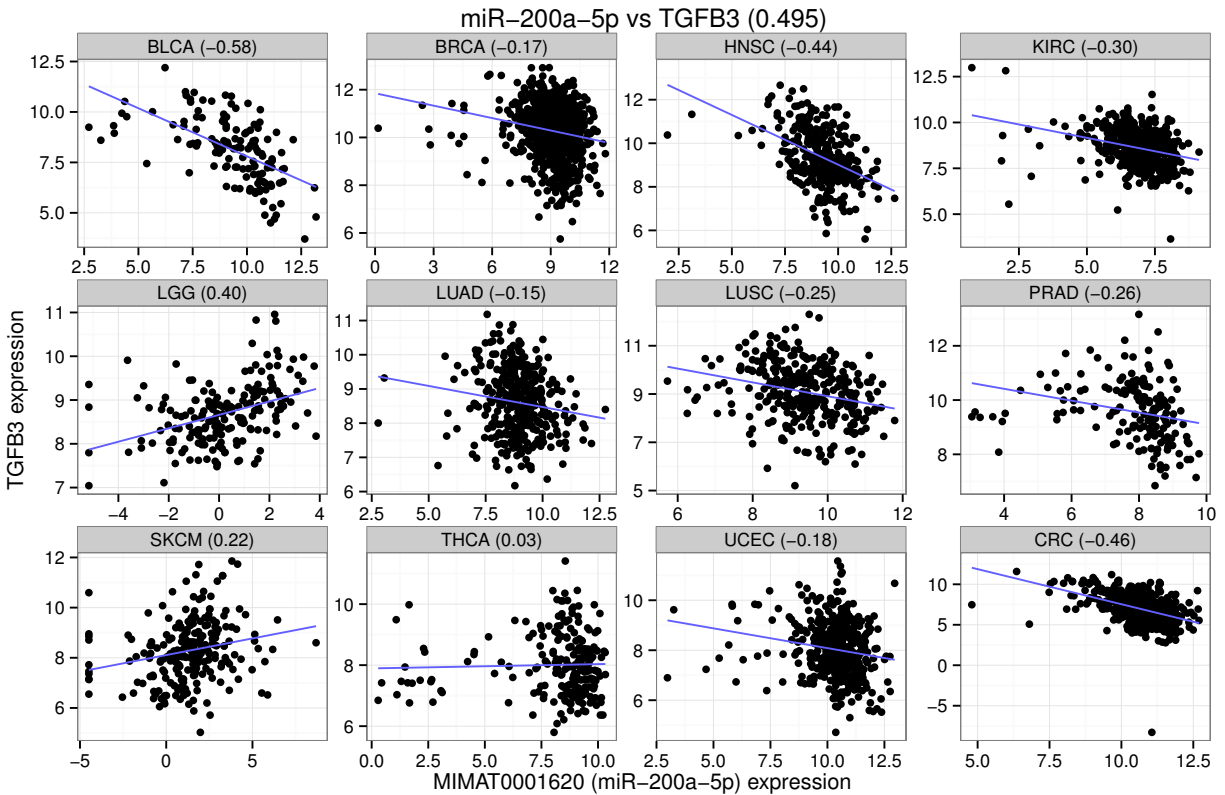
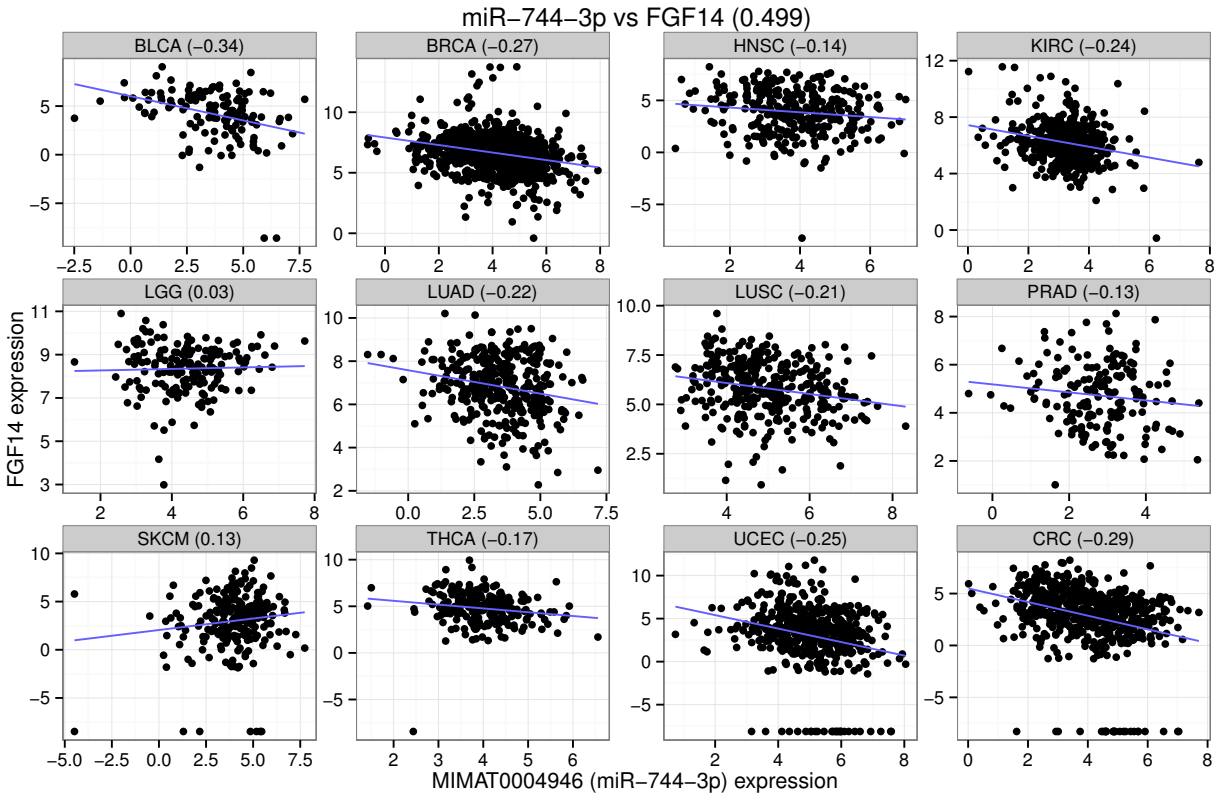


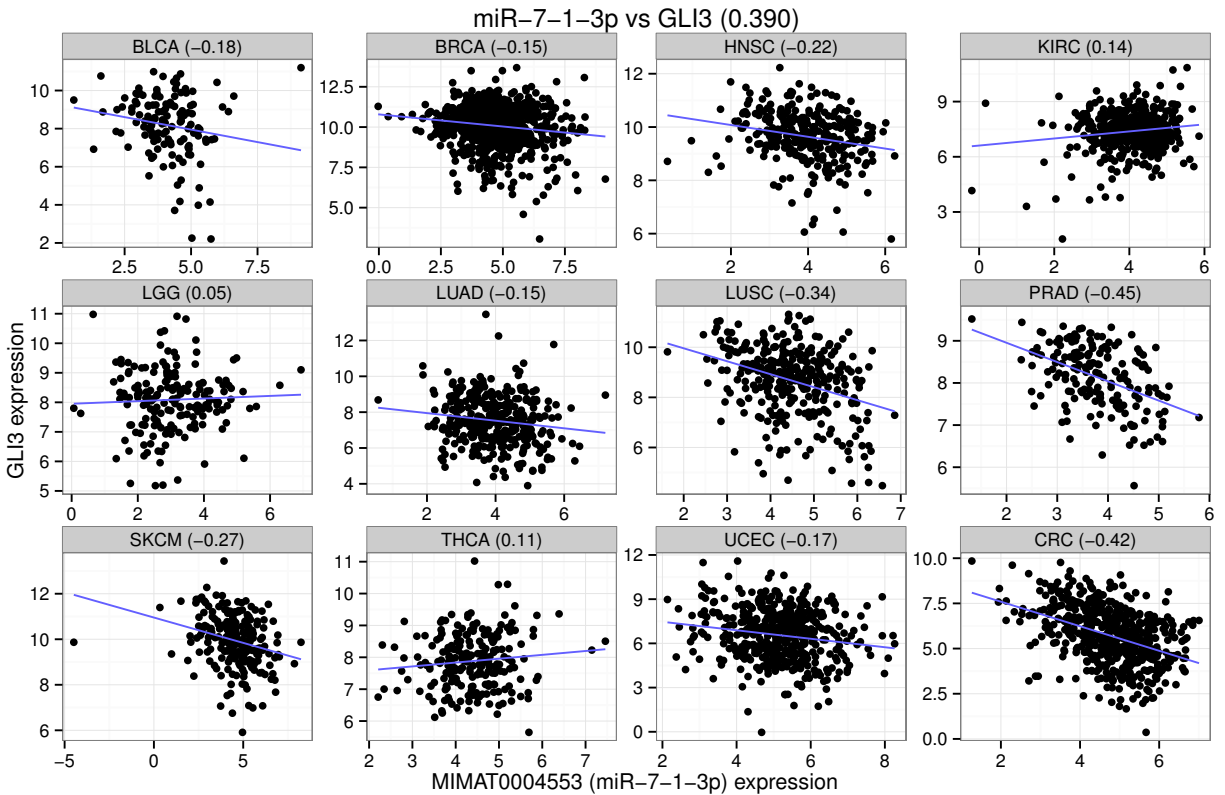
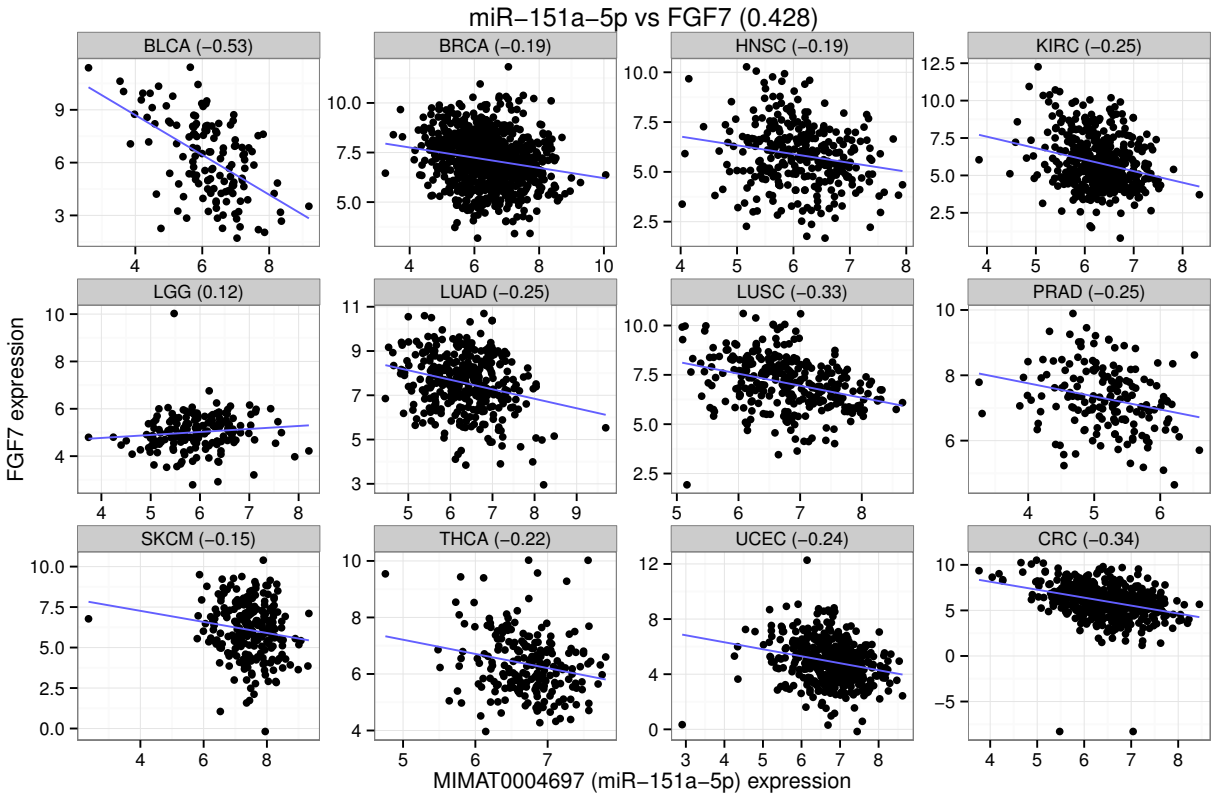


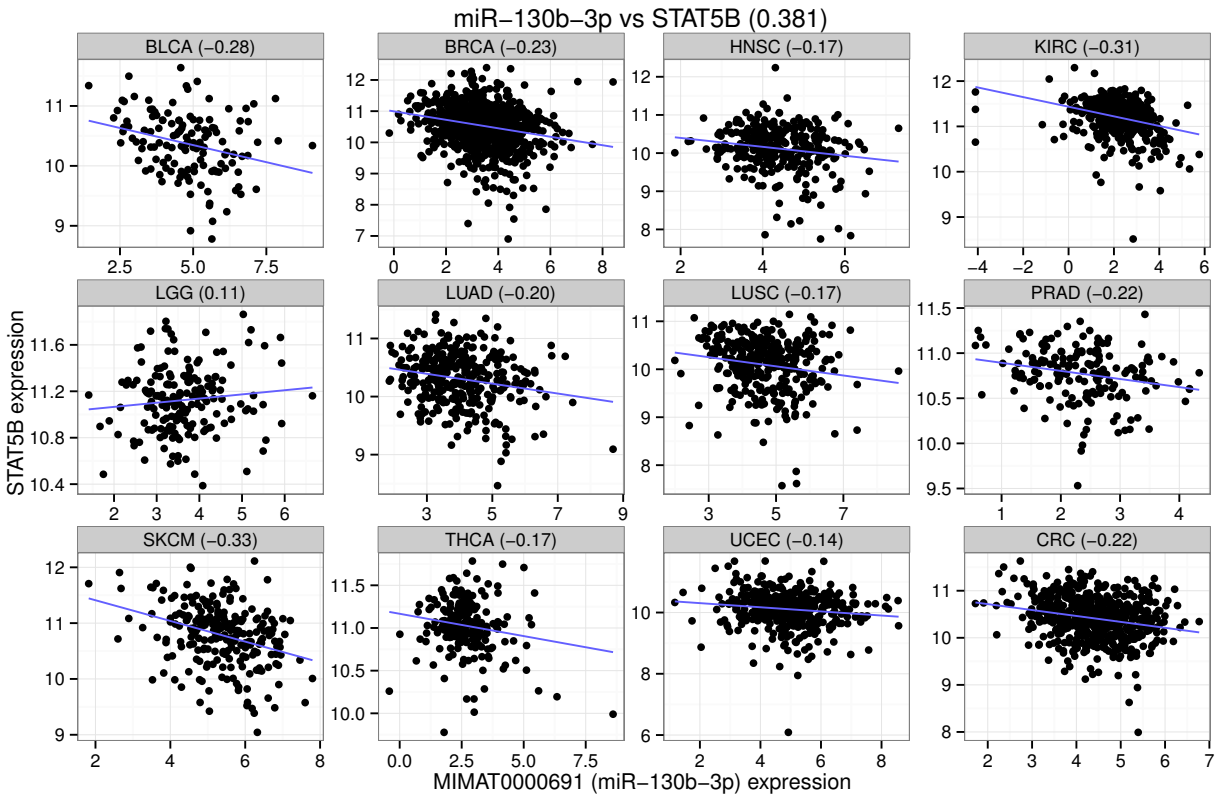
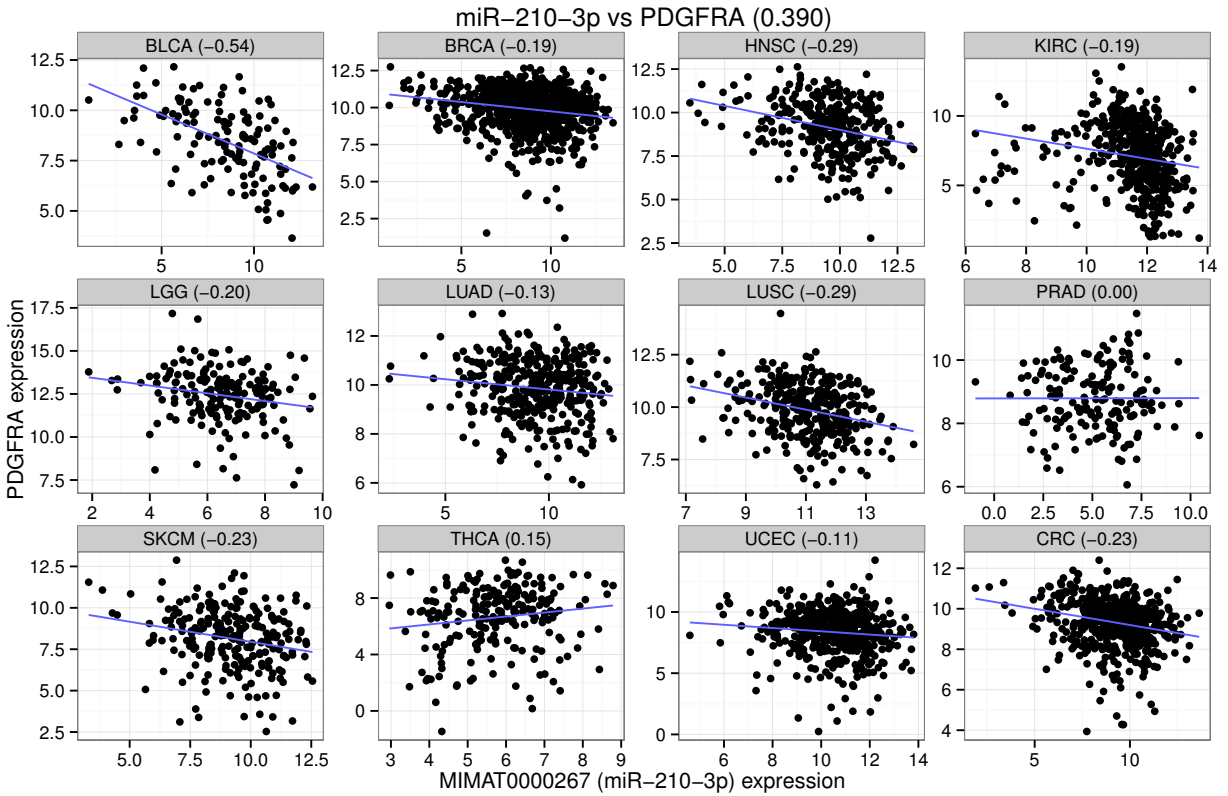


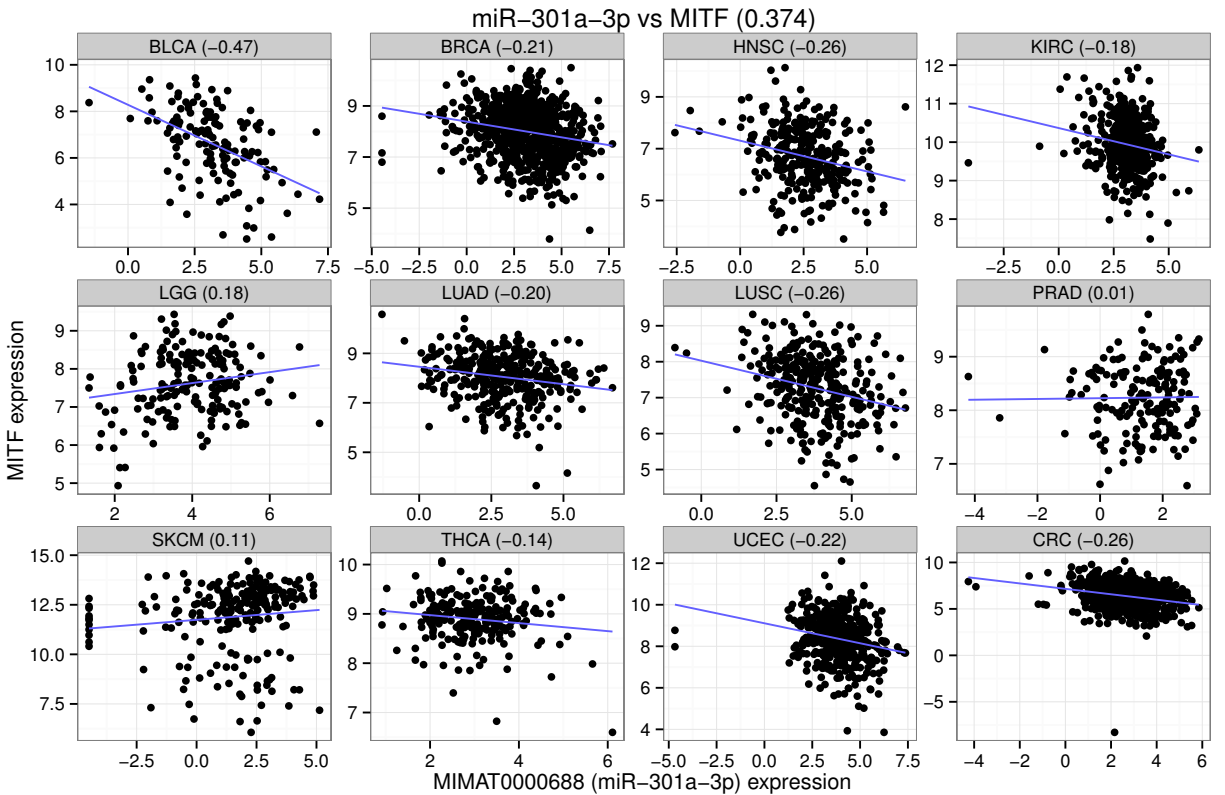
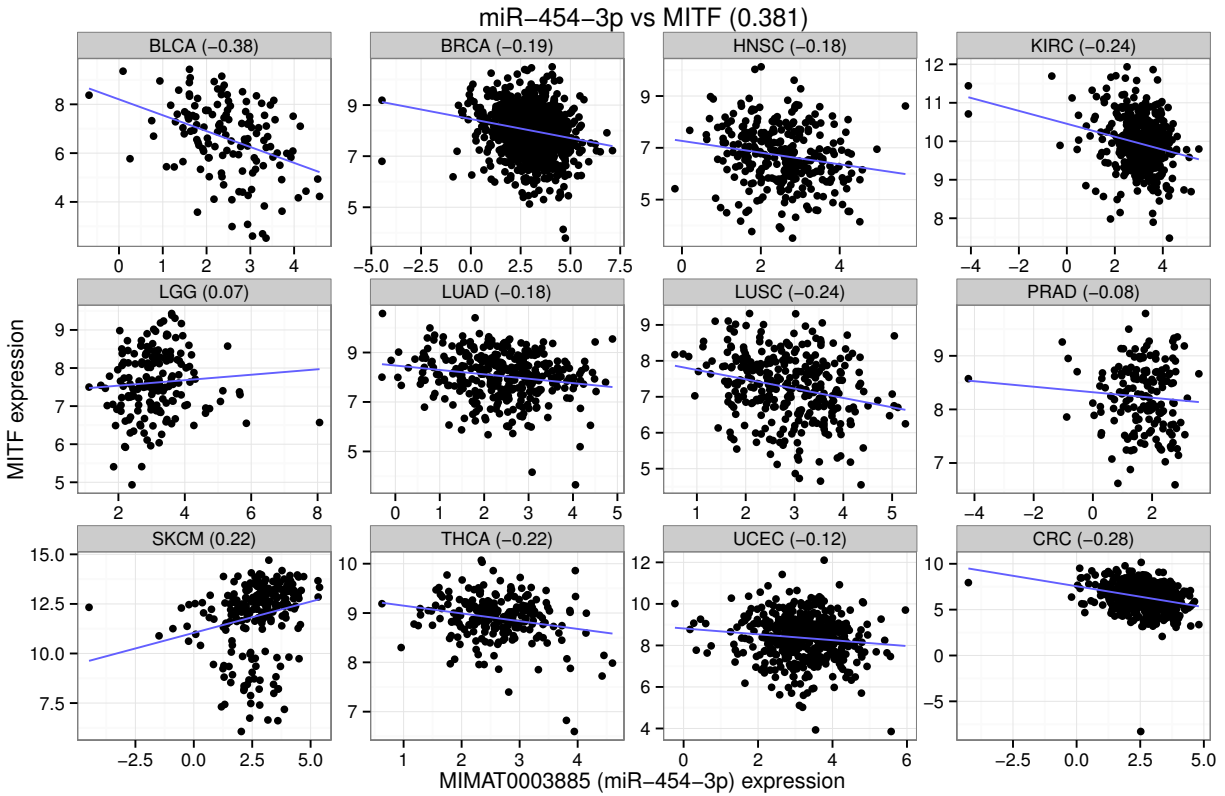


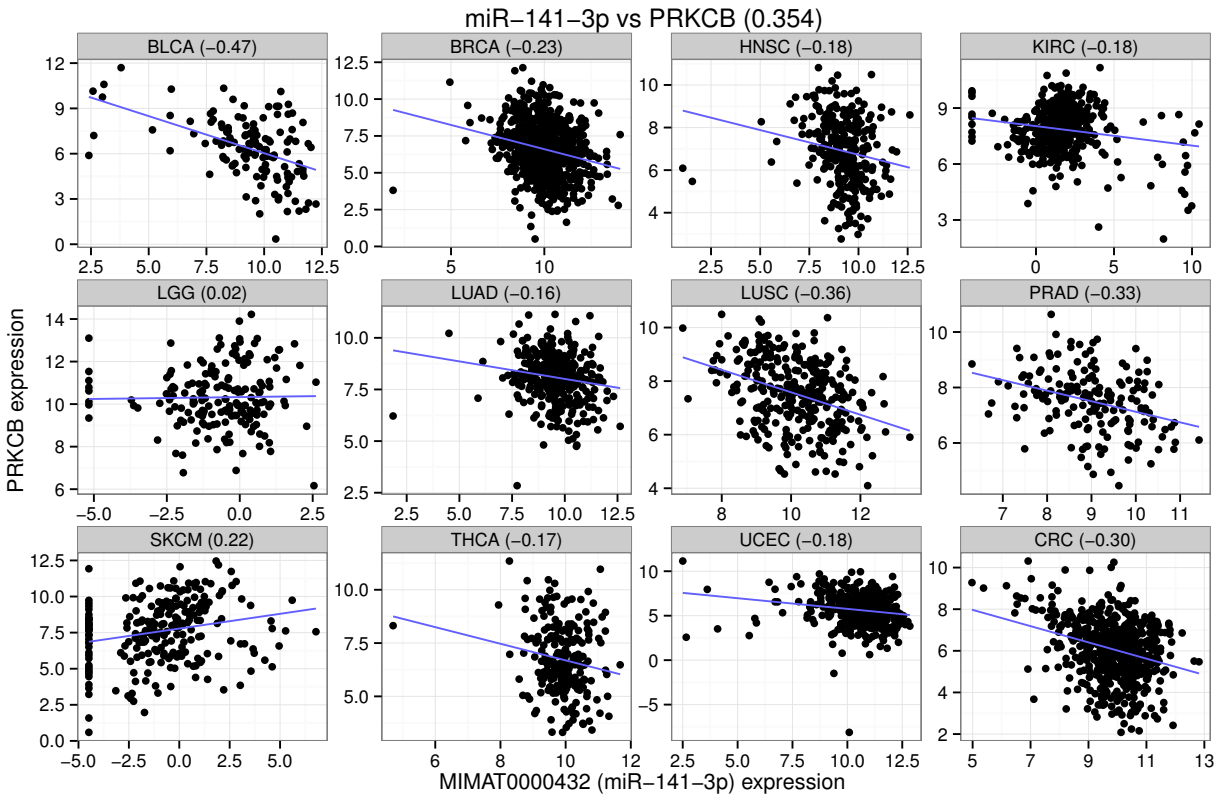
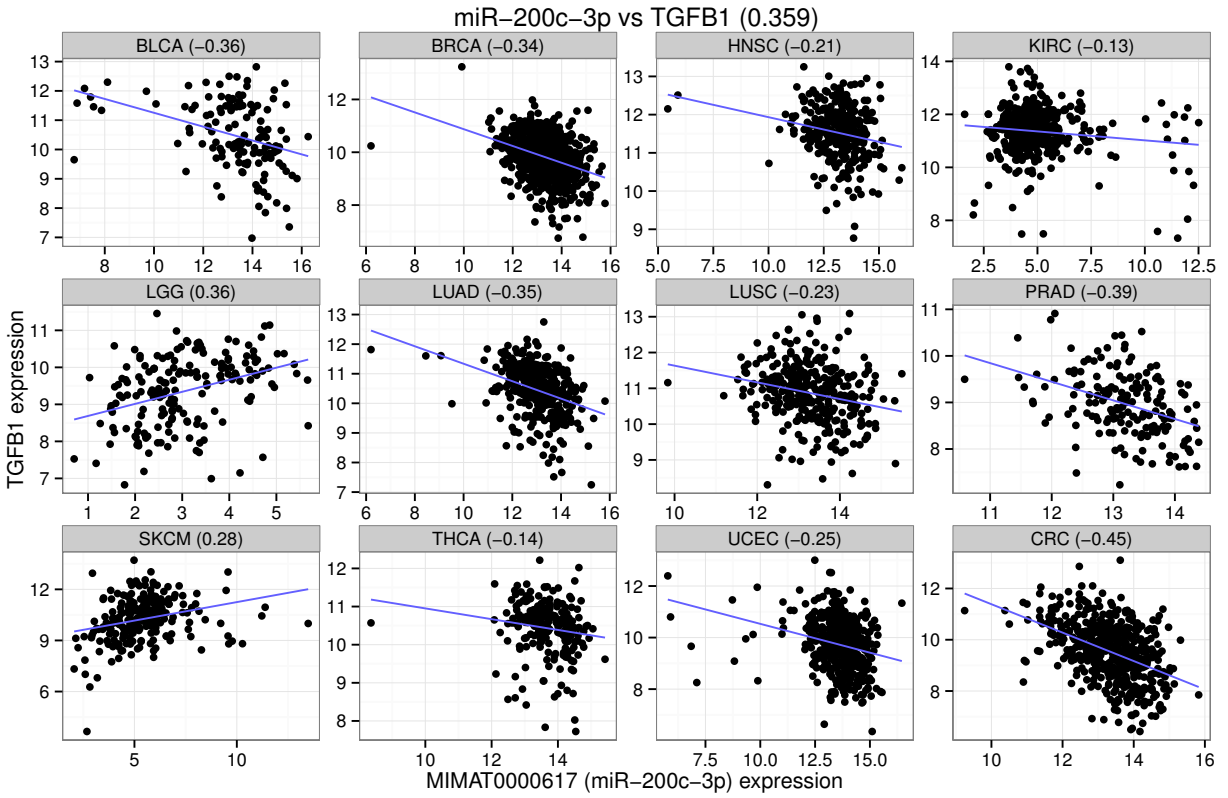


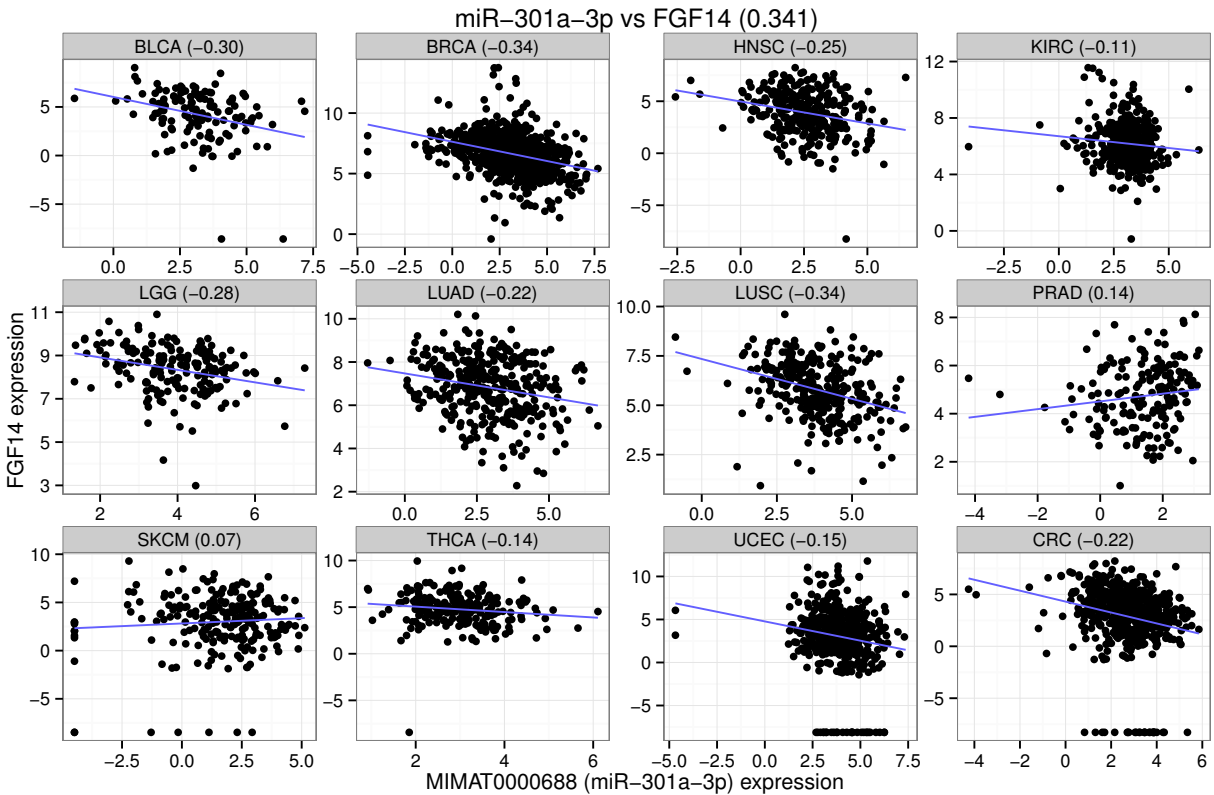
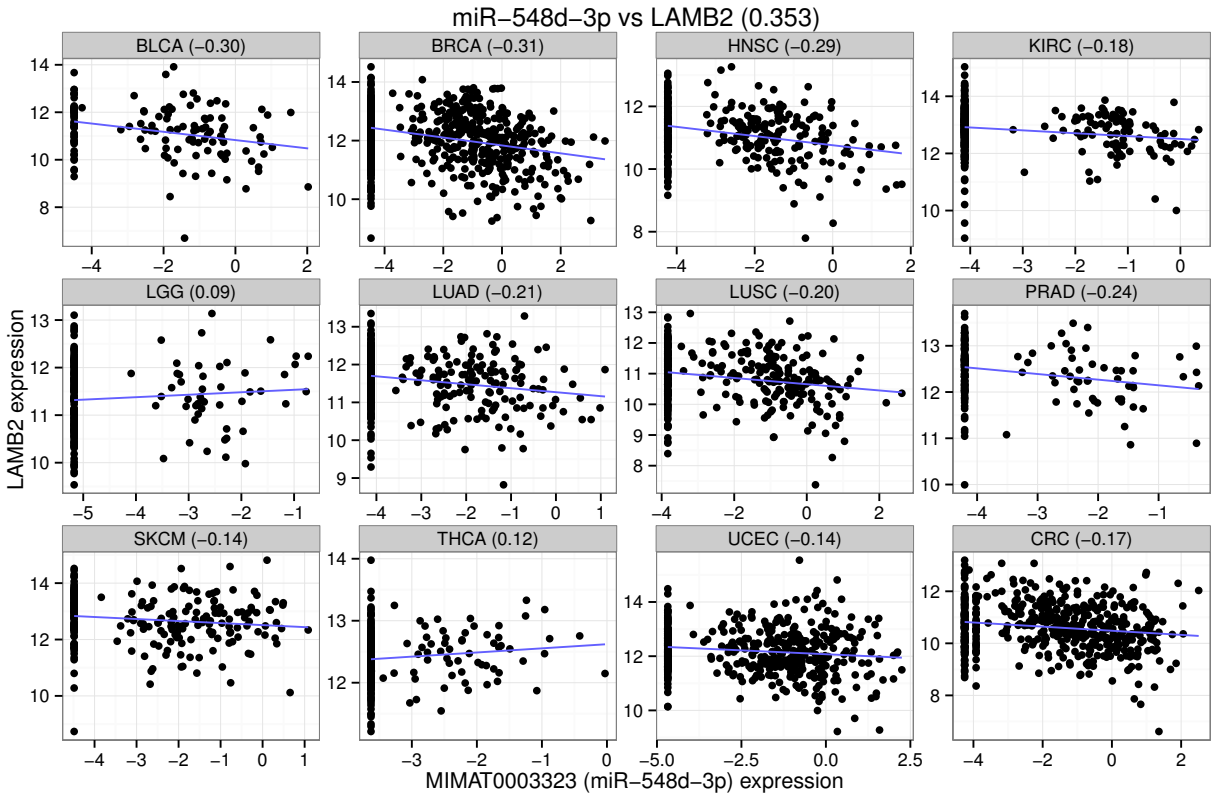


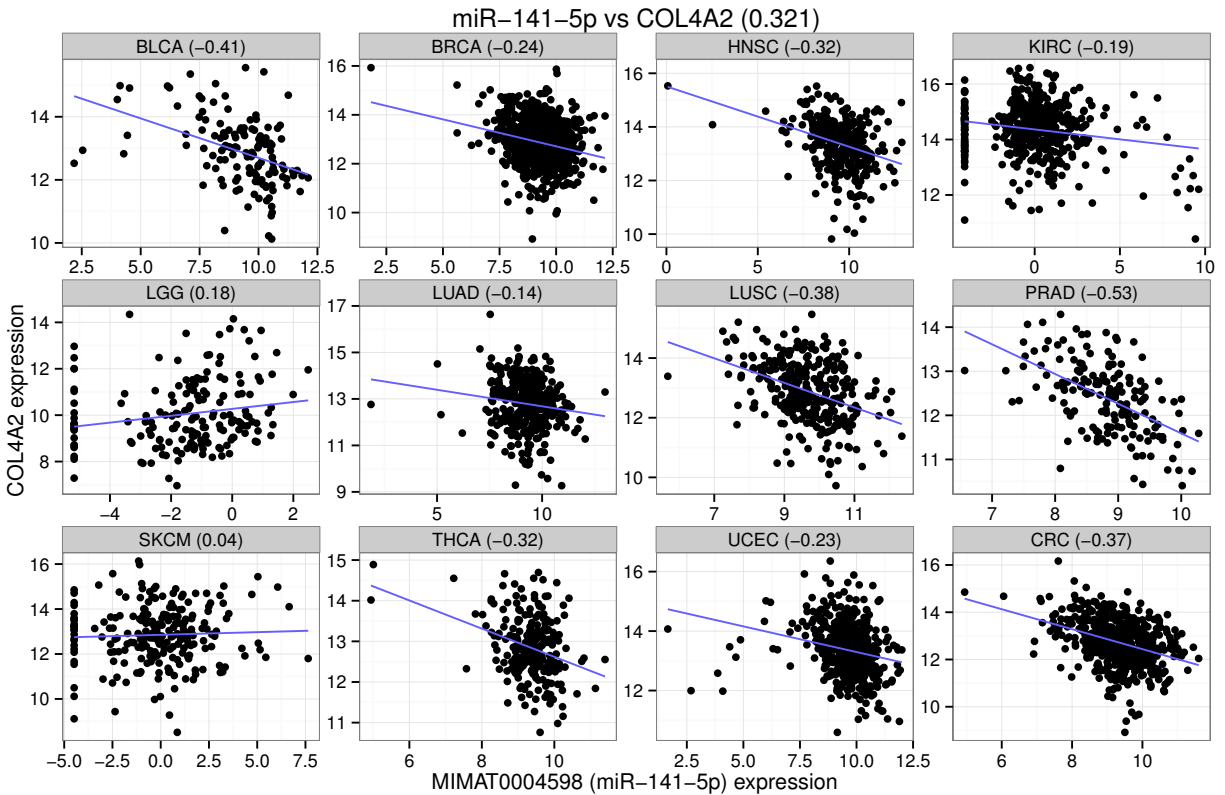
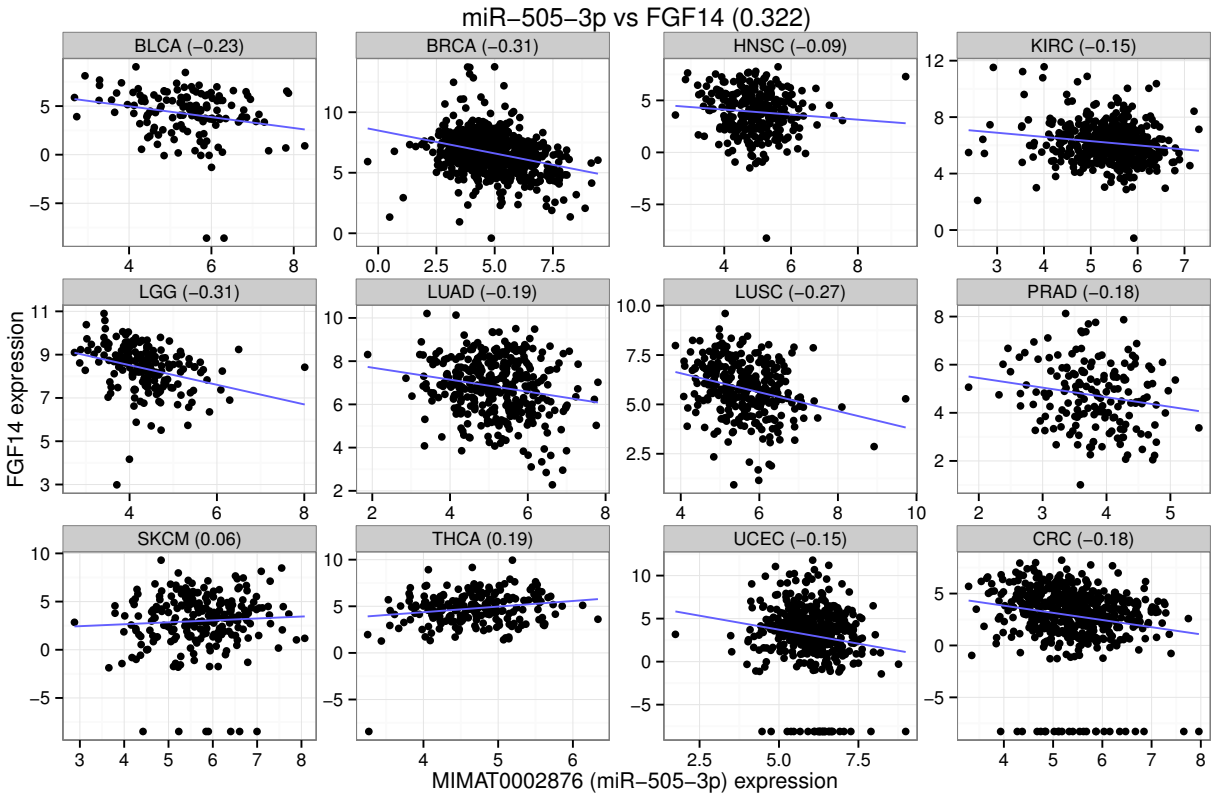




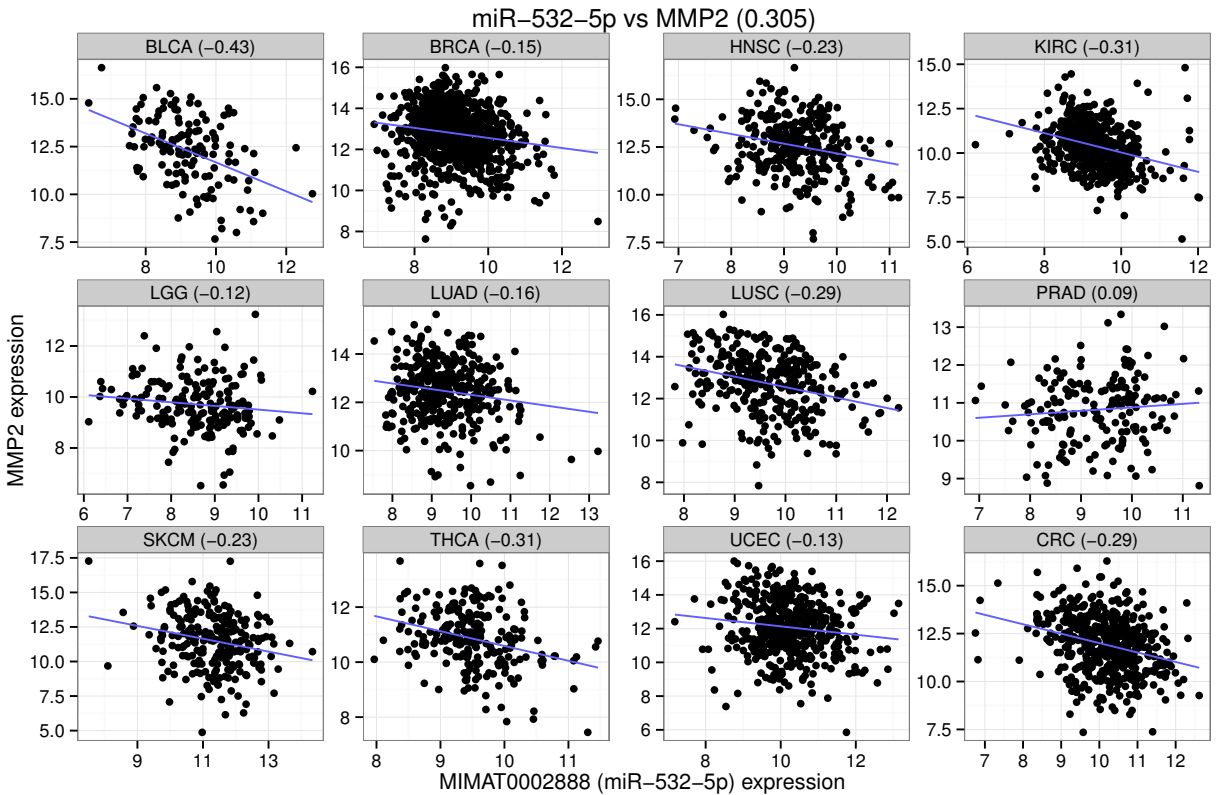
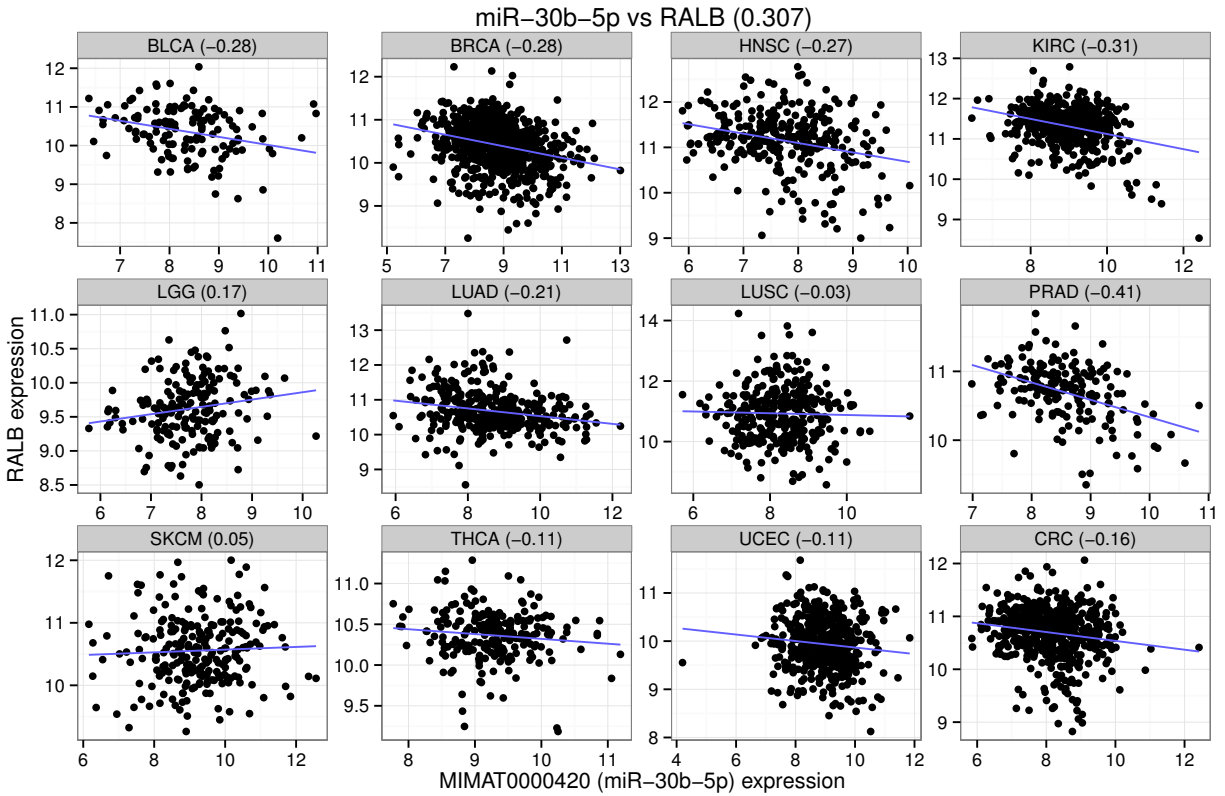


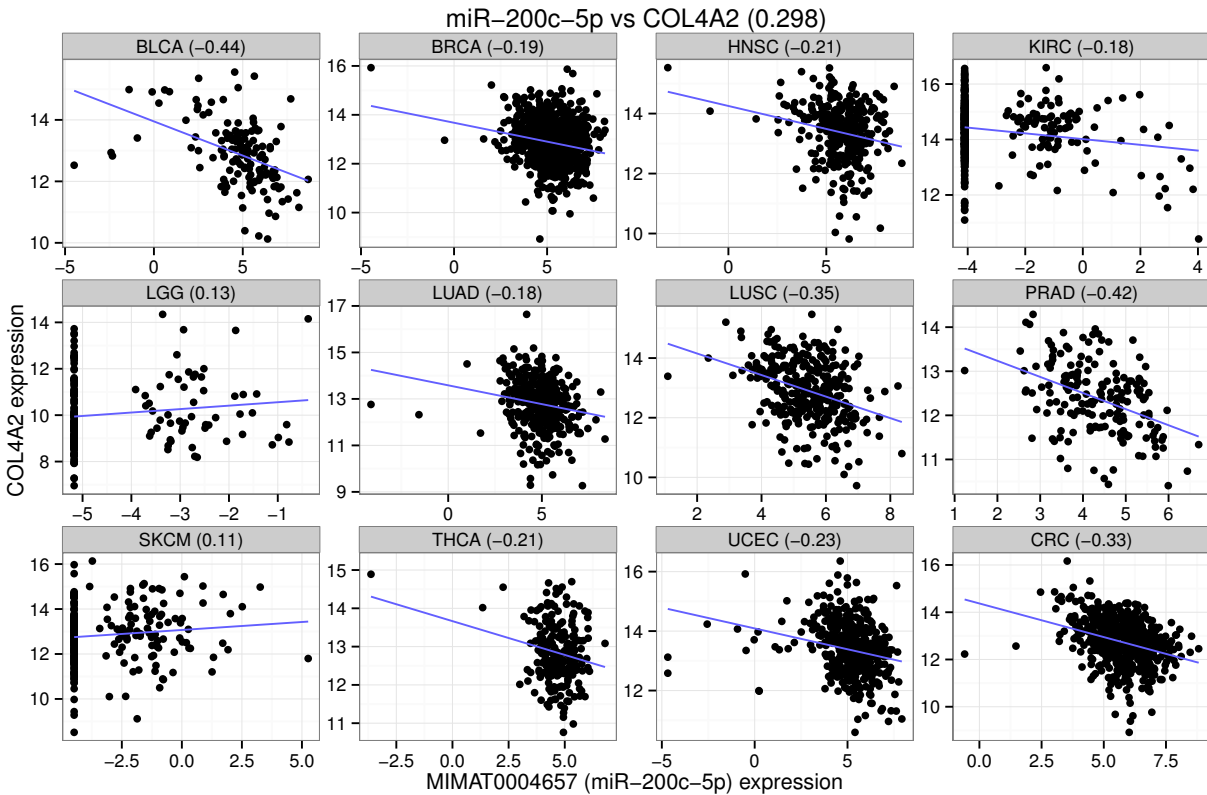
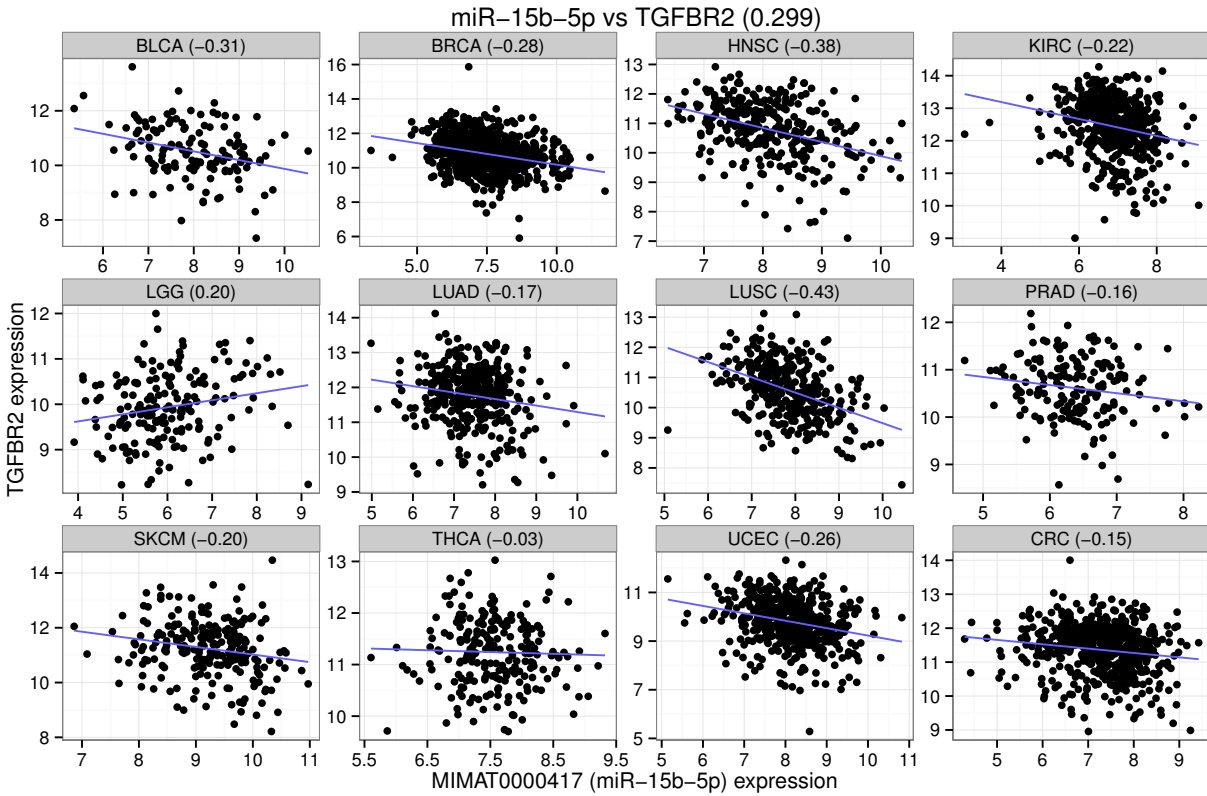


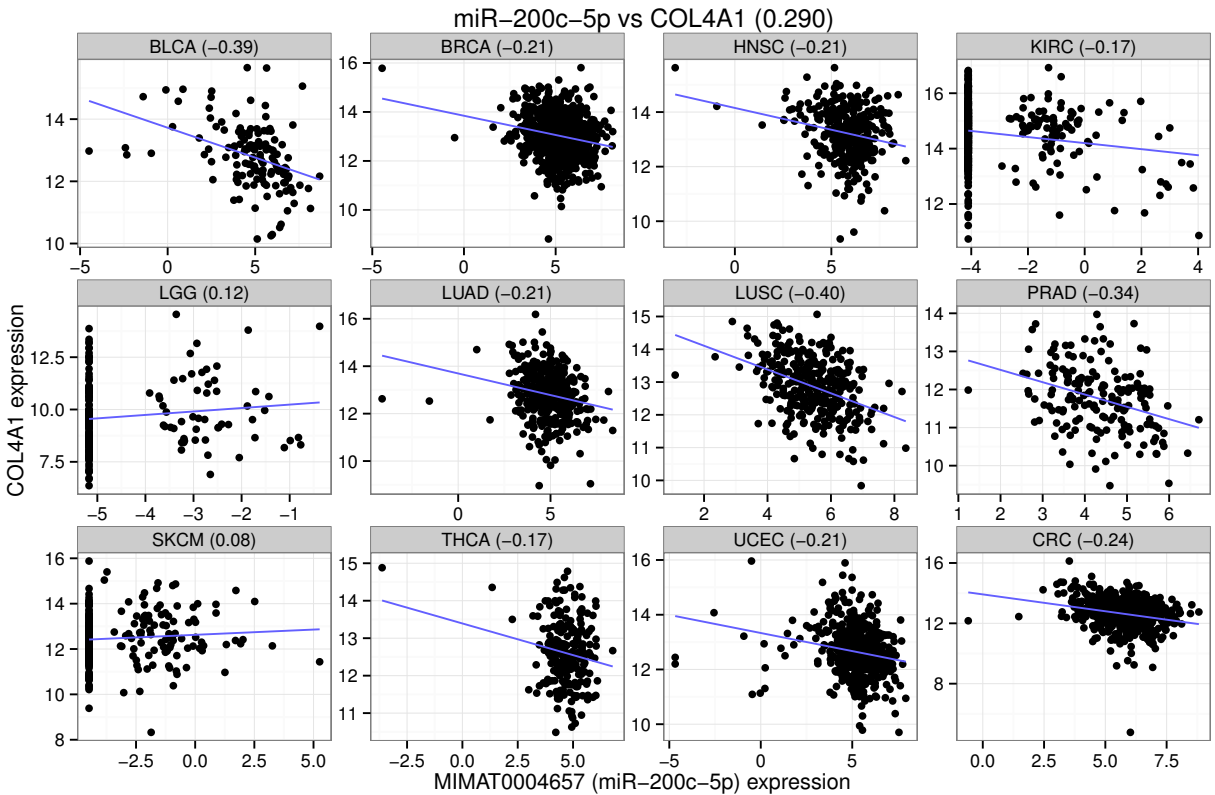
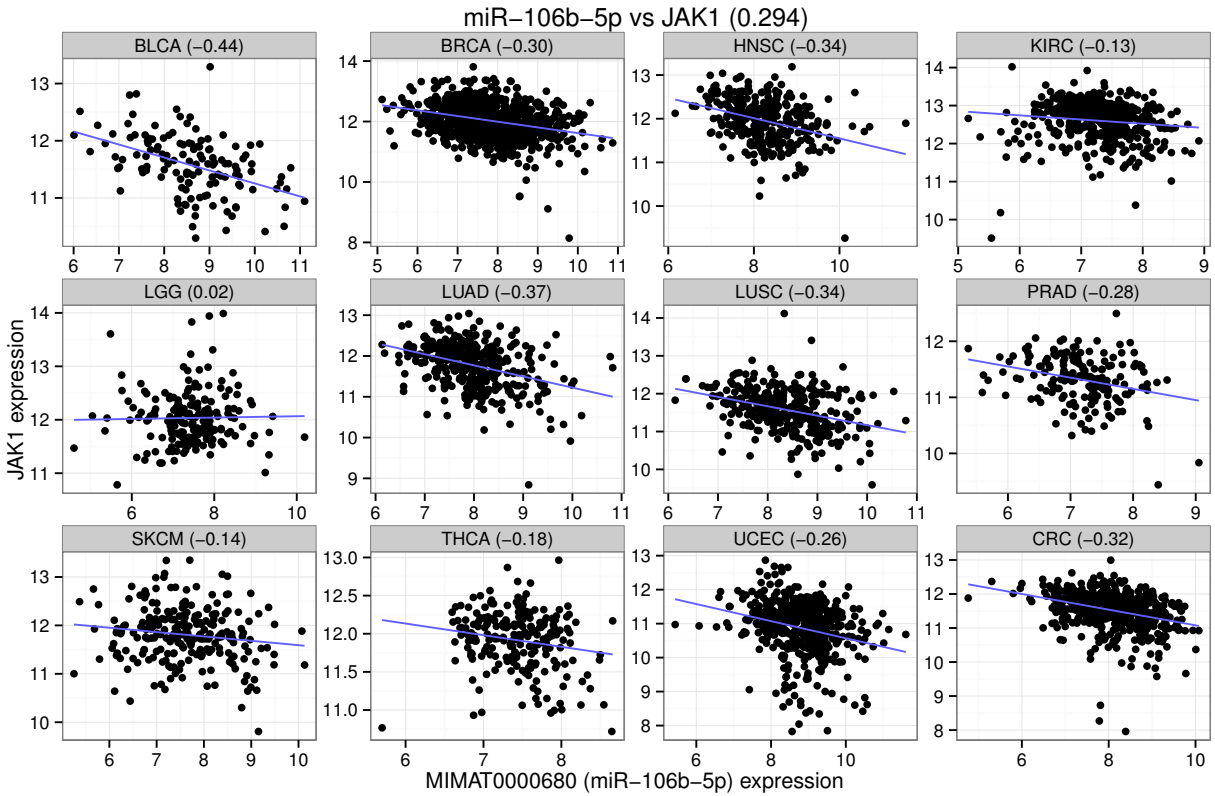


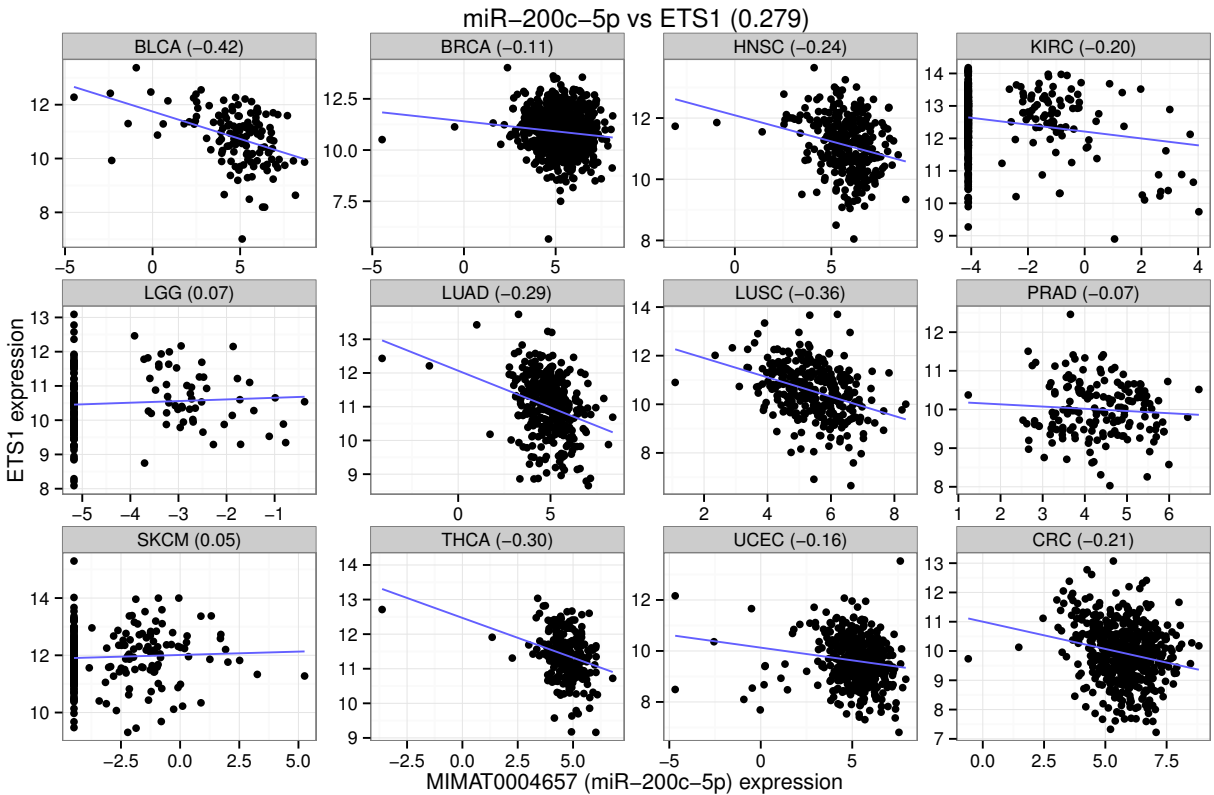
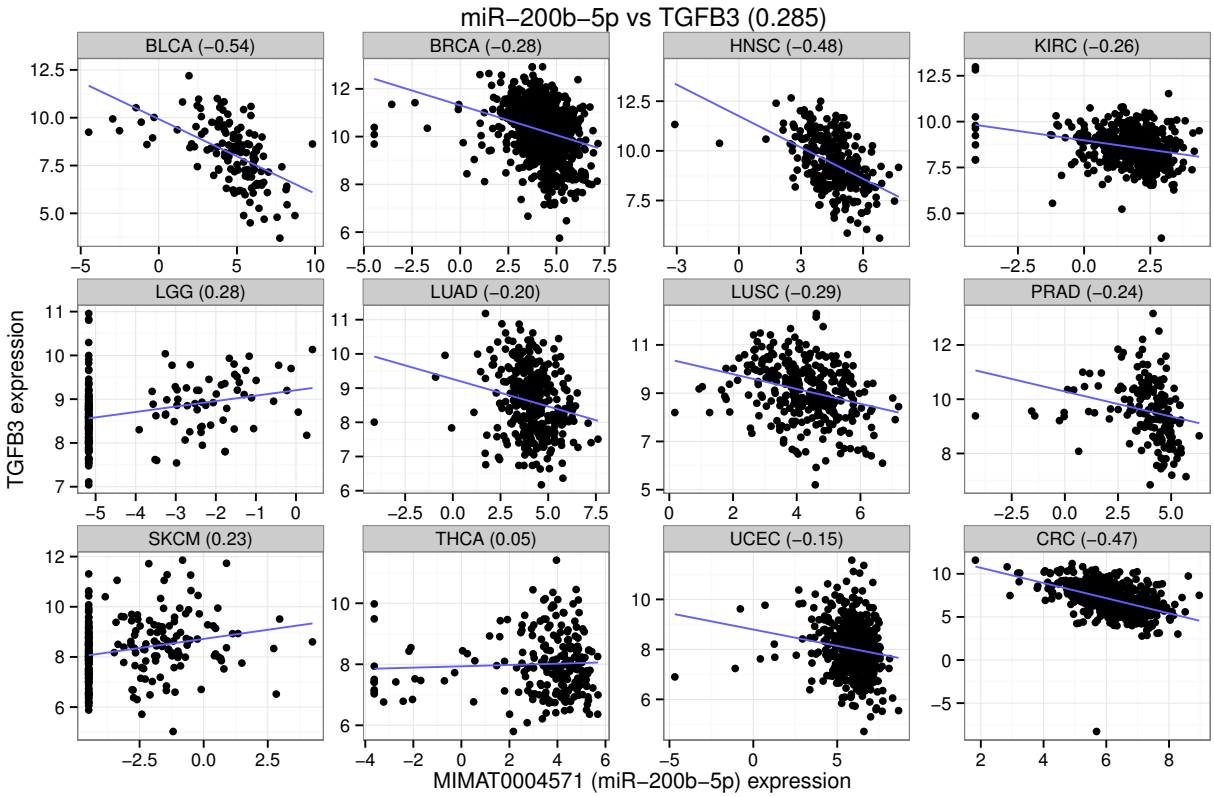


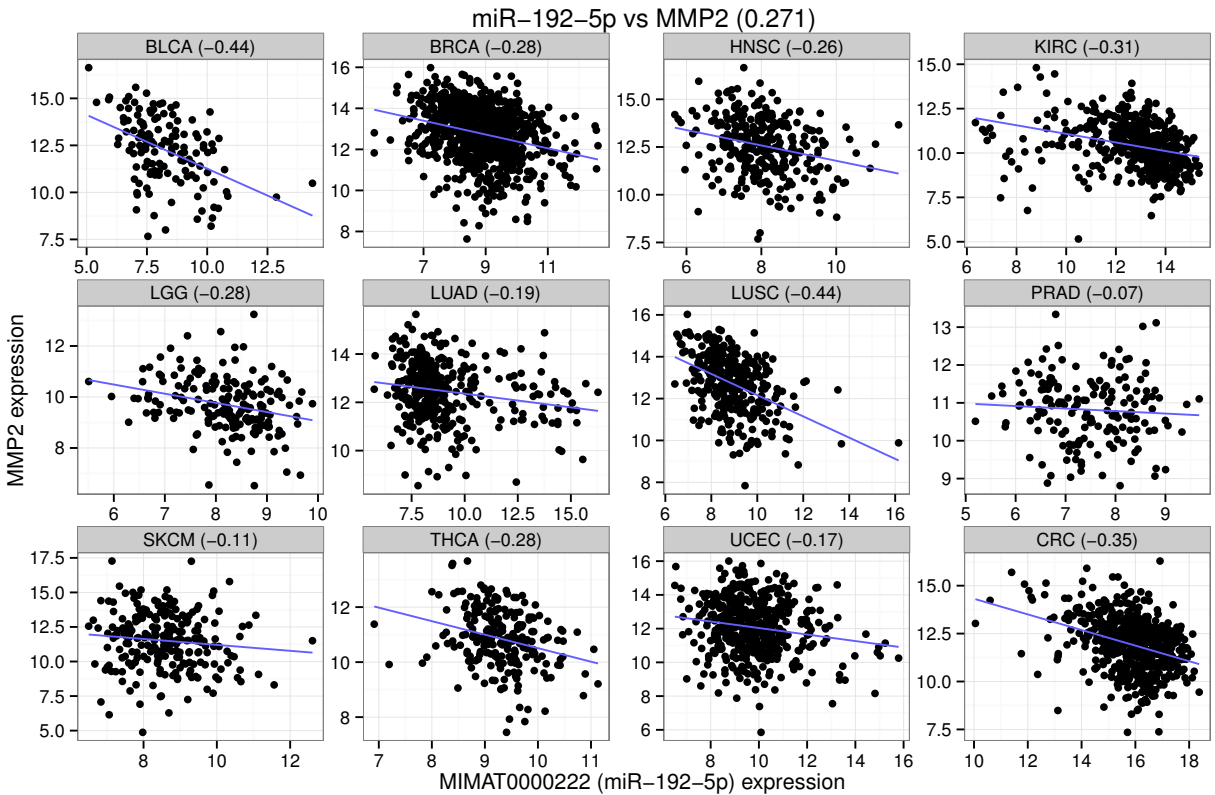
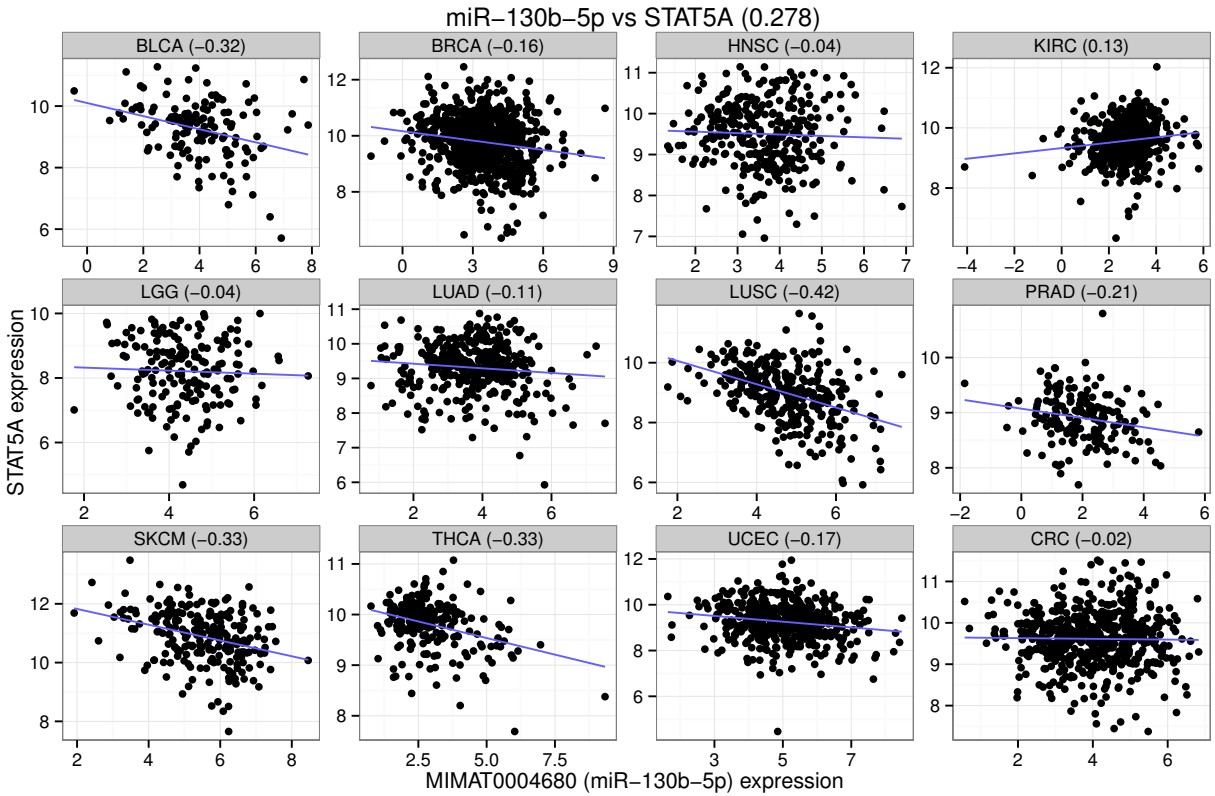


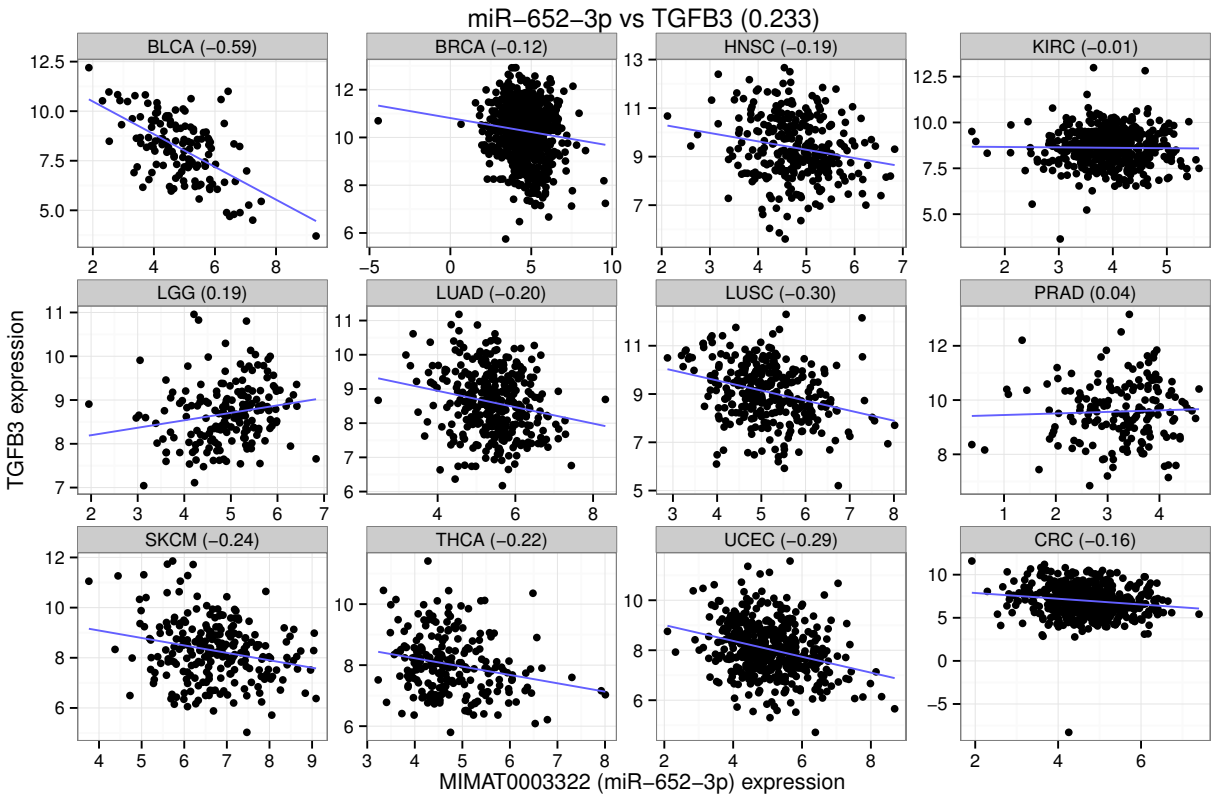
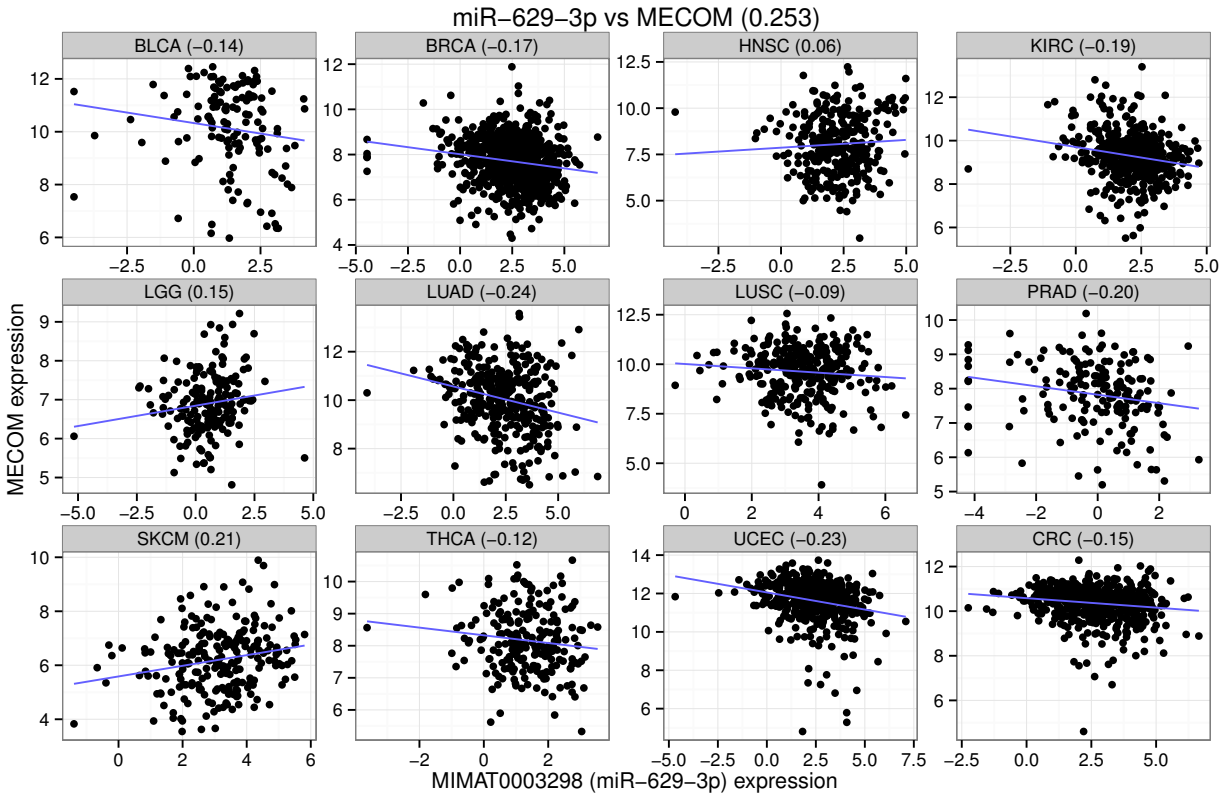


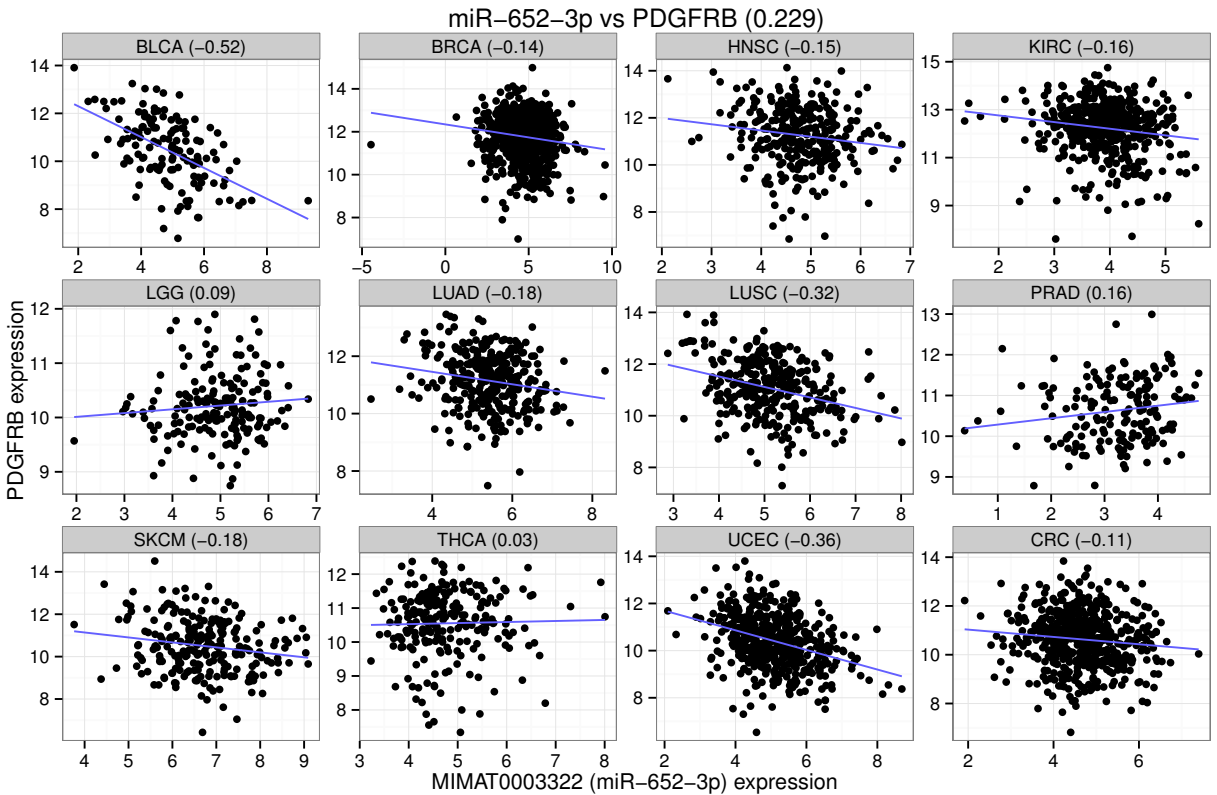
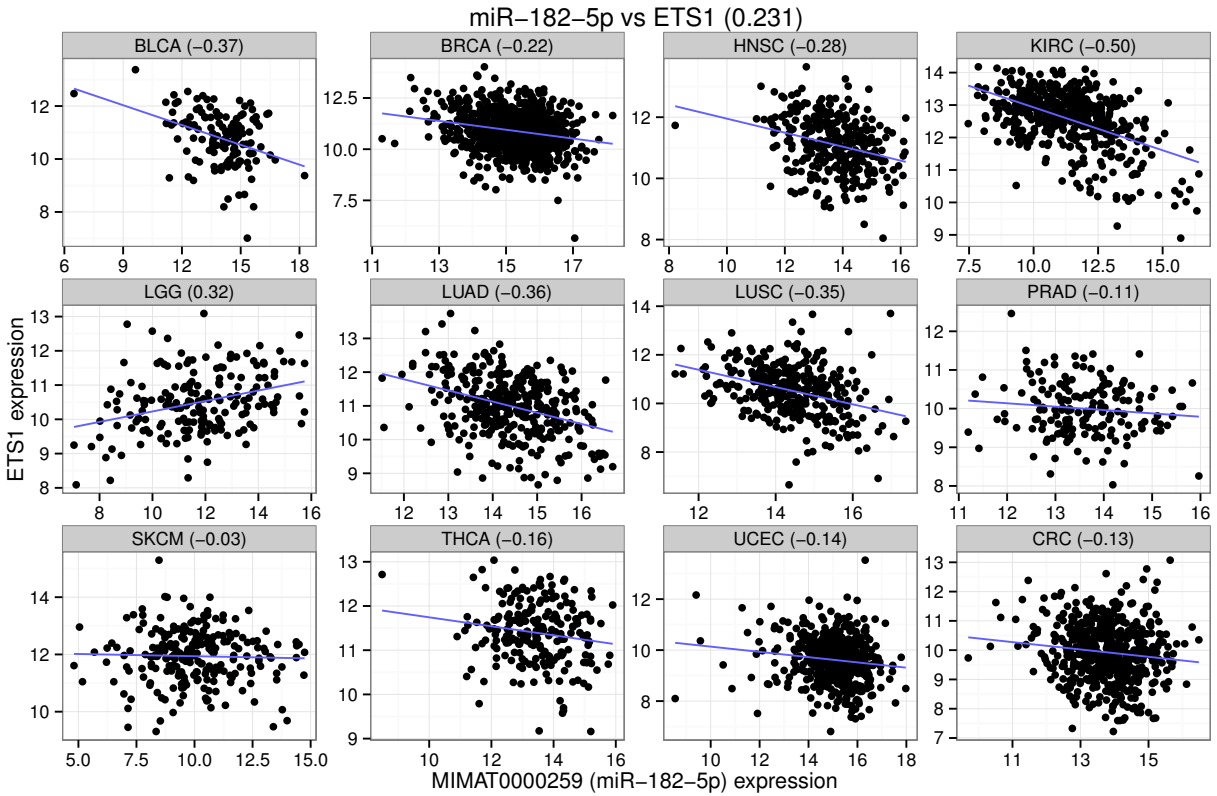


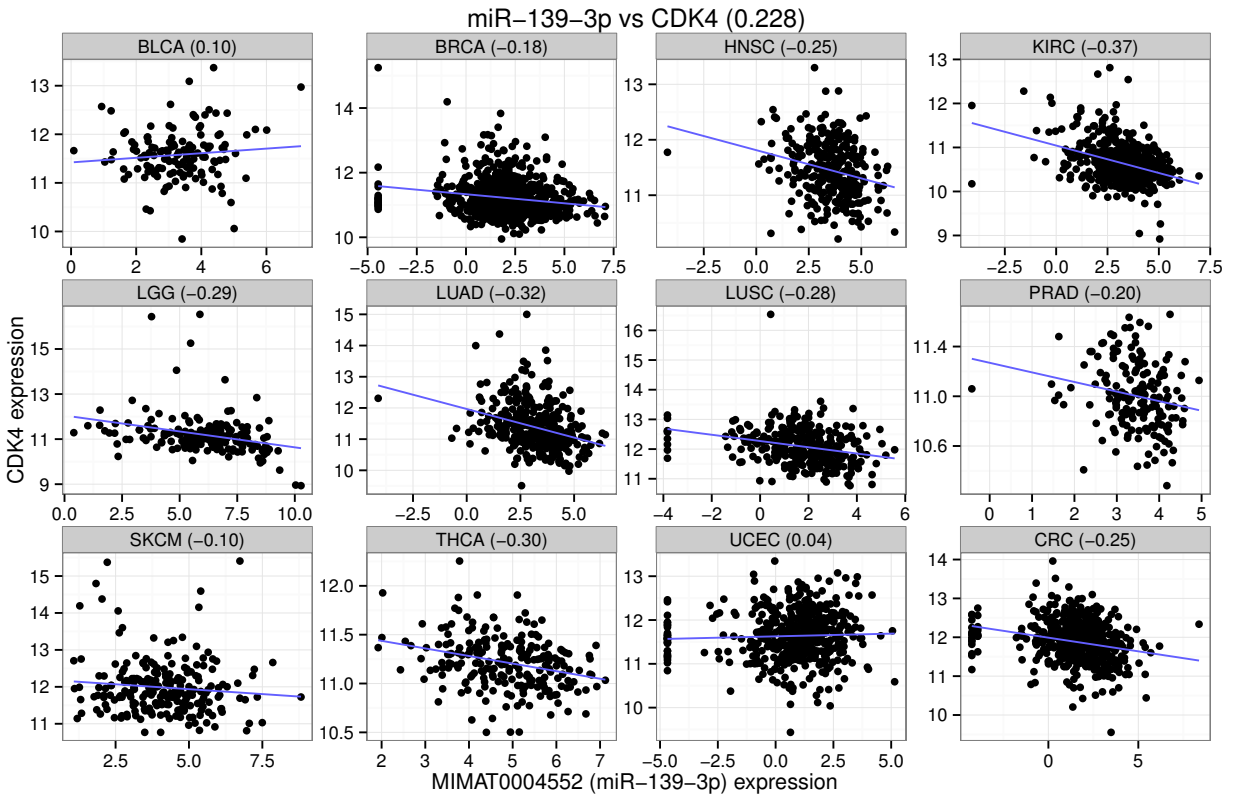
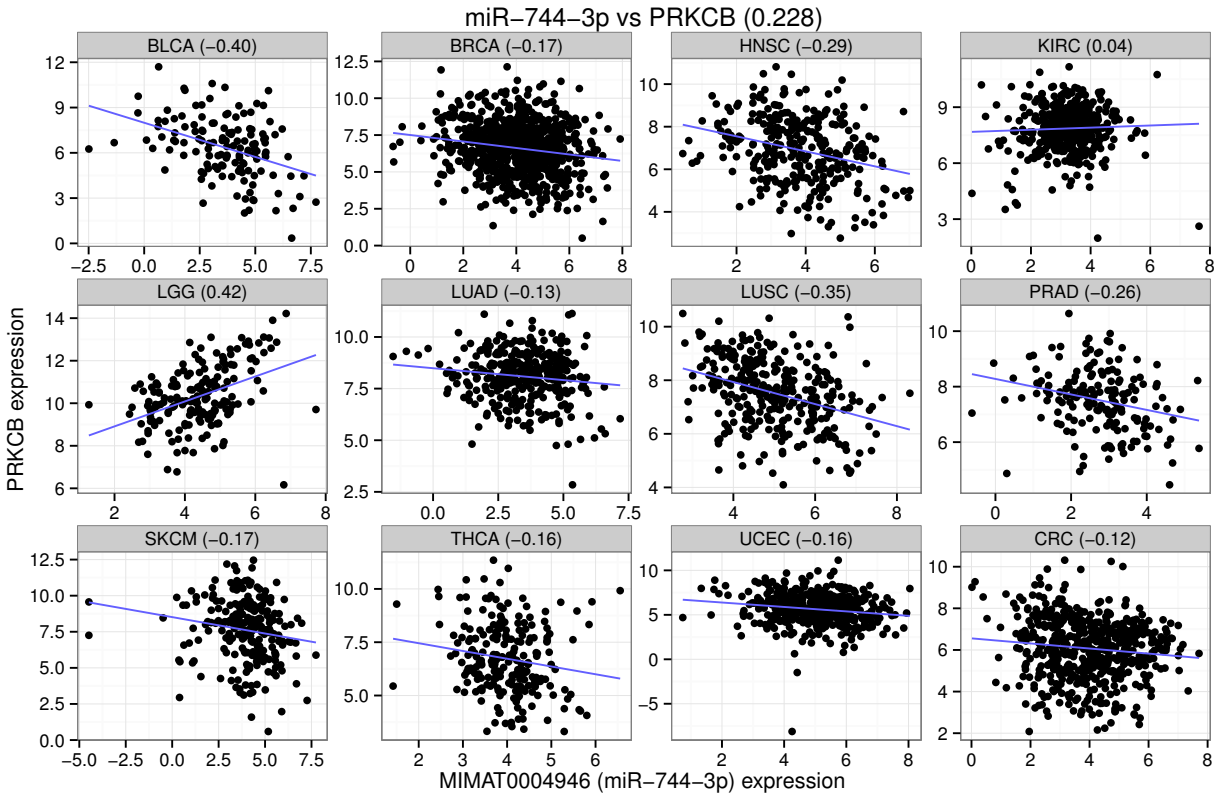




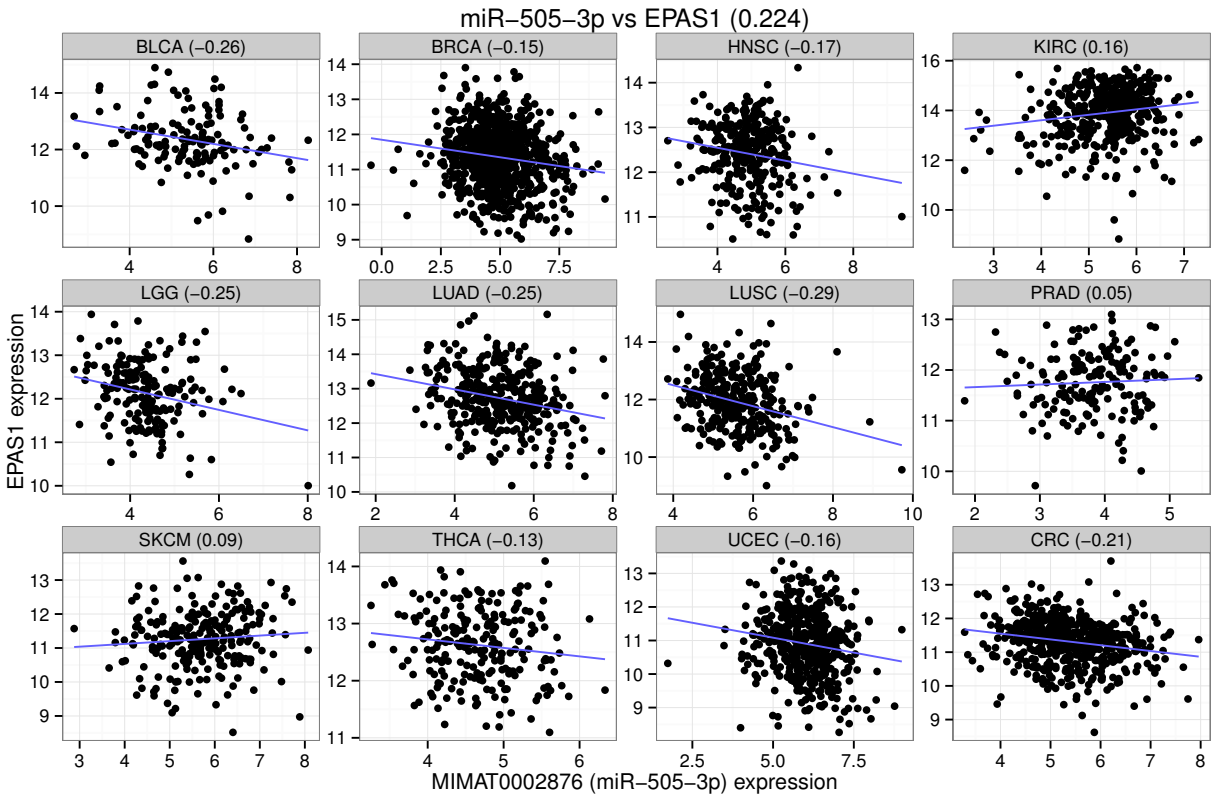
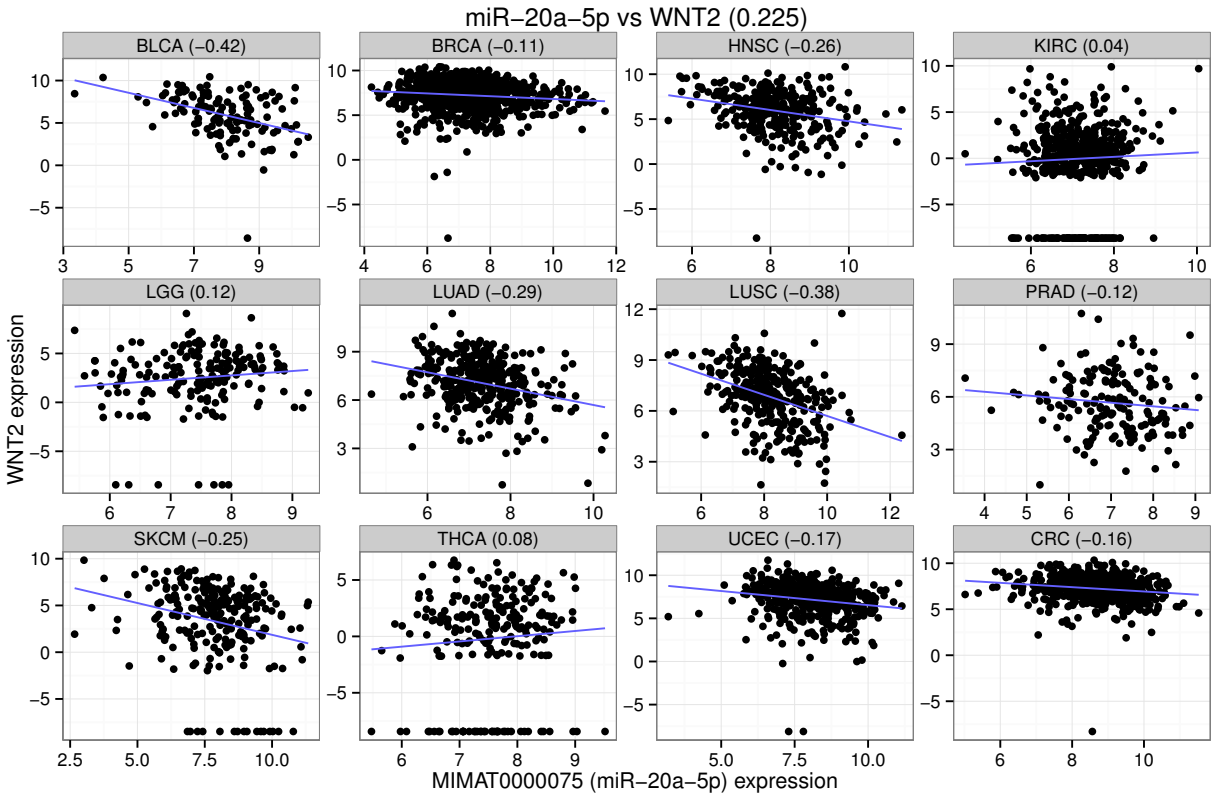


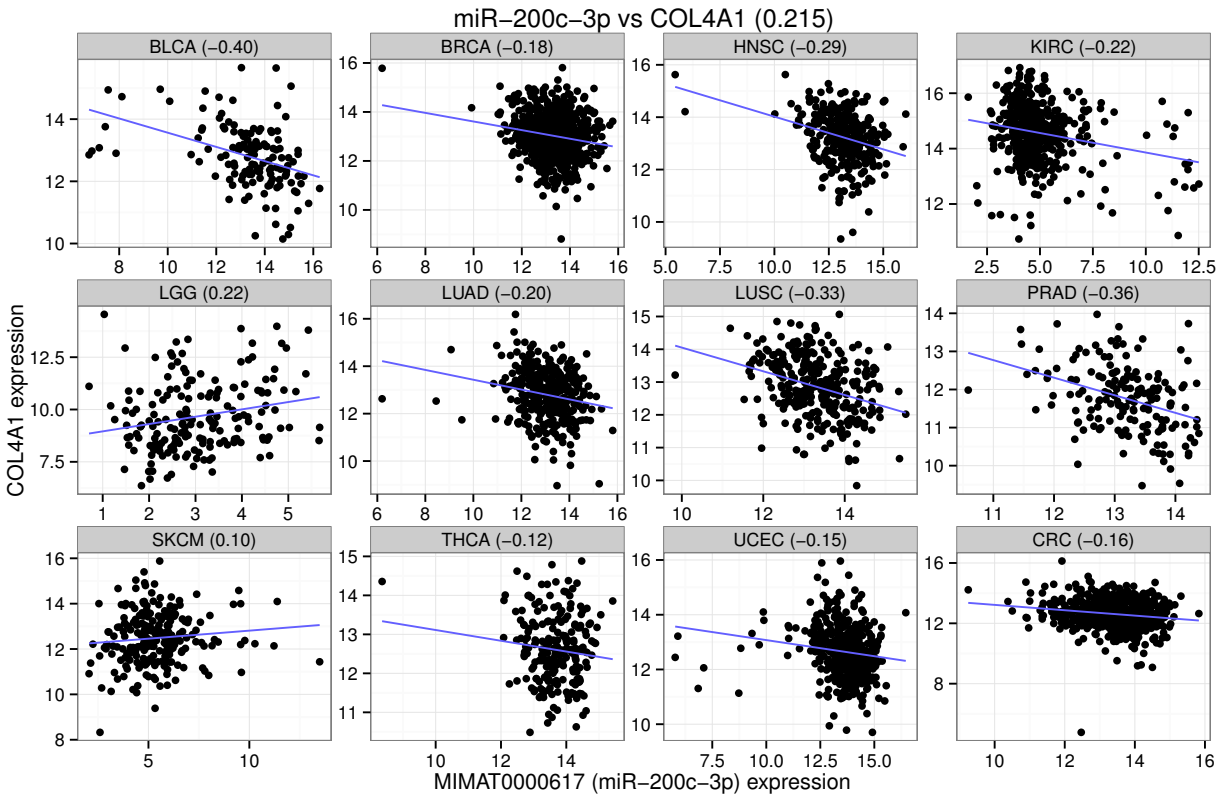
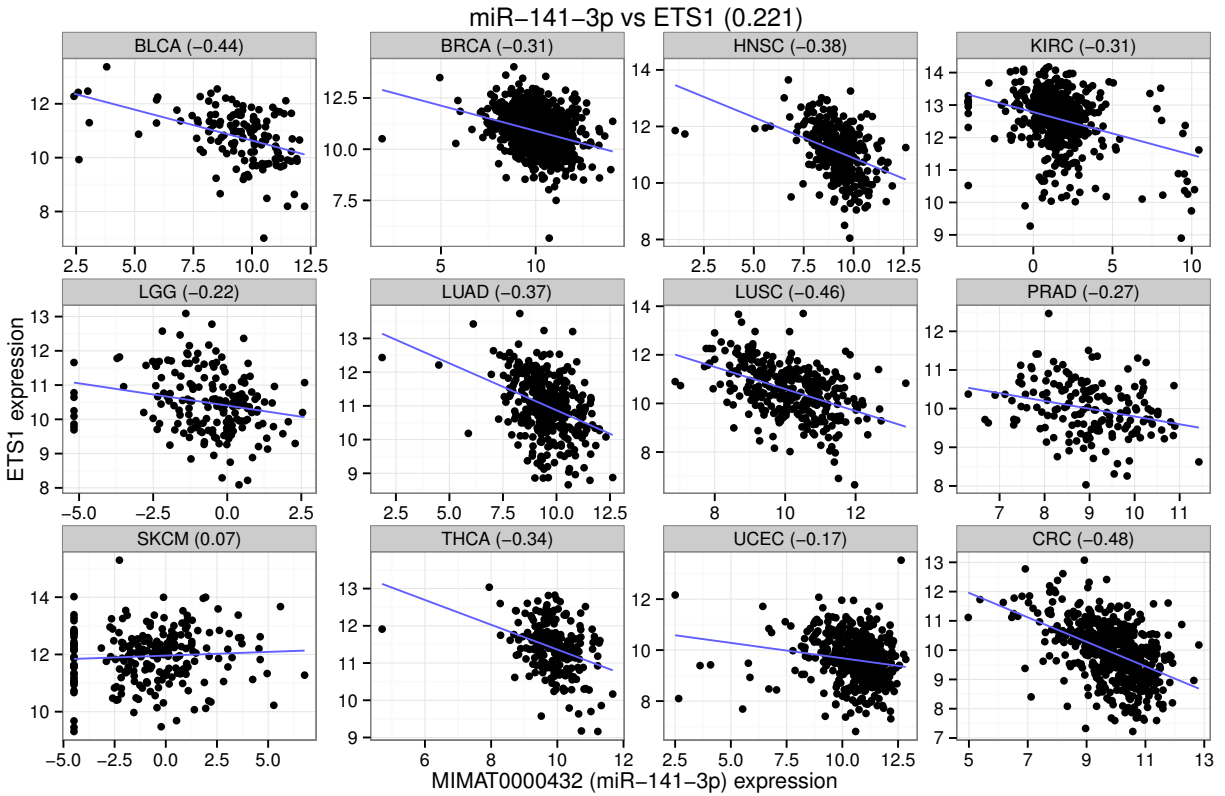


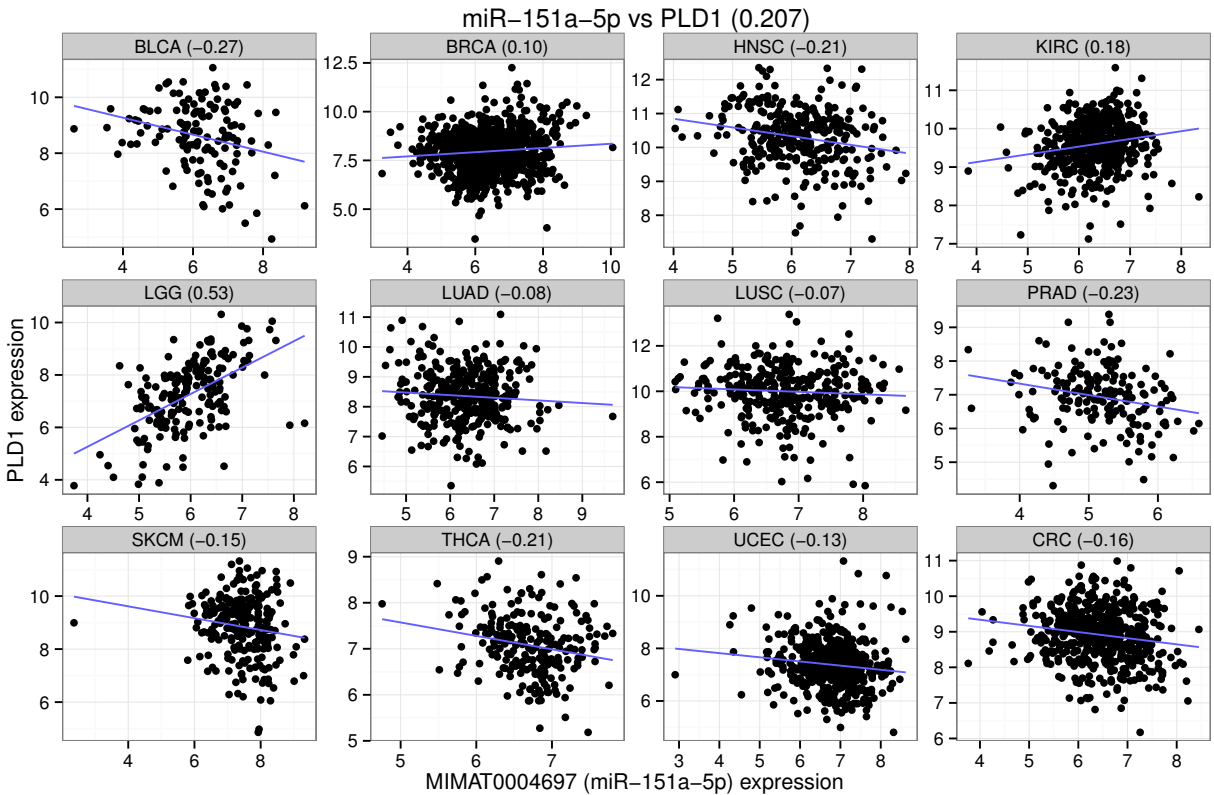
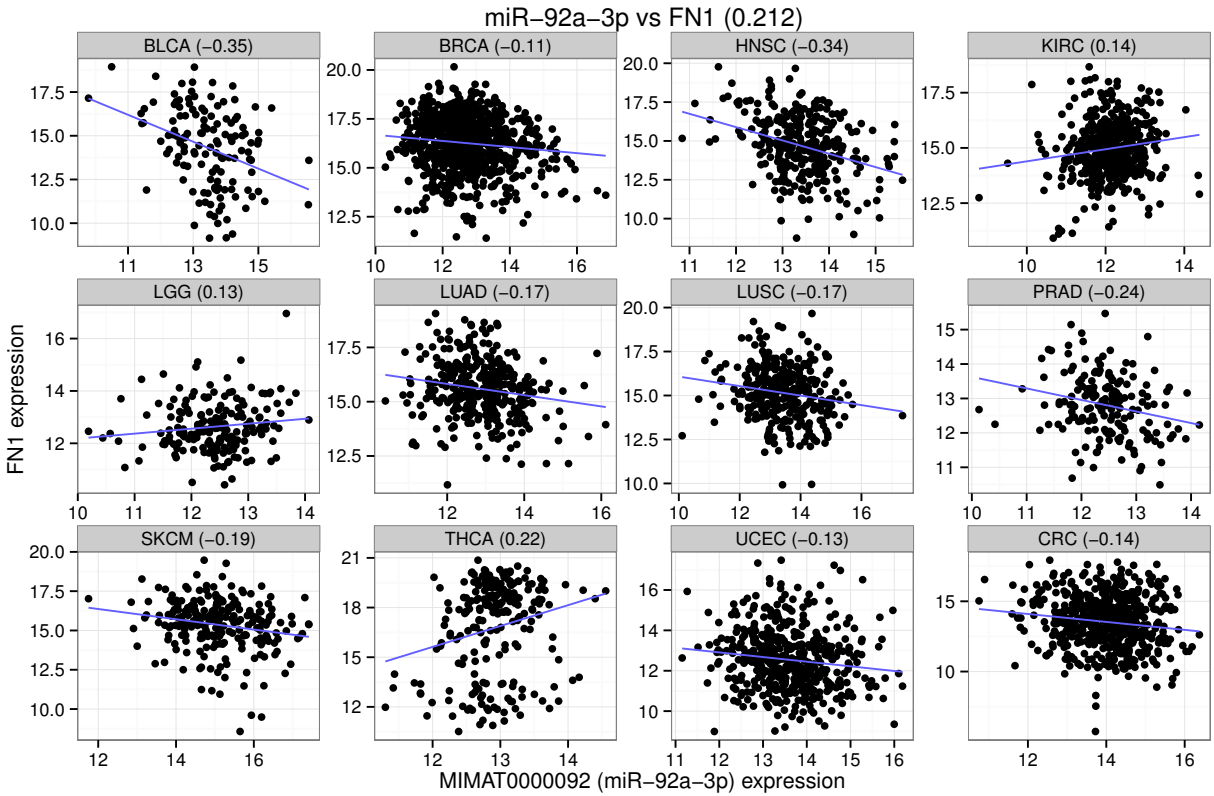












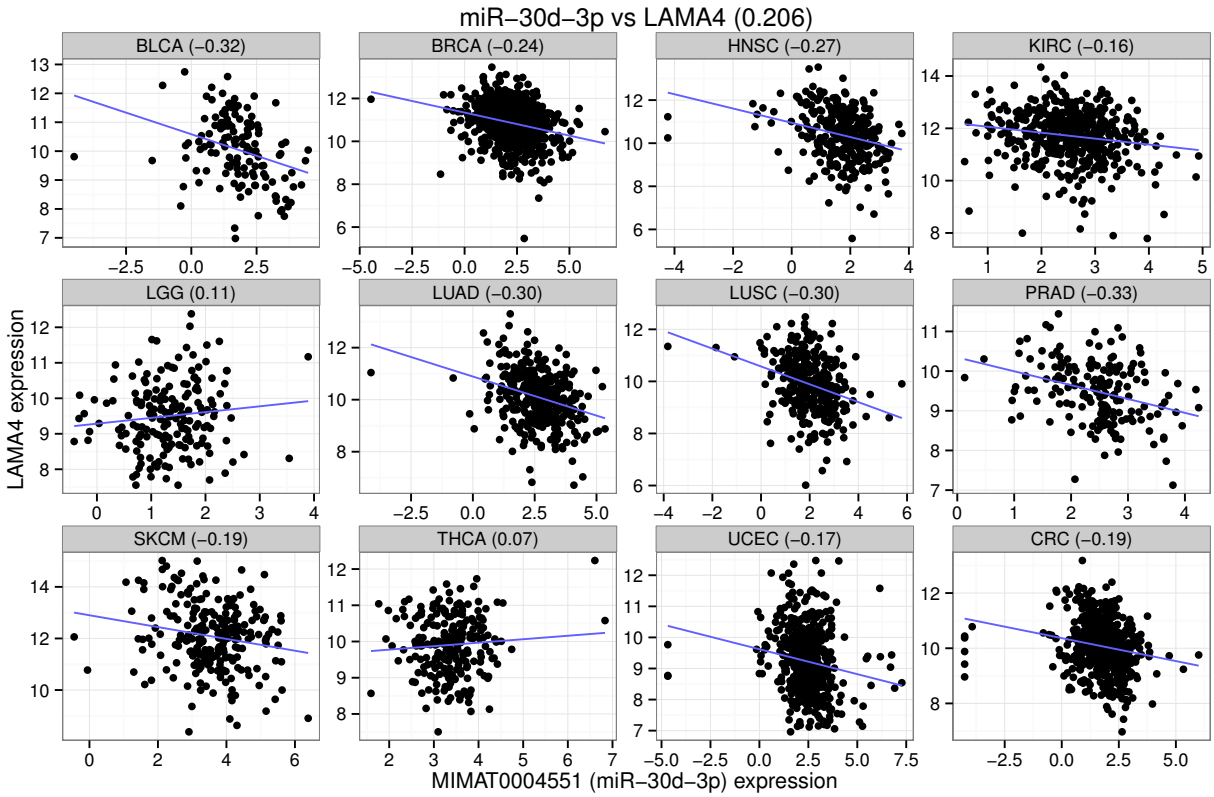


Figure S3: Scatter plot of the confidence miRNA-target pairs involved in the KEGG pathways in cancer. Each of the 12 panels represents a specific cancer type as indicated in the strip header. In each panel, each dot represents a sample with the coordinate determined by the corresponding miRNA (x-axis) and target expression (y-axis).

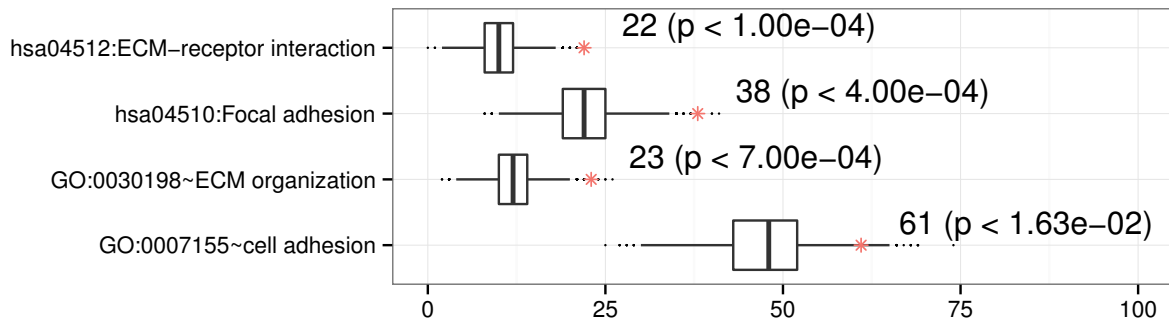


Figure S4: **Empirical distribution of random gene counts involved in the four select GO-BP or KEGG pathways.** We randomly sampled 1480 interactions from the  $\sim 1.8$  million interactions and counted the number genes involved in each of the four GO terms or KEGG pathways related to ECM receptor interaction/organization or cell/focal adhesion. The distribution for each gene set were displayed as boxplot, and the red asterisk indicate the location of the observed gene counts. P-values were calculated by the fraction of gene count in a million samplings that have gene count greater than the corresponding observed values:  $p = 10^{-6} \sum_{i=1}^{10^6} I(N_i > N_o)$ , where  $N_i$  and  $N_o$  are the number of gene hits in the randomly sampled and the observed gene hits in the recurrent interactions, respectively;  $I(\cdot)$  is a binary indicator that gives 1 for a true statement and 0 otherwise.

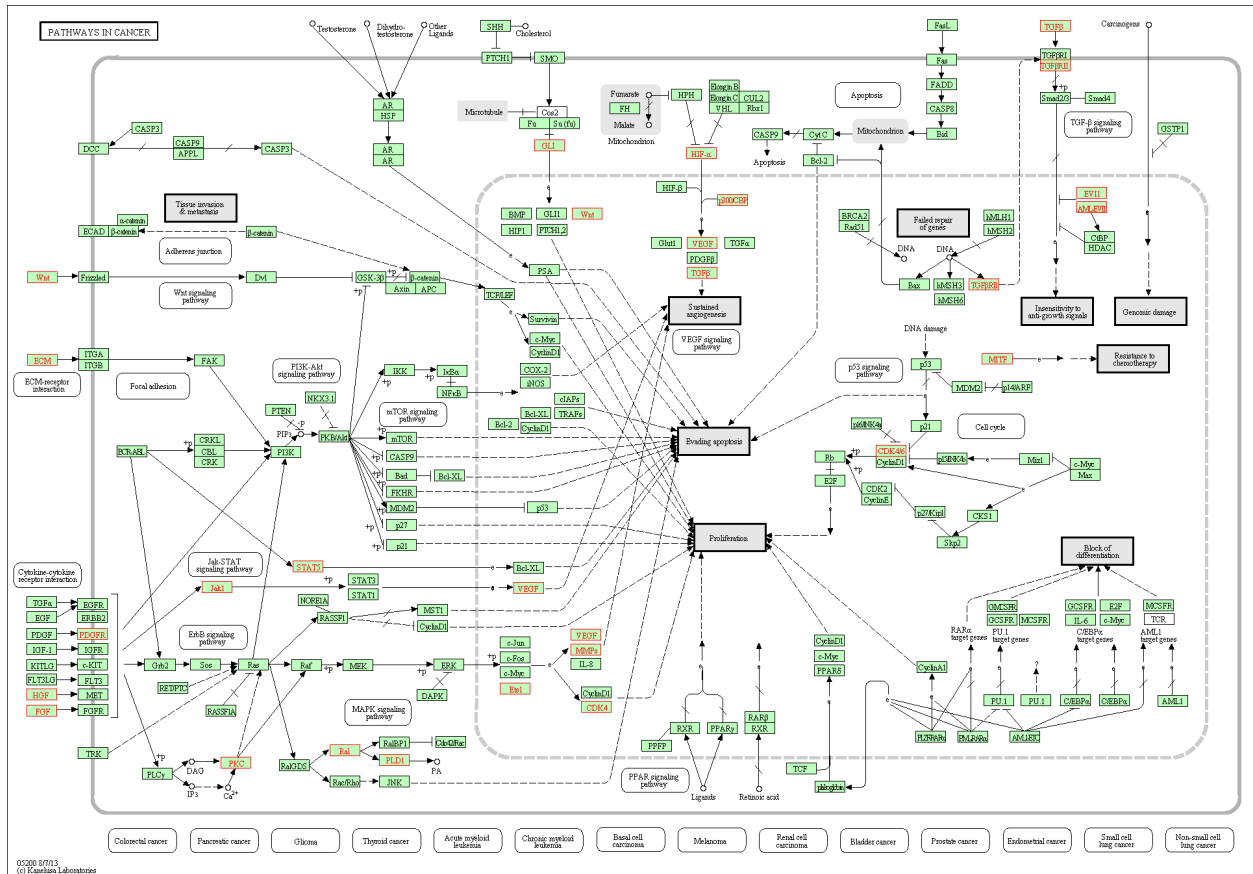


Figure S5: The original screenshot of the KEGG ECM-receptor interactions. The highlighted boxes indicating the targets involved in the recurrent miRNA regulatory network.

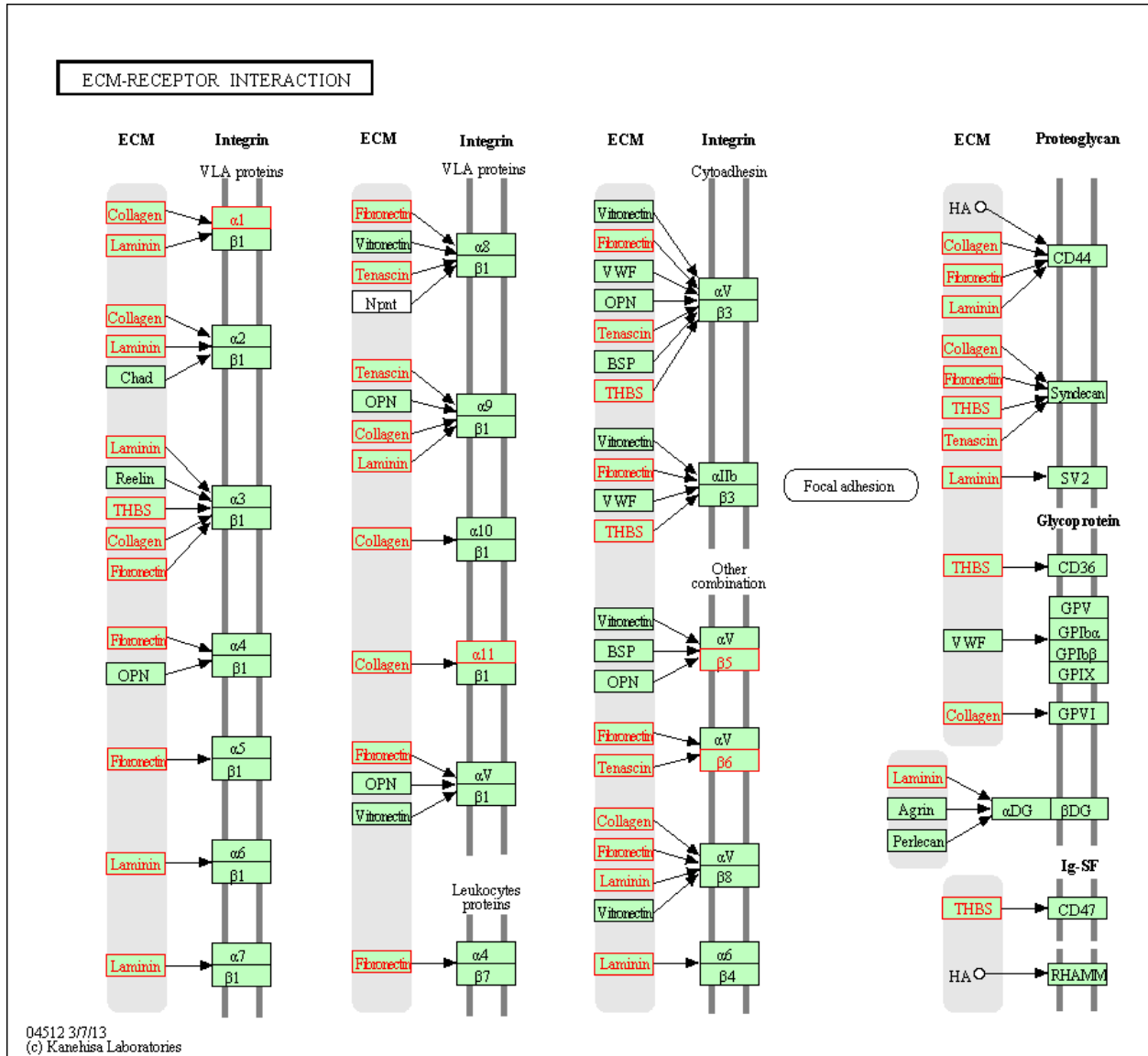
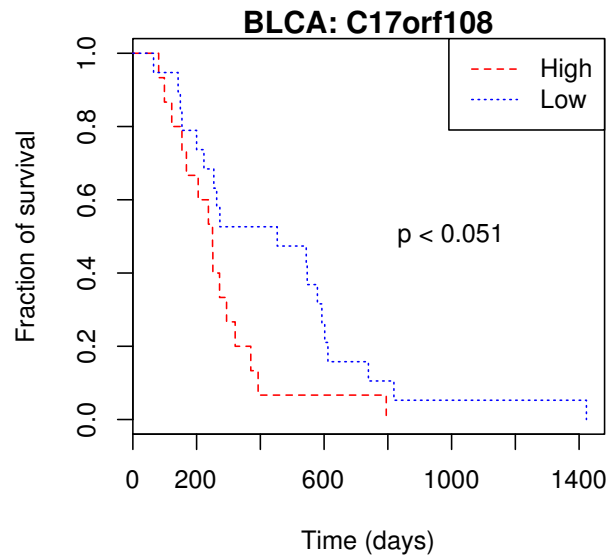
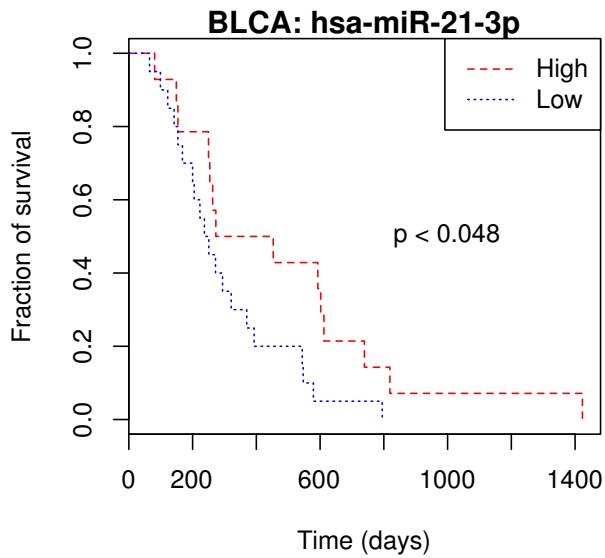
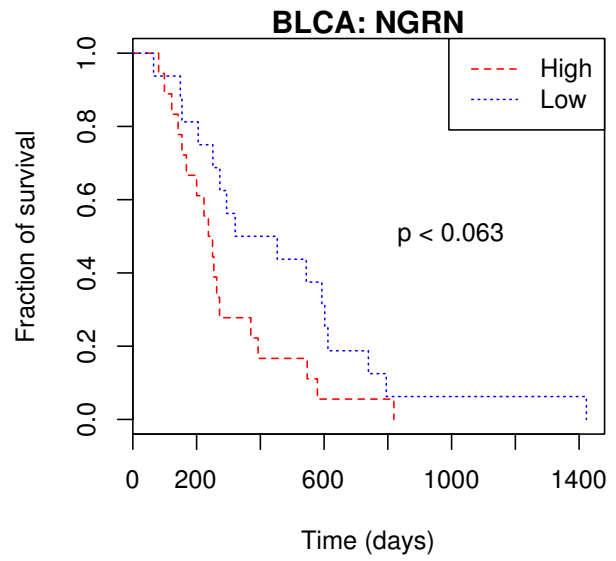
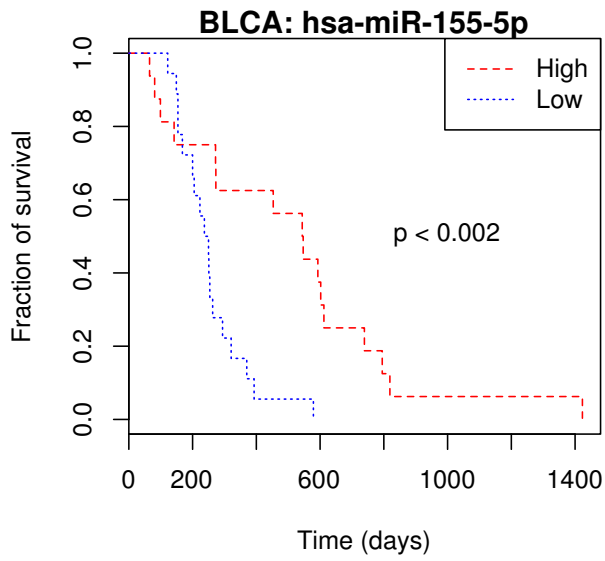
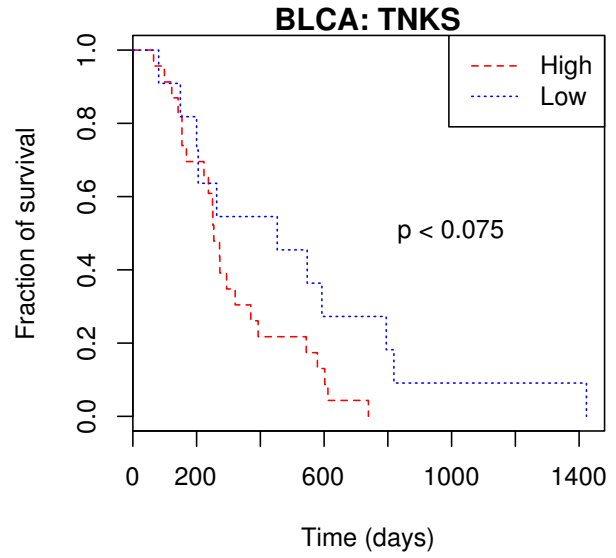
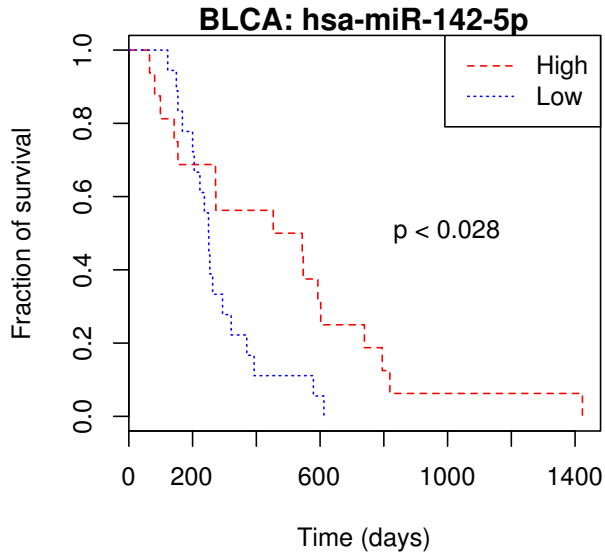
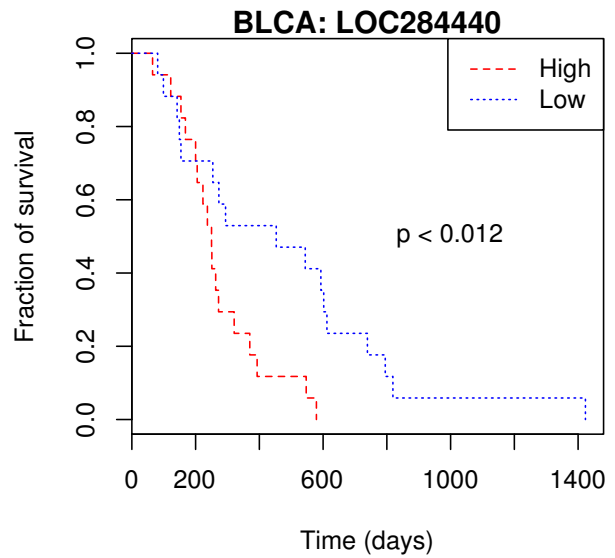
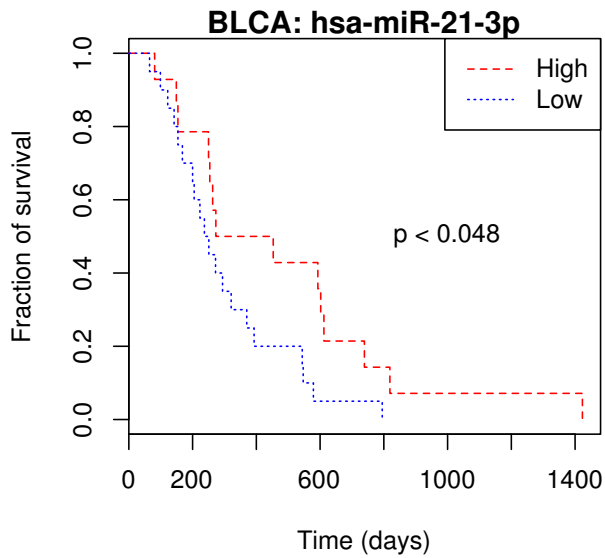
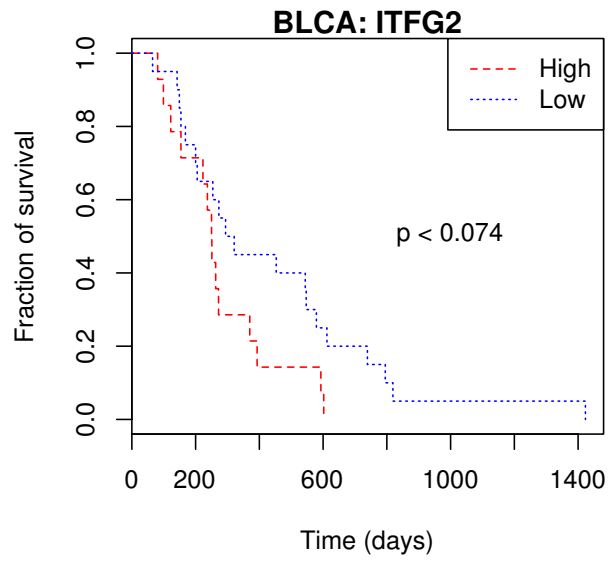
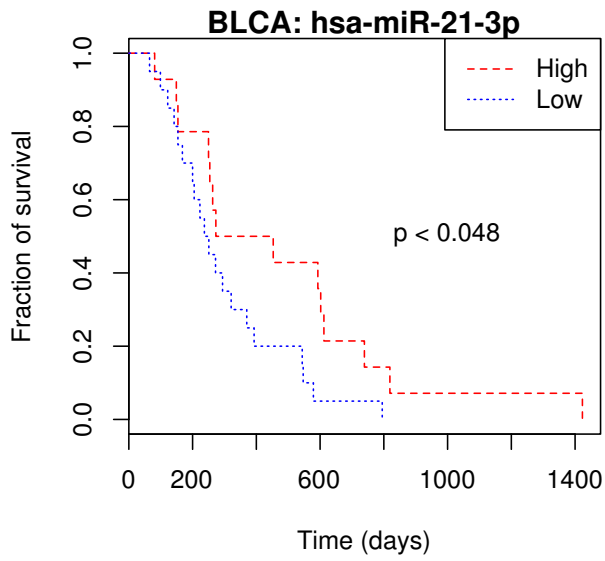
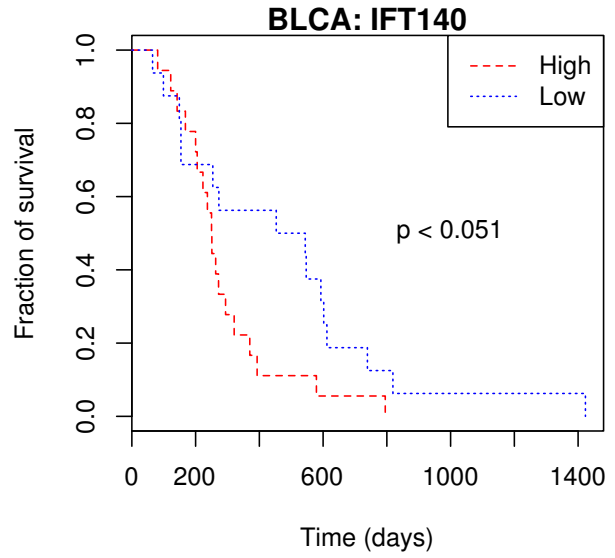
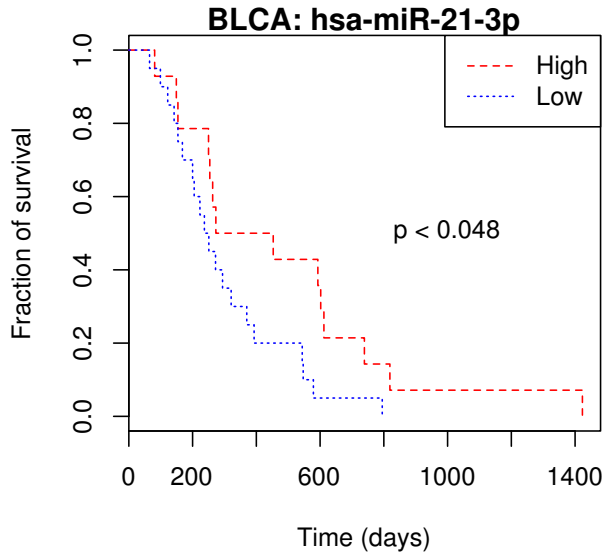
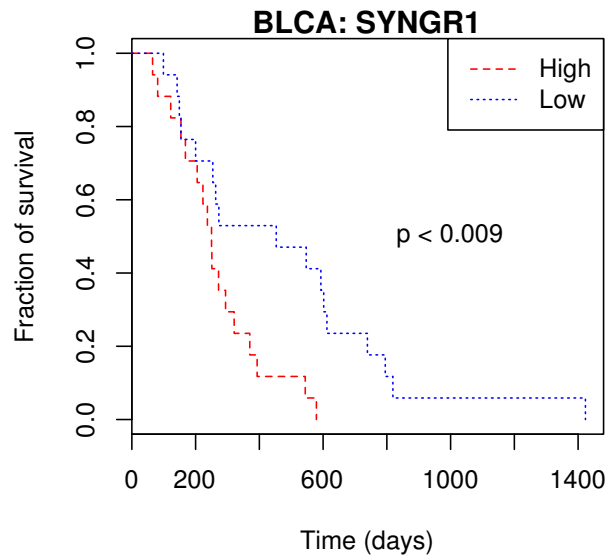
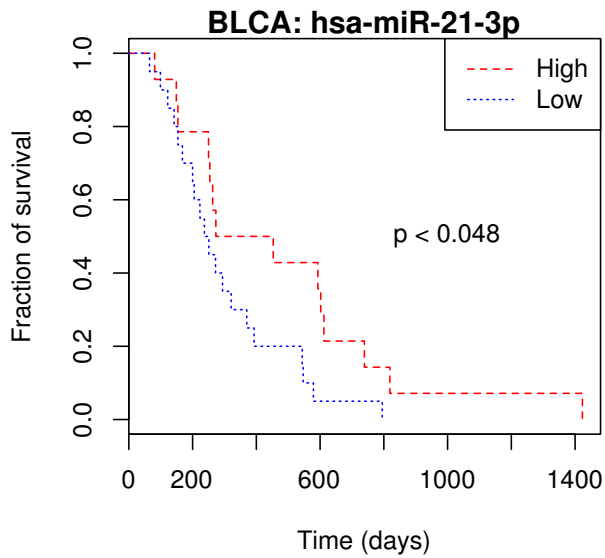
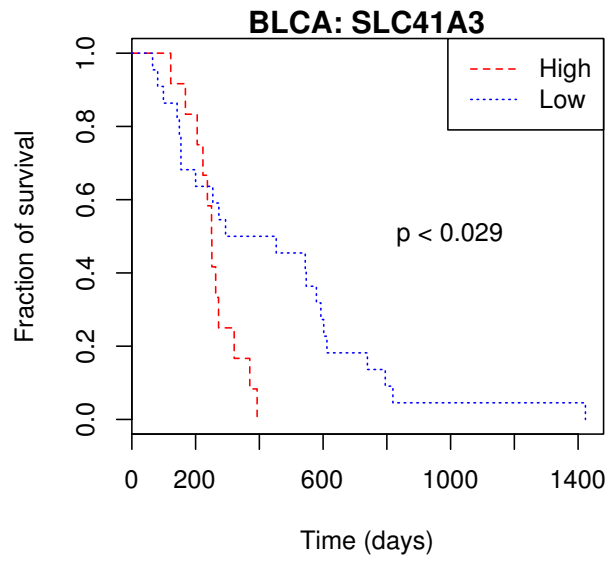
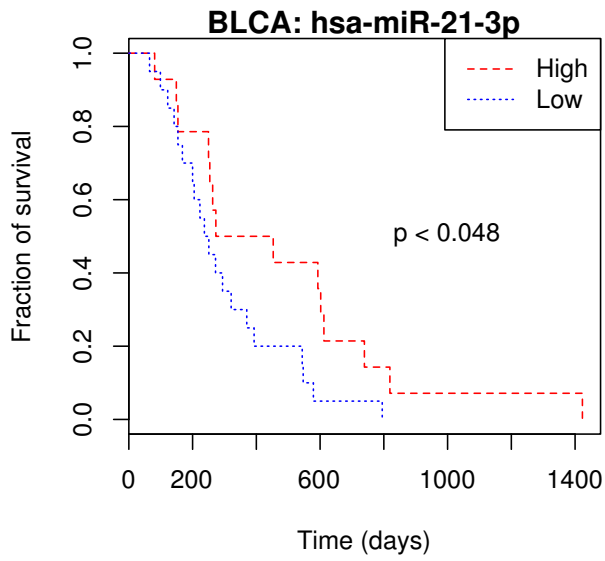
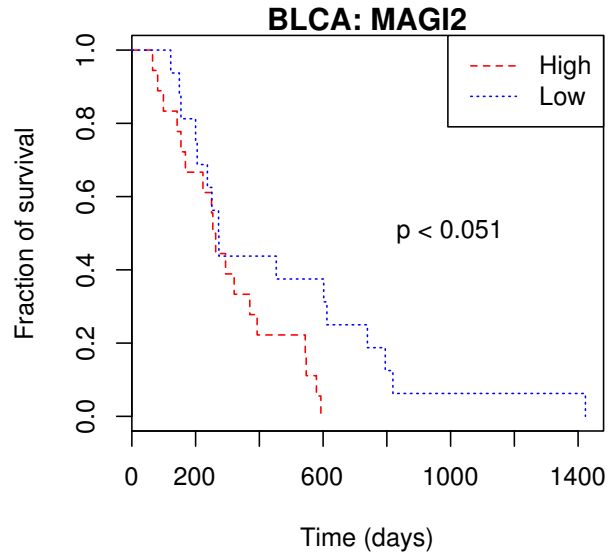
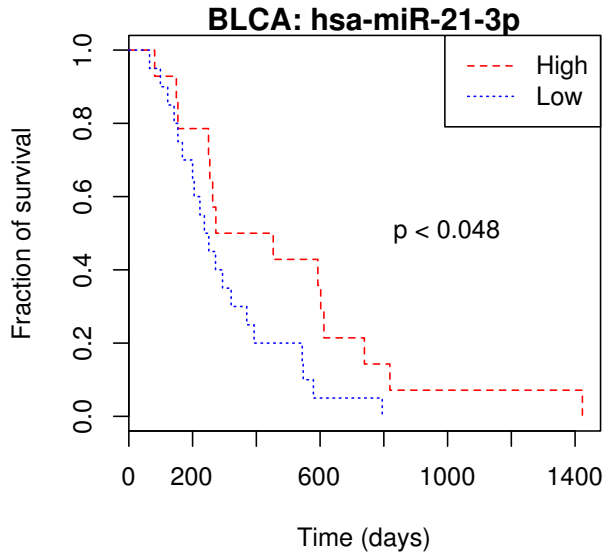


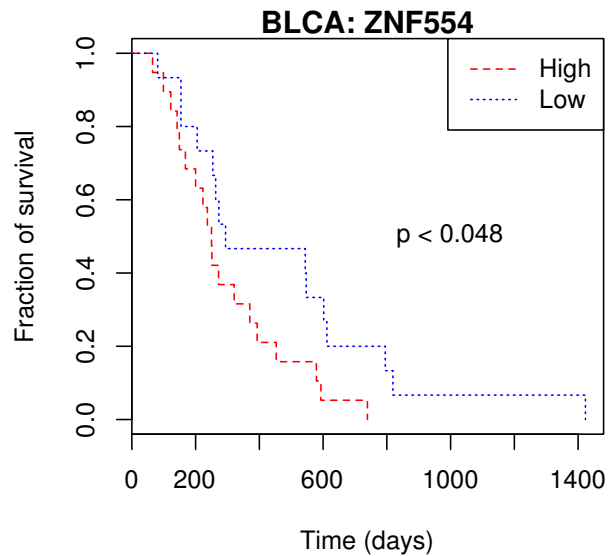
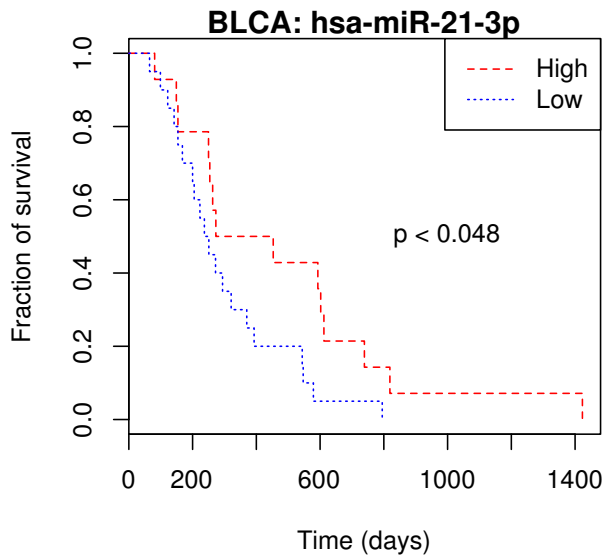
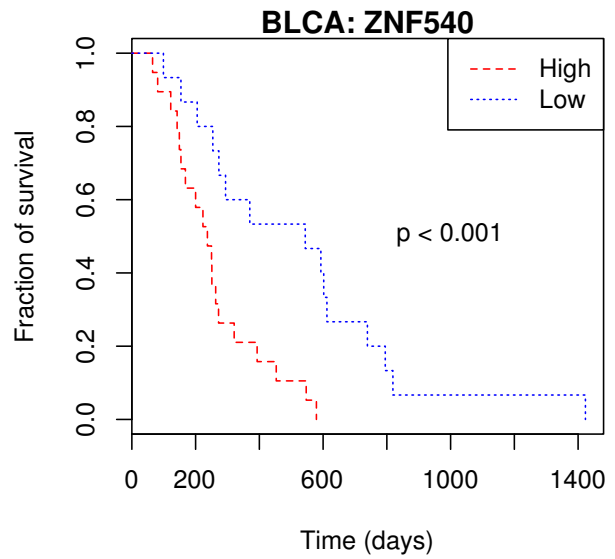
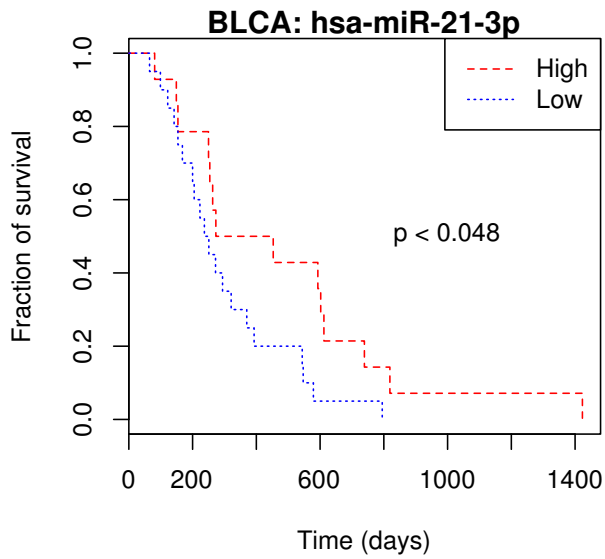
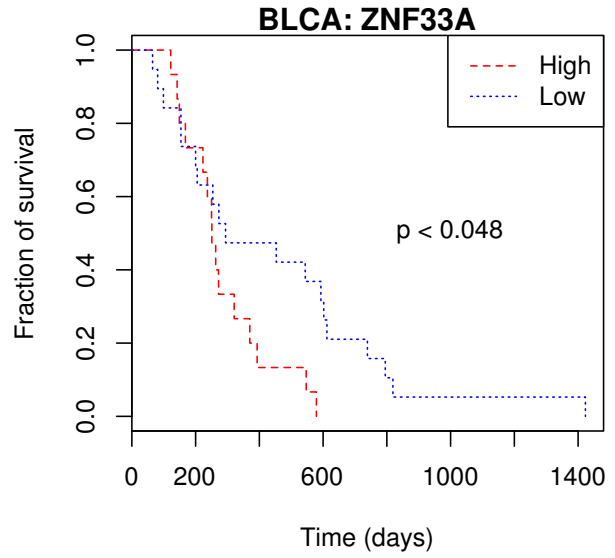
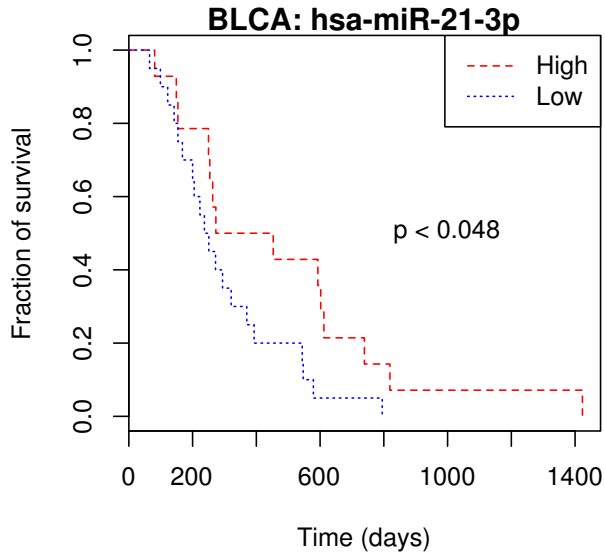
Figure S6: The original screenshot of the KEGG pathways in cancer. The high-lighted boxes indicating the targets involved in the recurrent miRNA regulatory network.

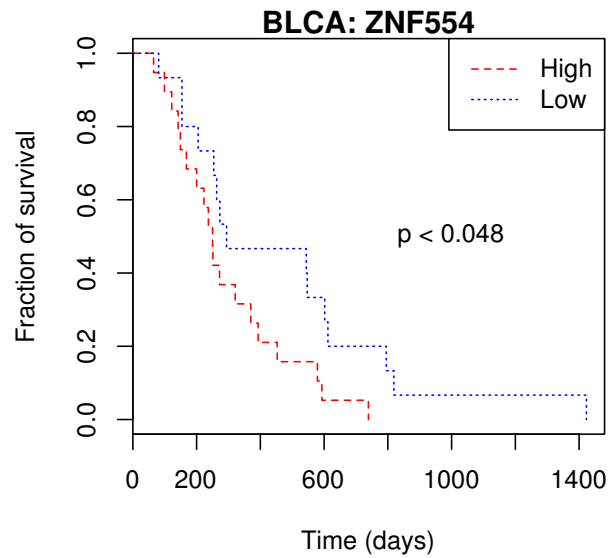
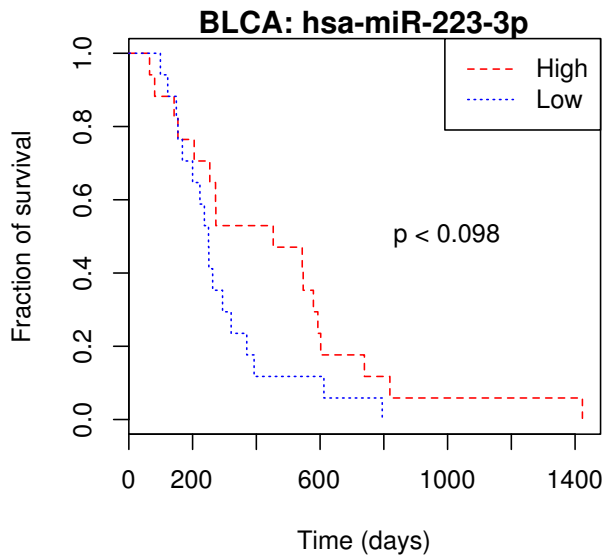
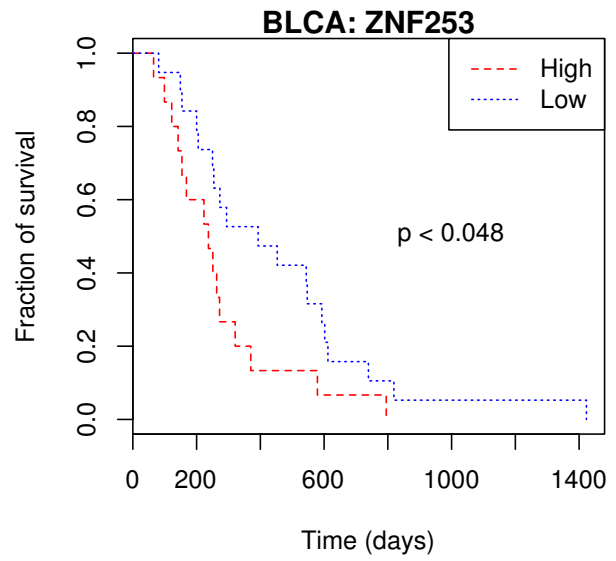
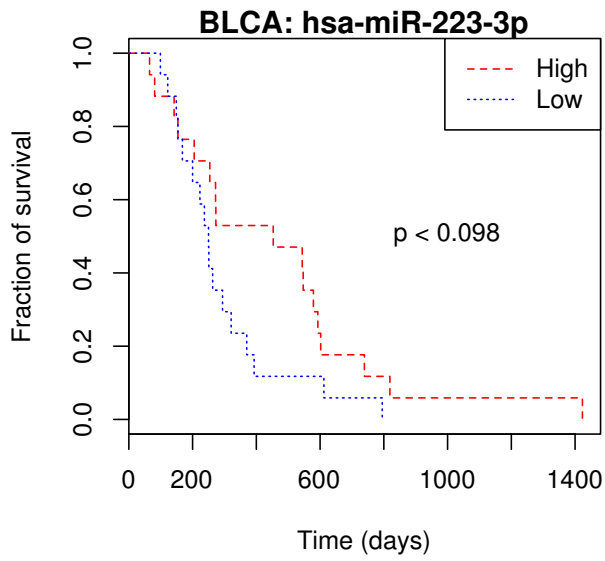
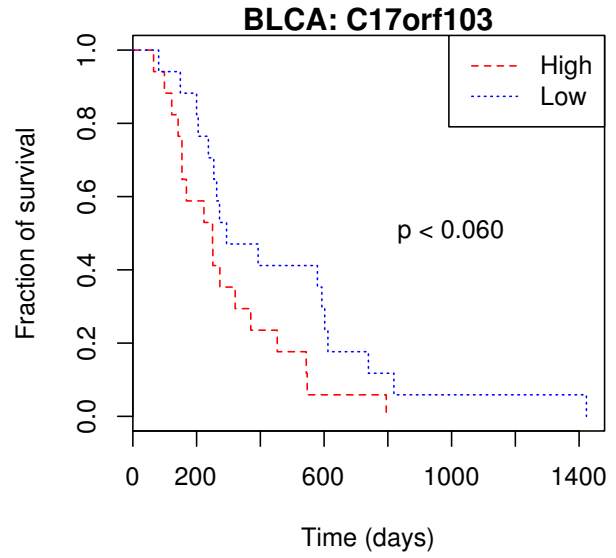
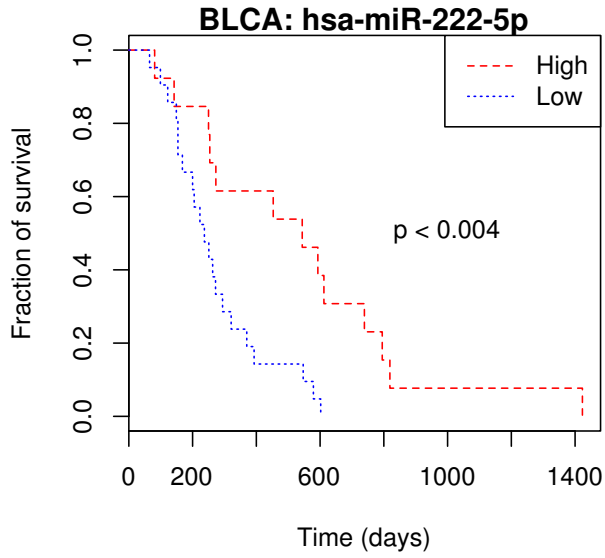


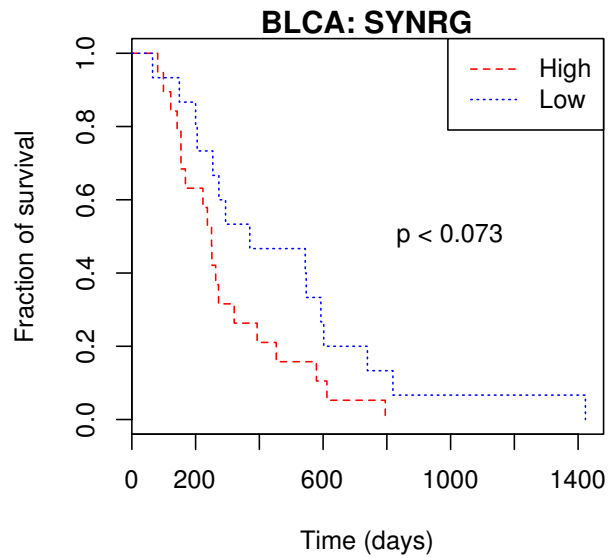
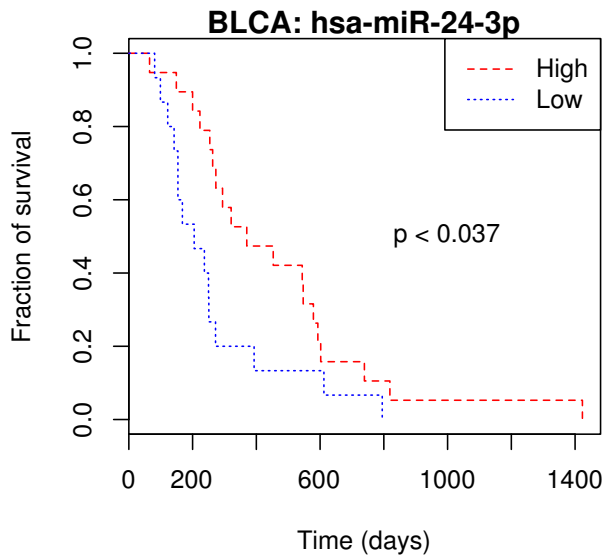
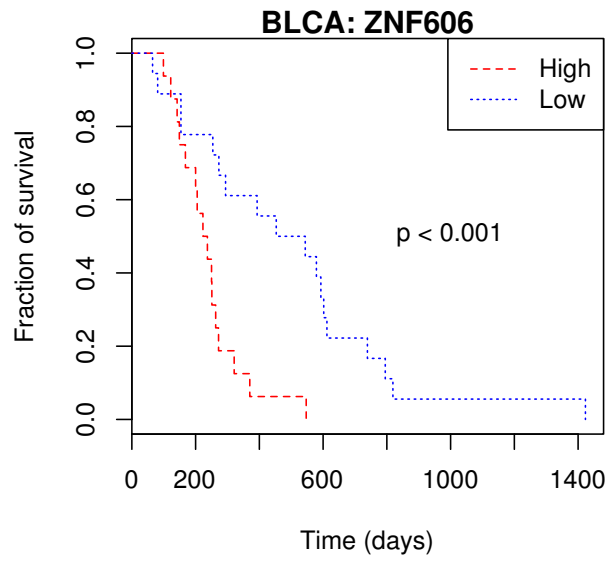
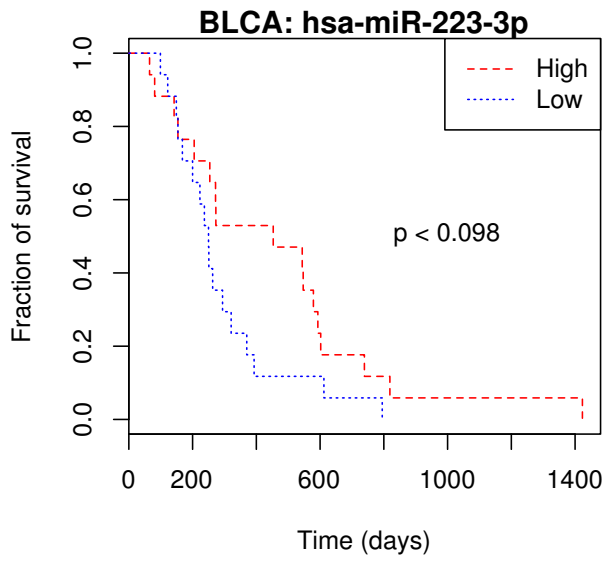
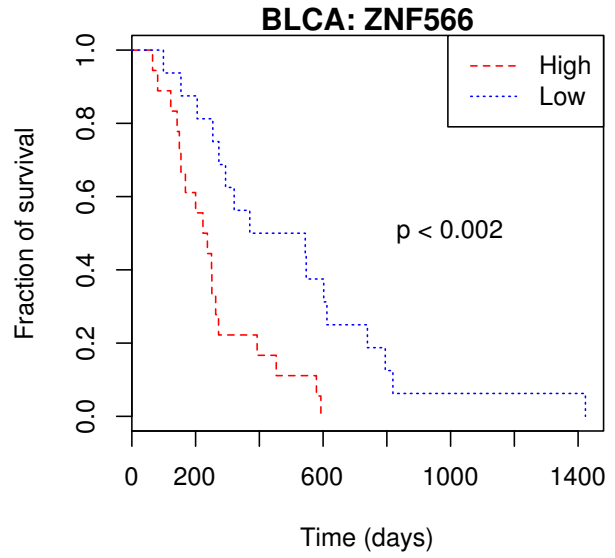
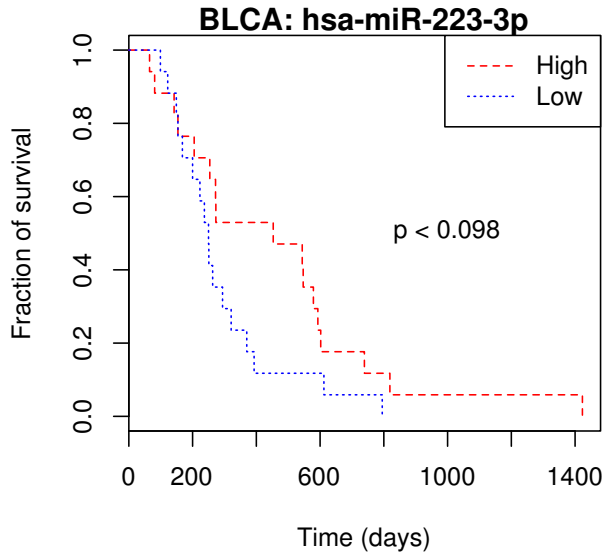


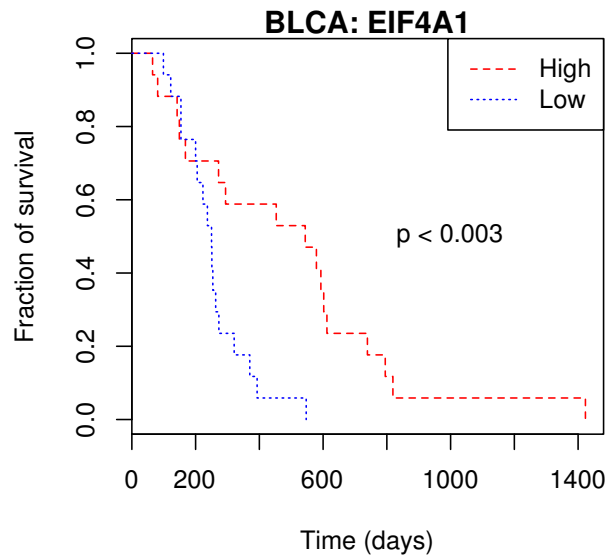
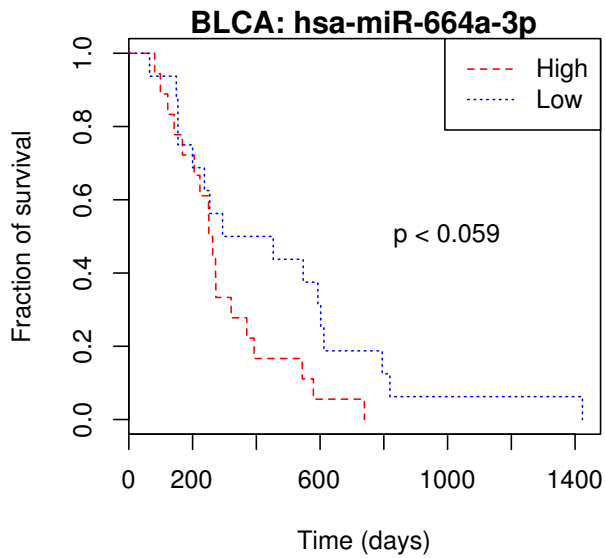
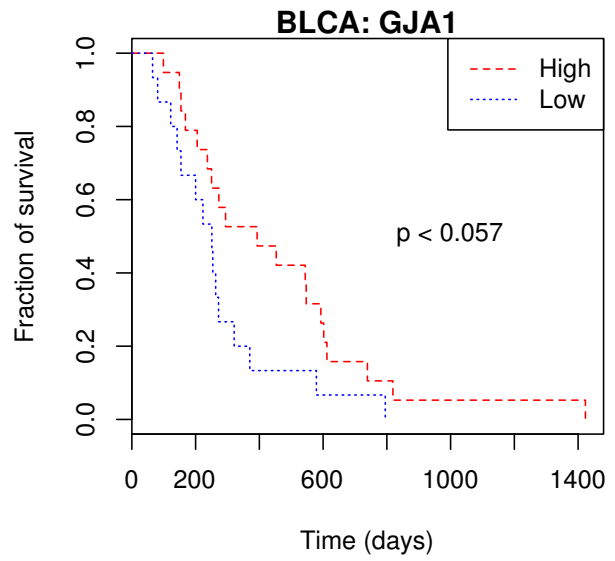
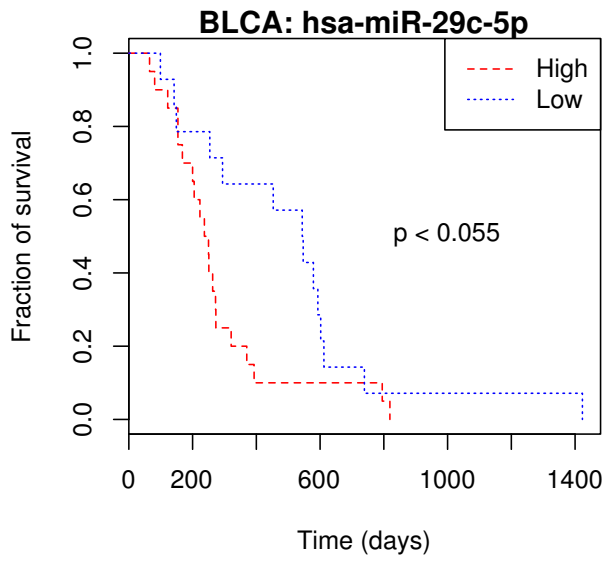
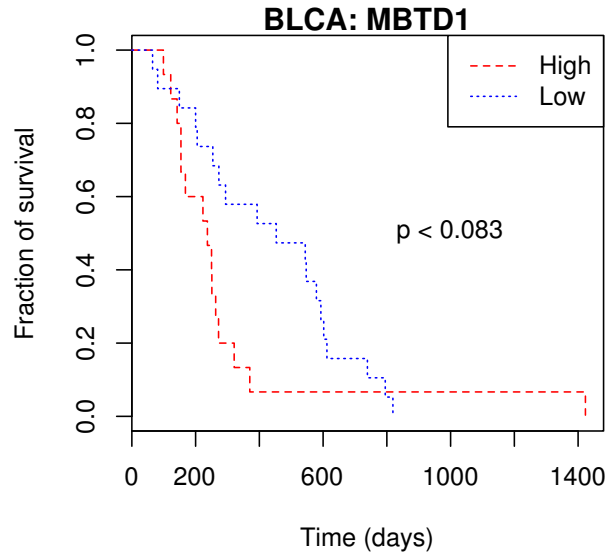
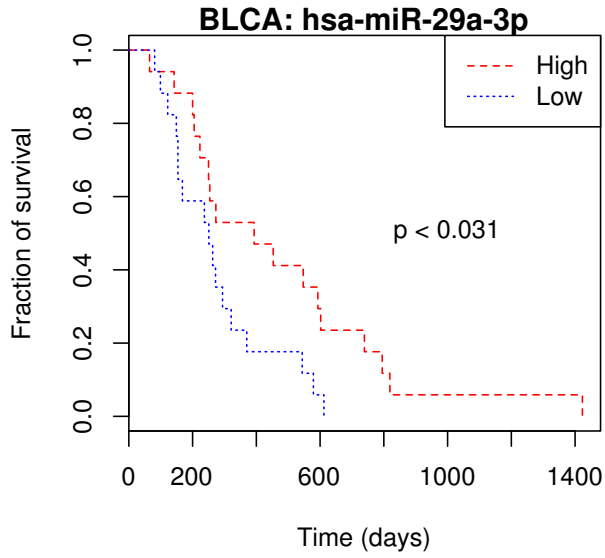


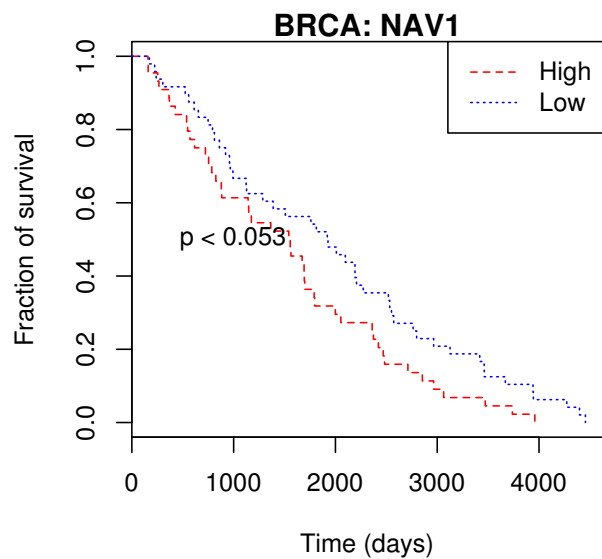
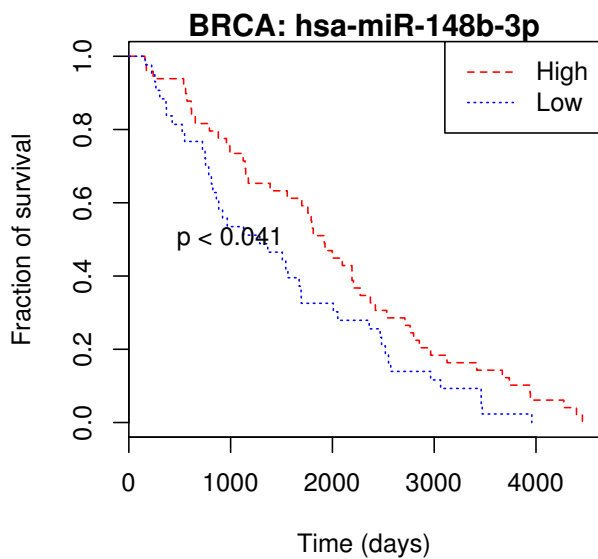
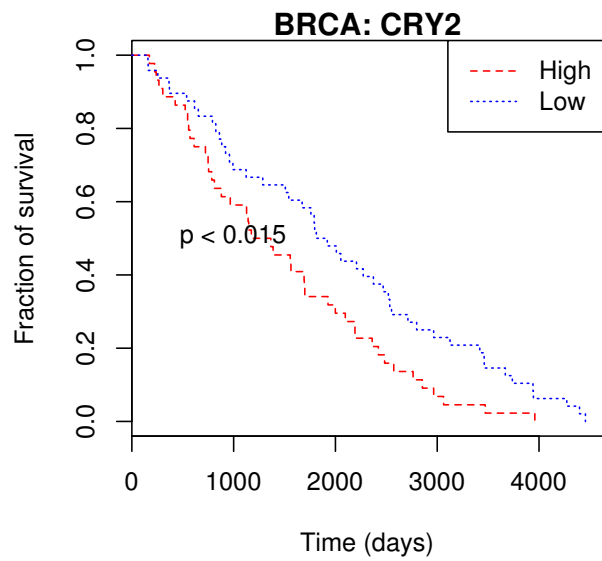
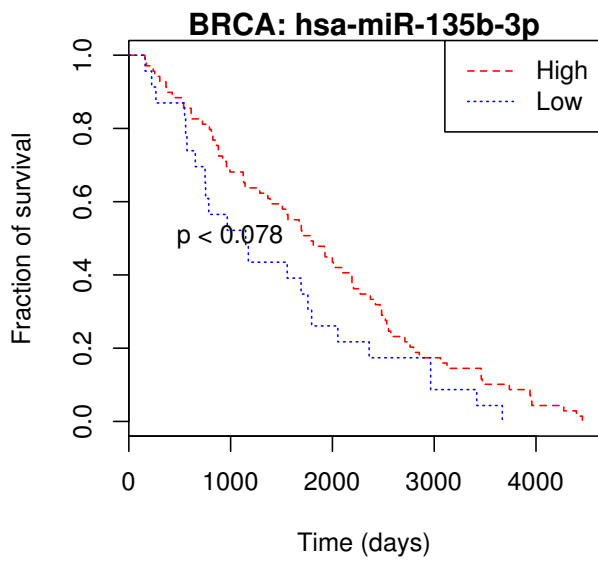
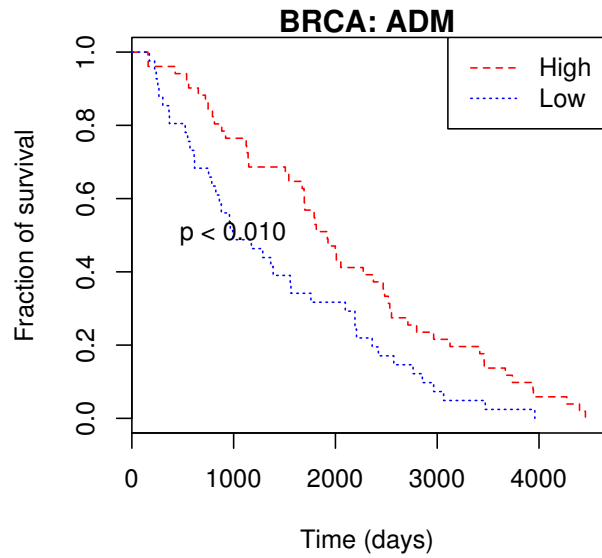
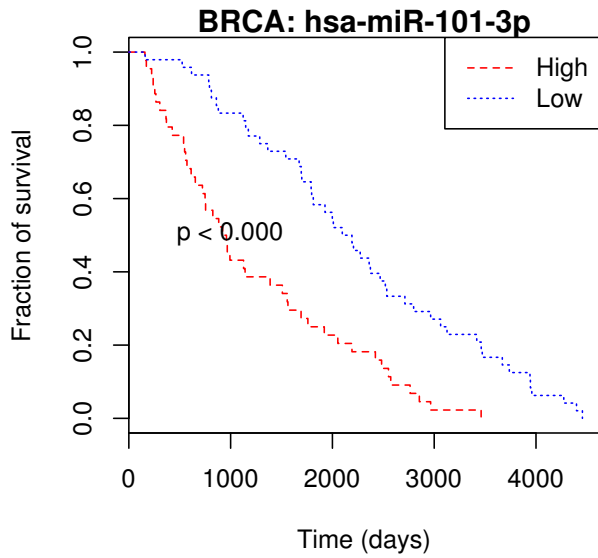


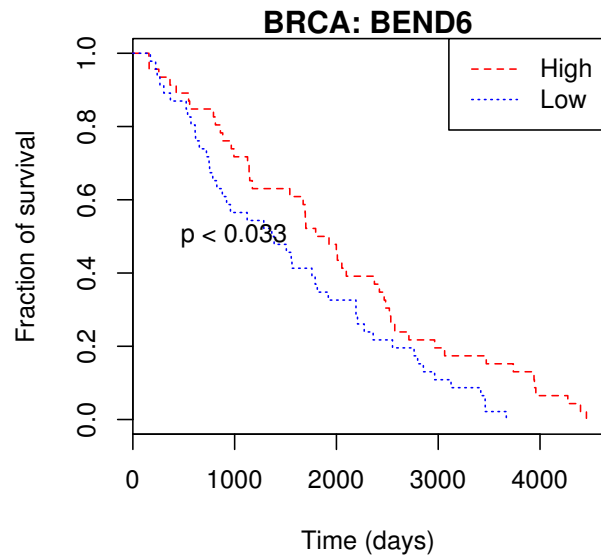
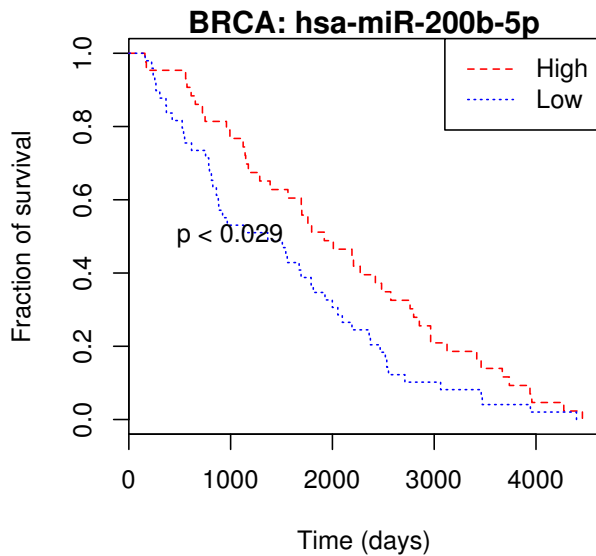
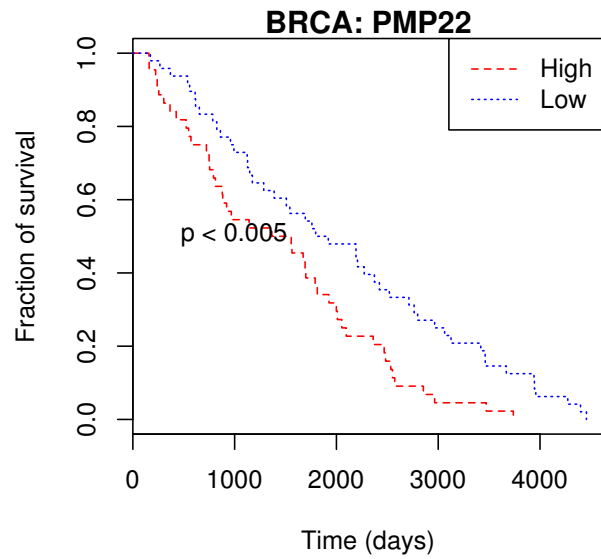
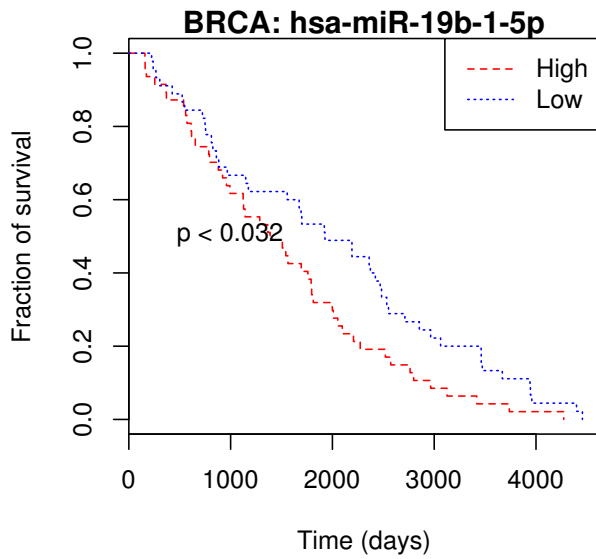
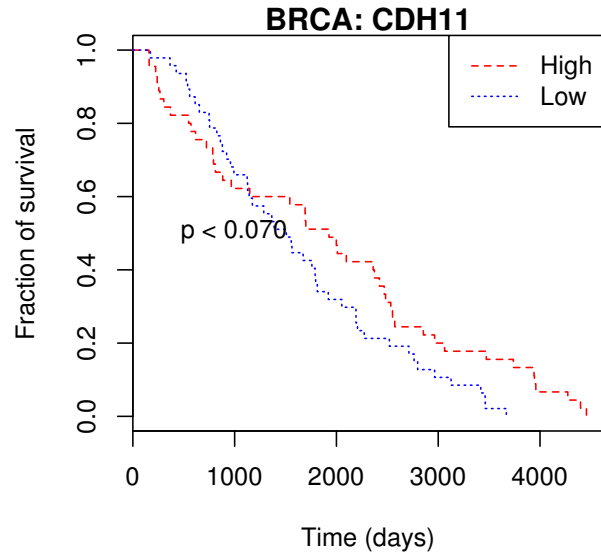
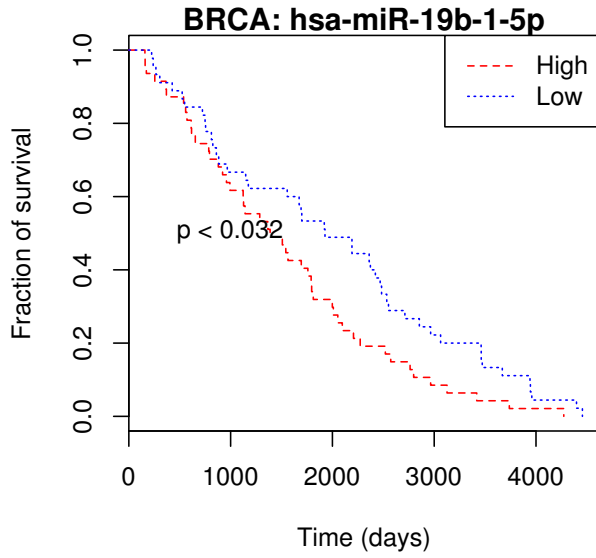




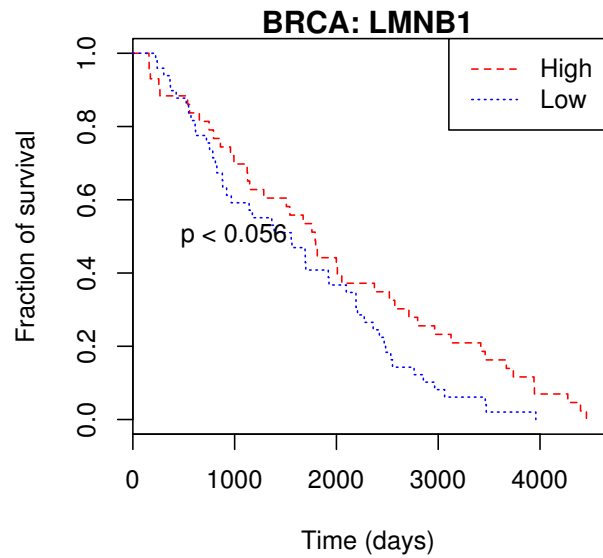
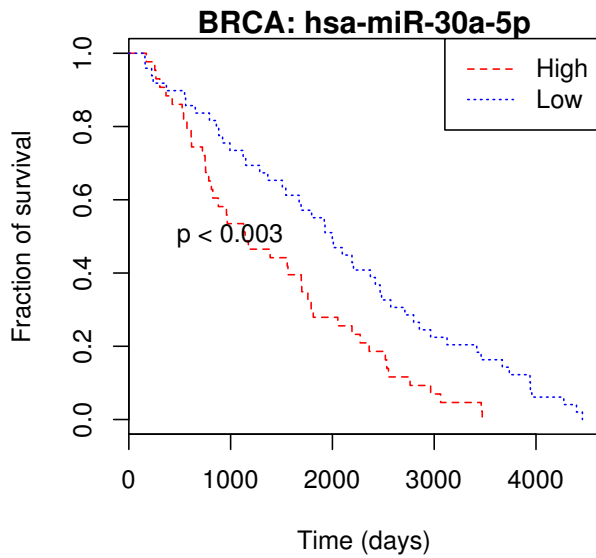
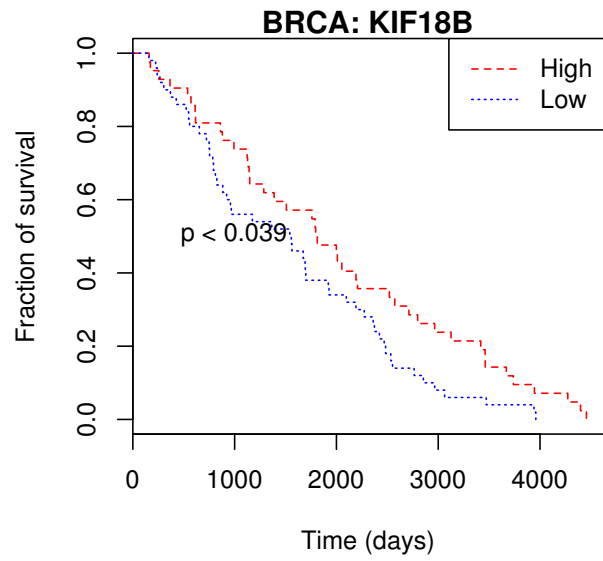
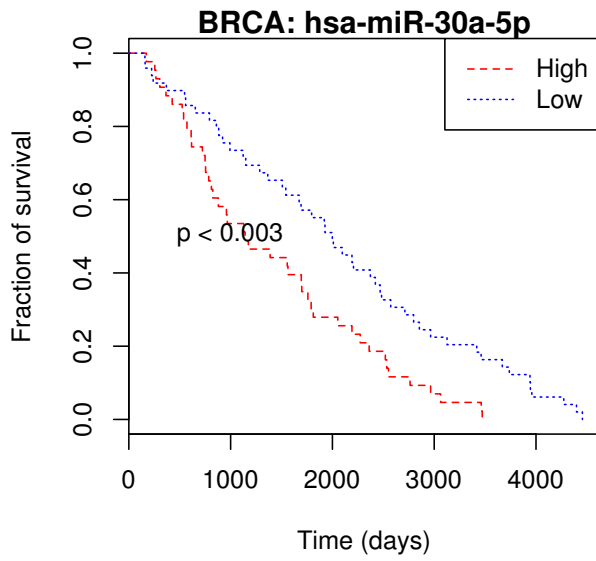
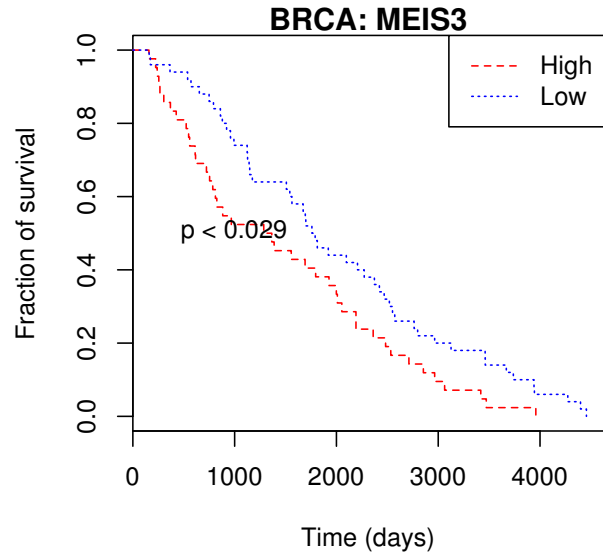
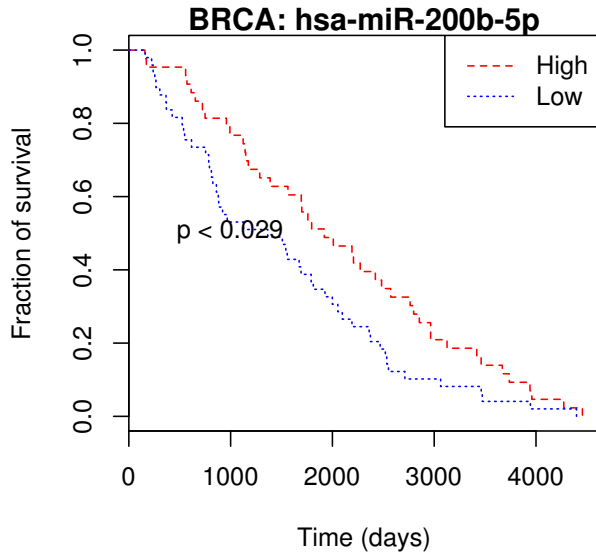


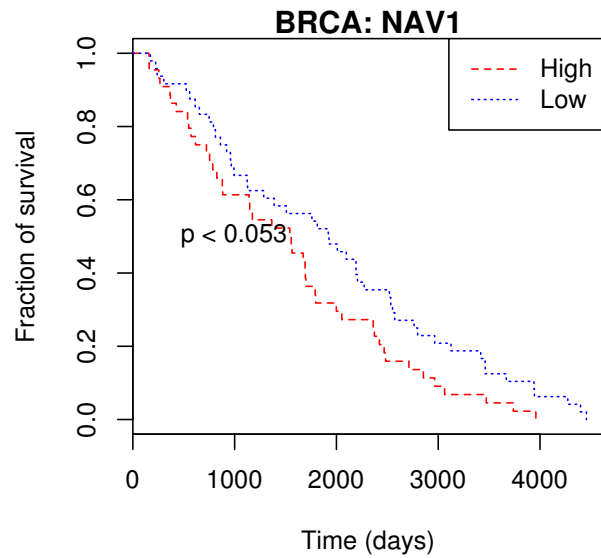
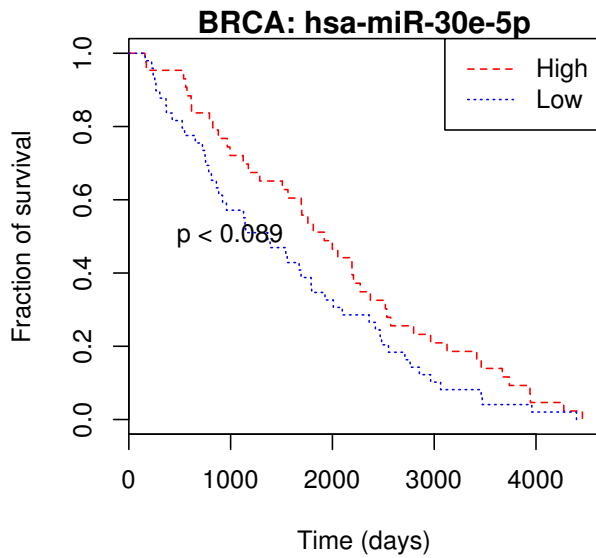
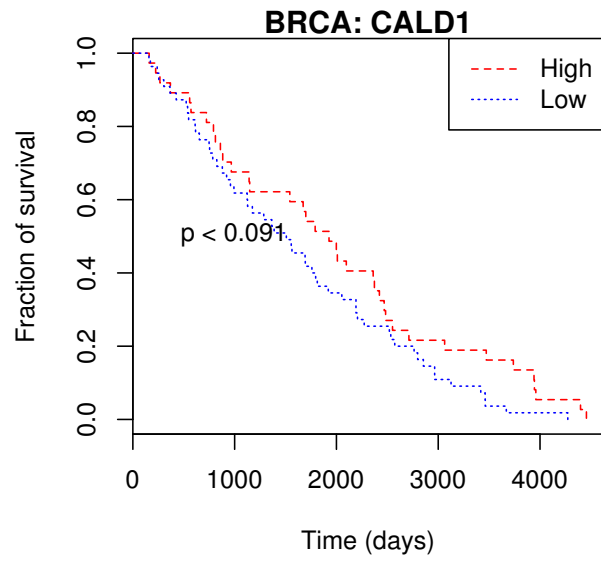
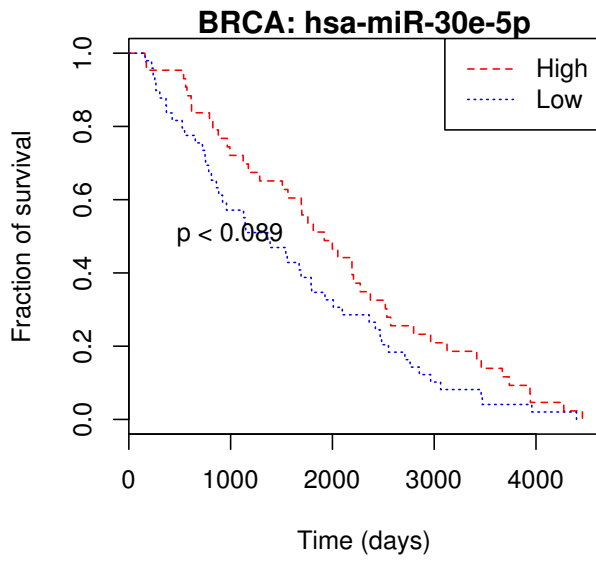
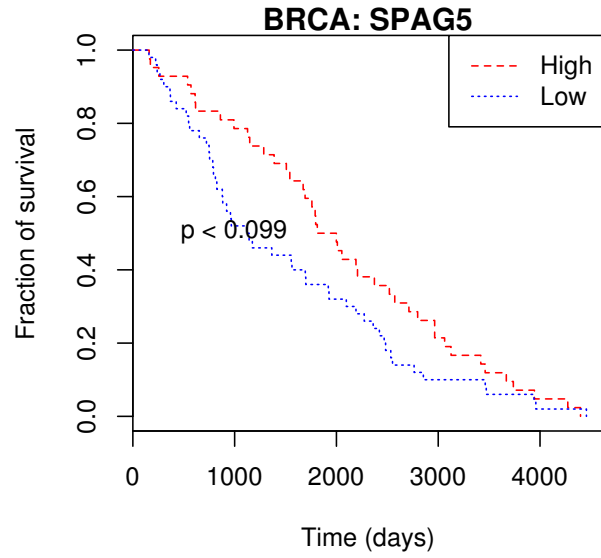
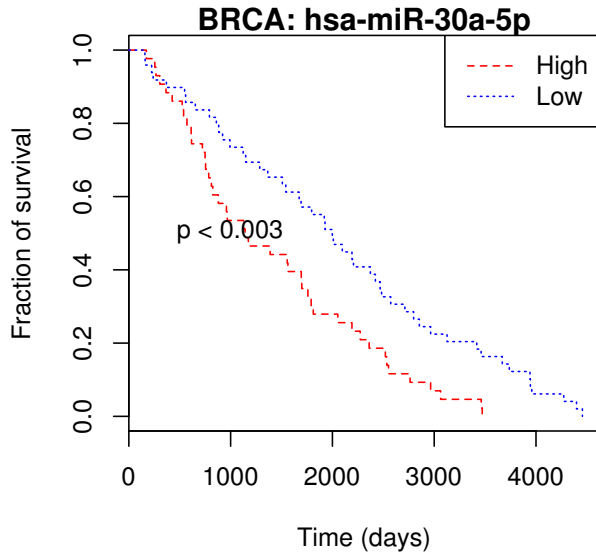


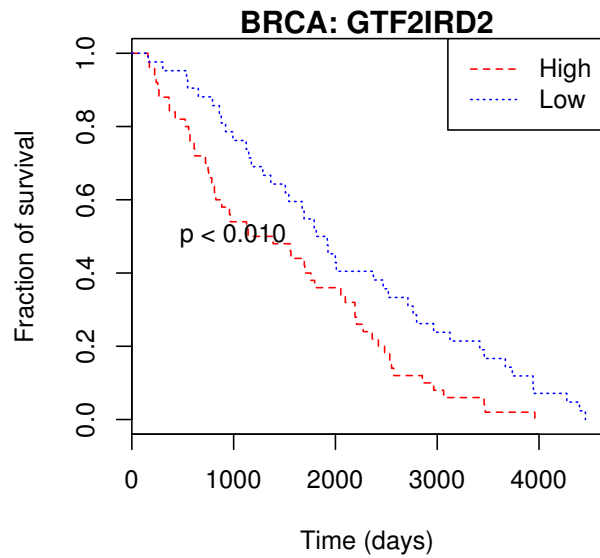
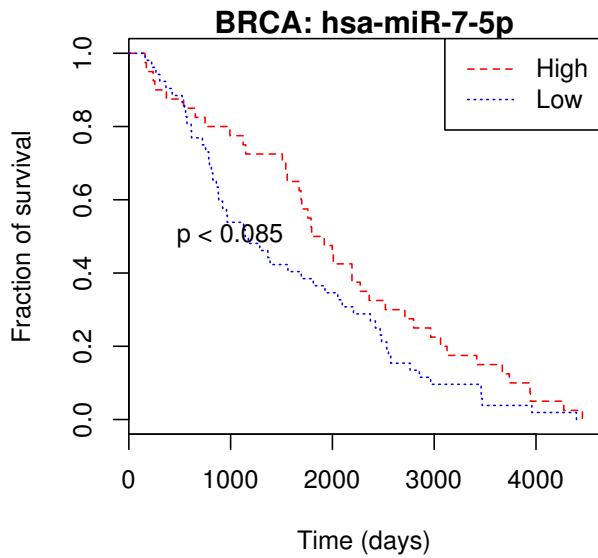
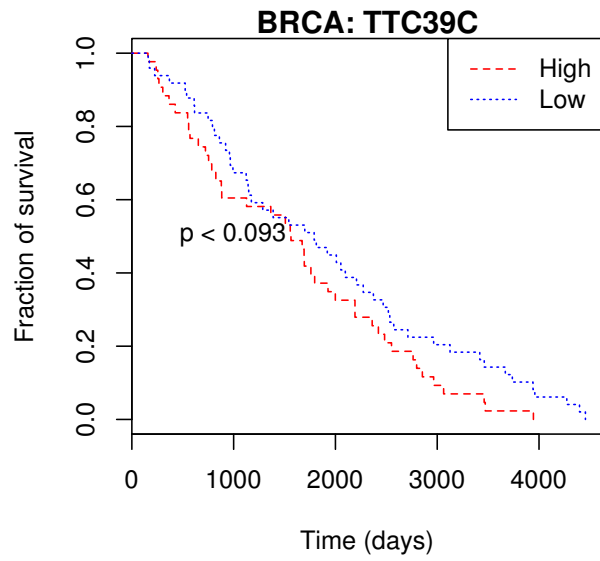
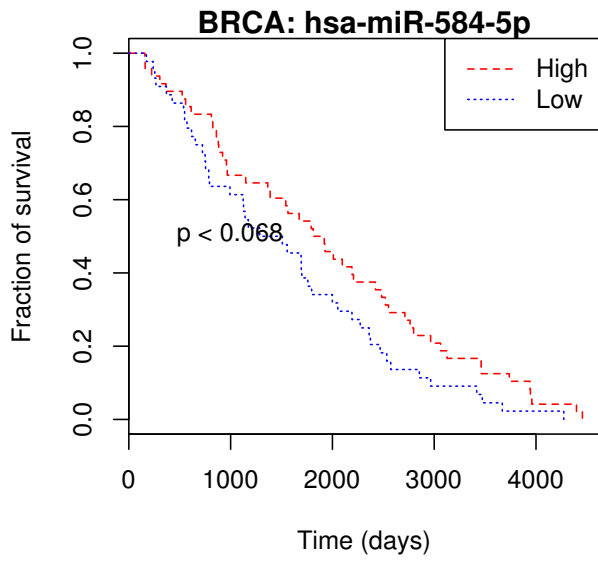
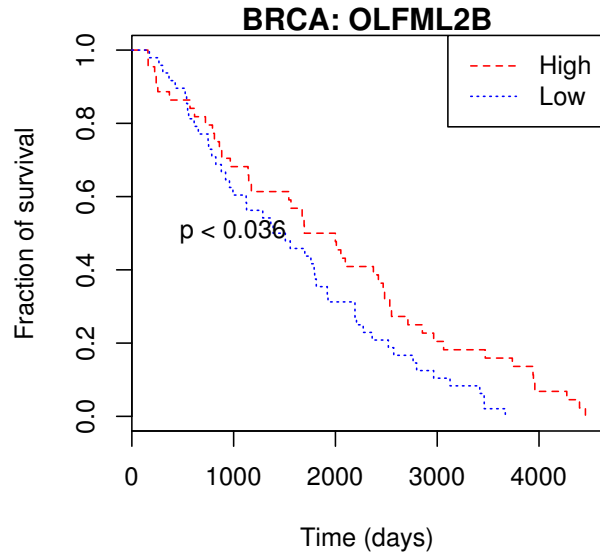
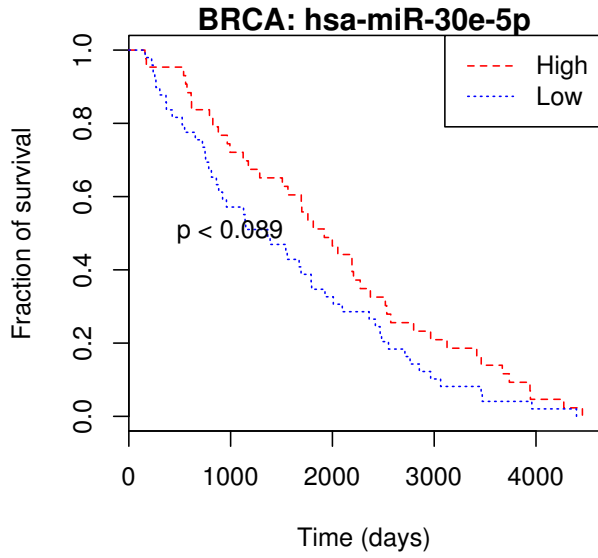


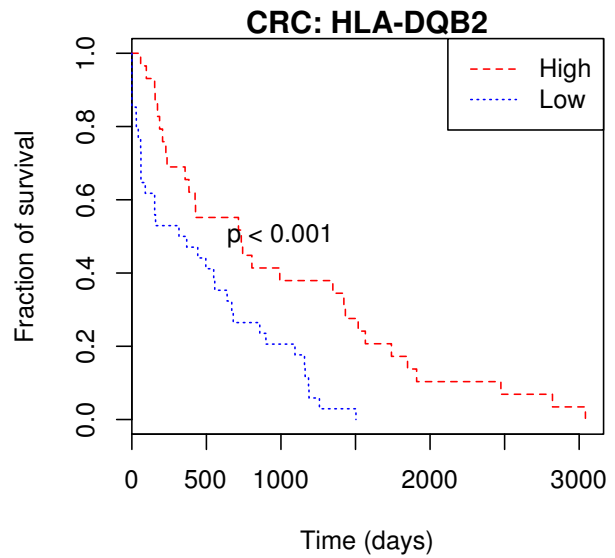
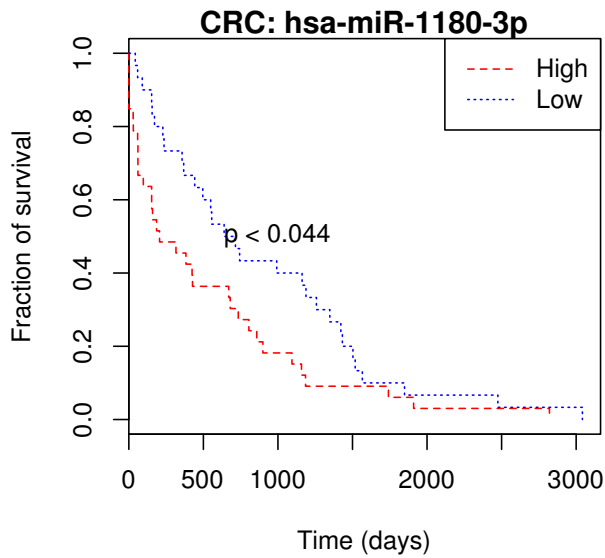
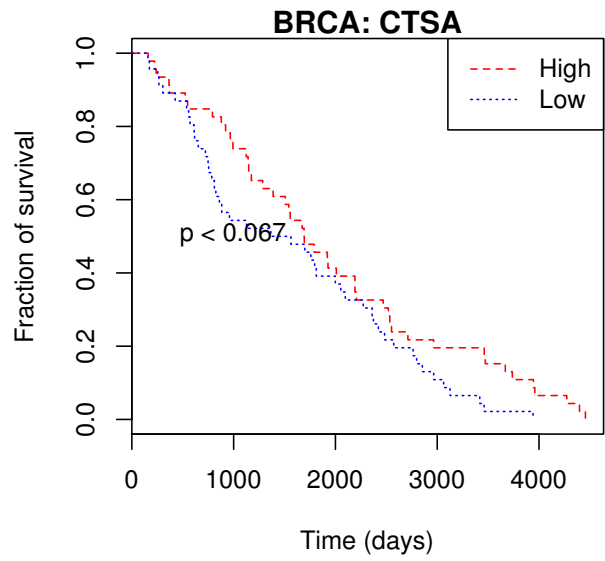
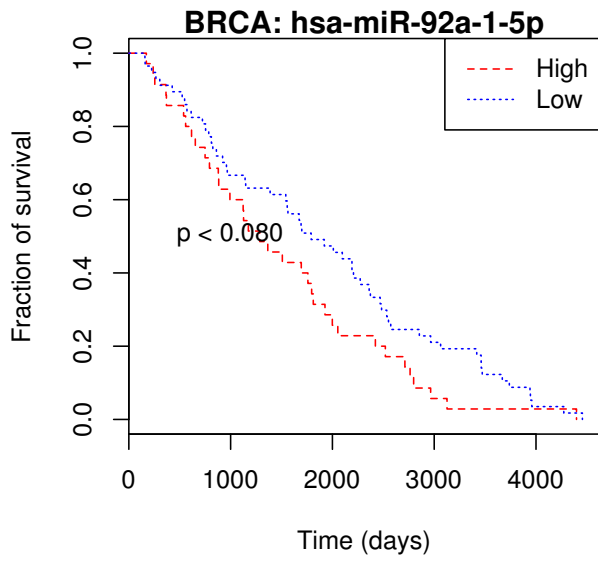
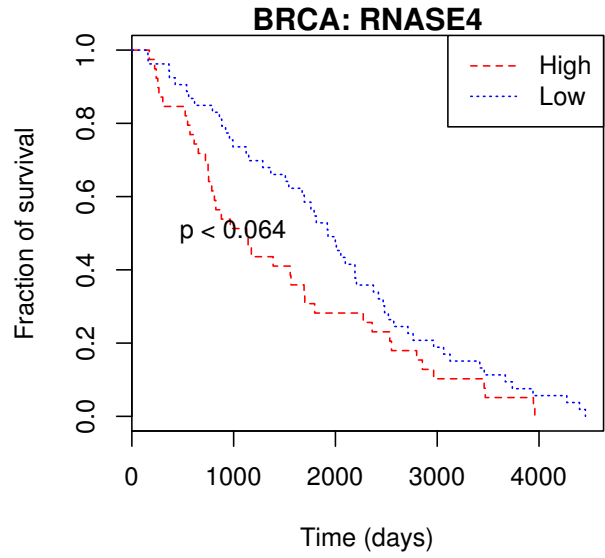
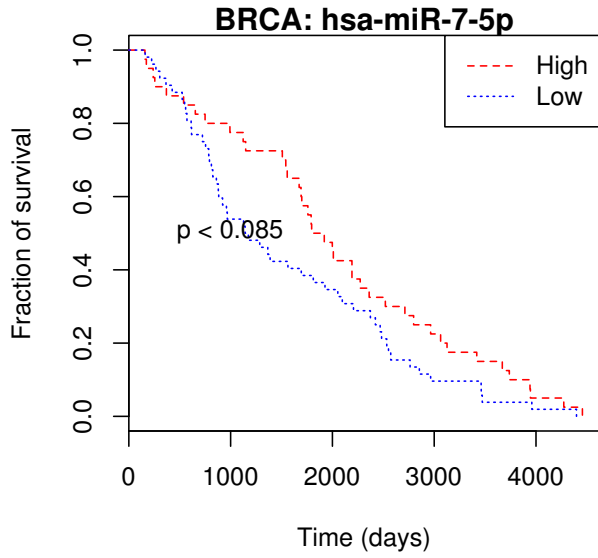


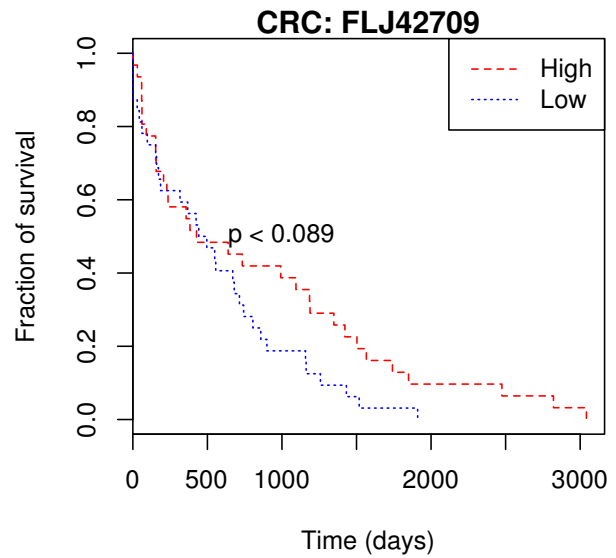
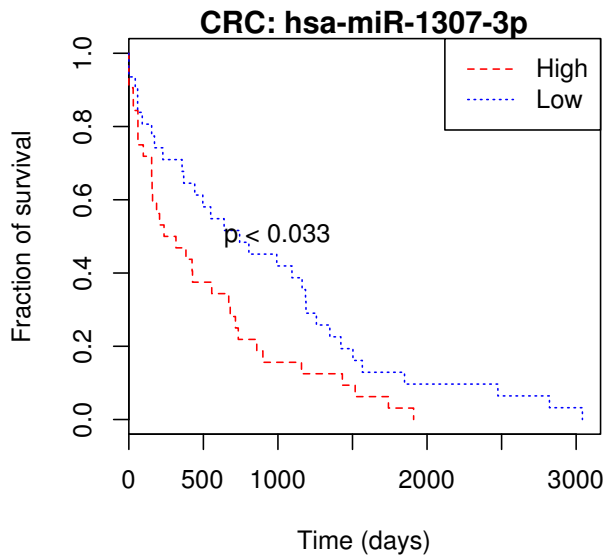
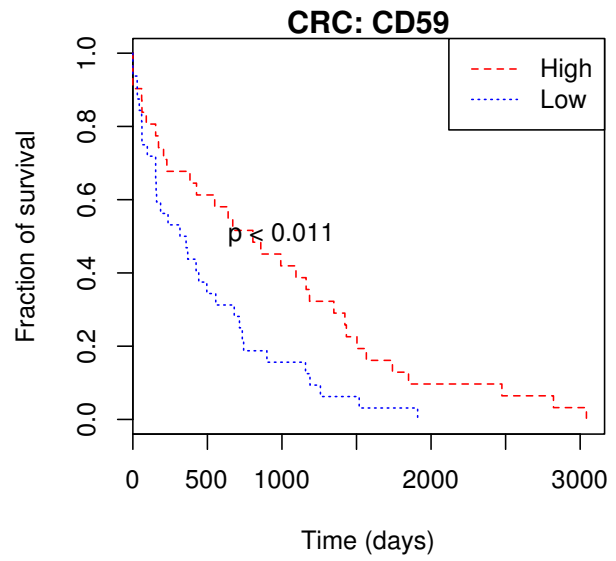
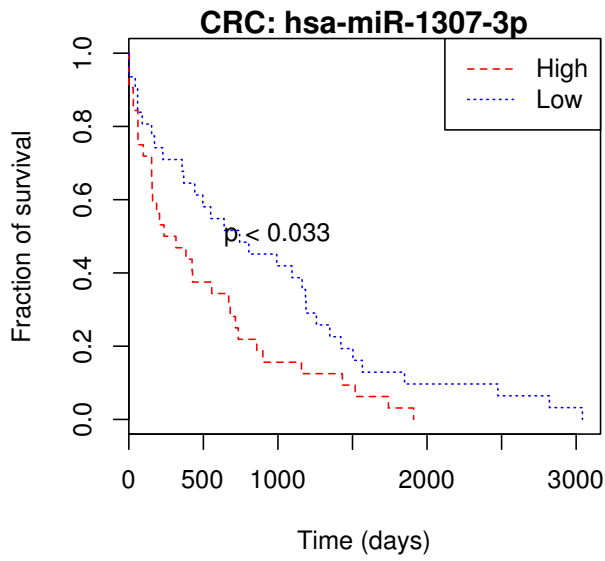
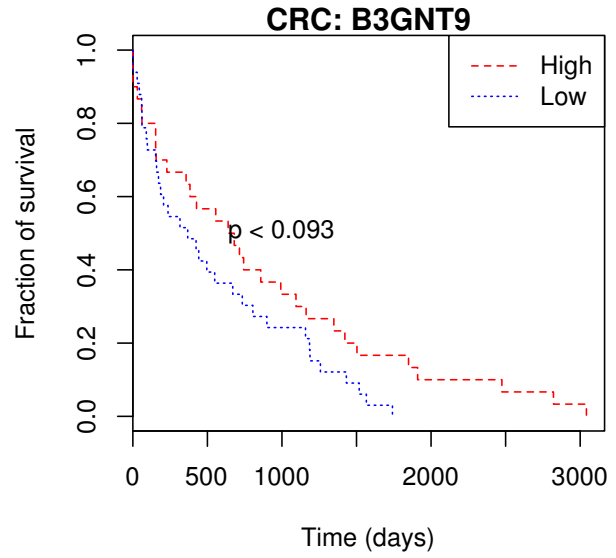
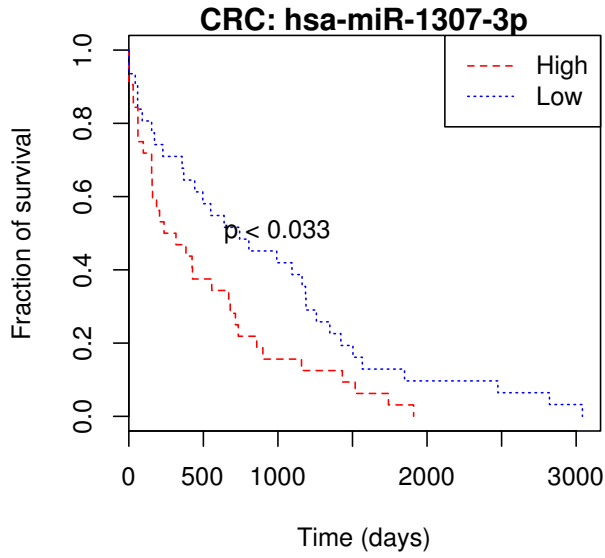


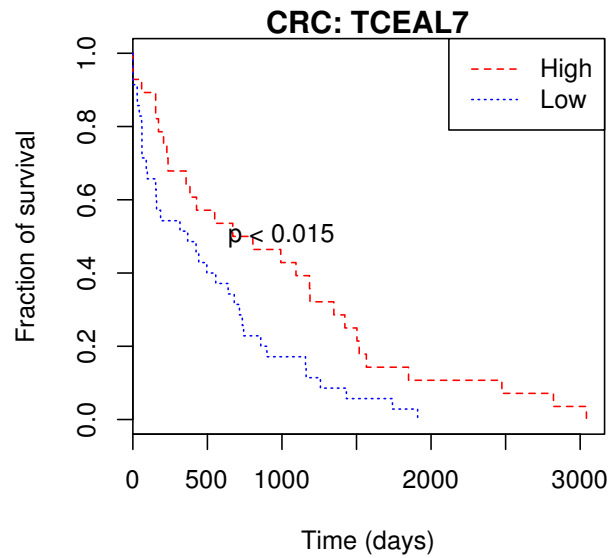
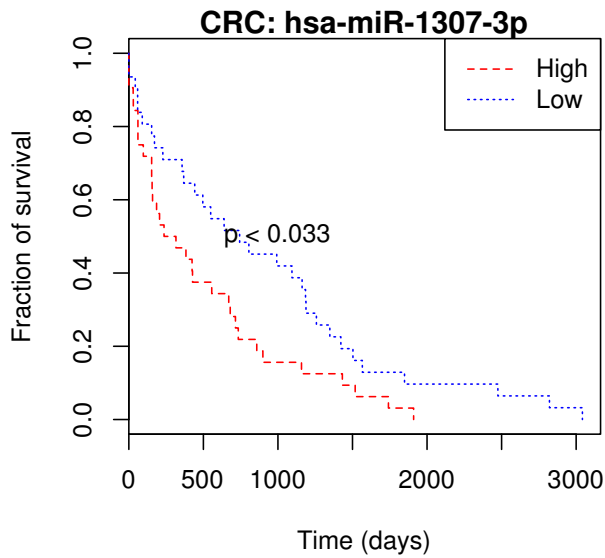
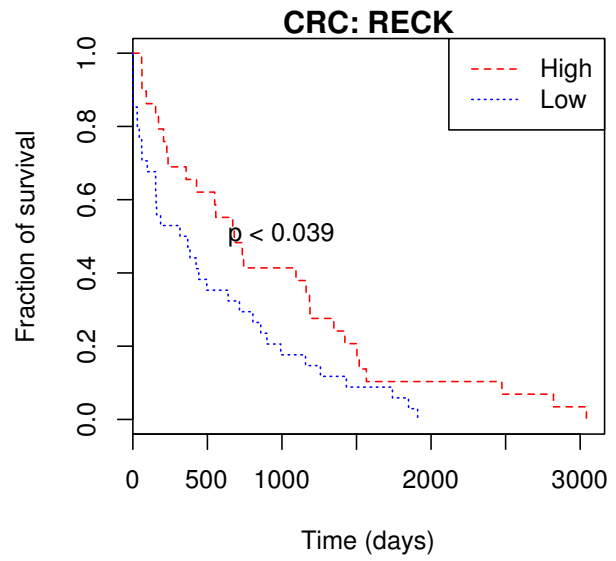
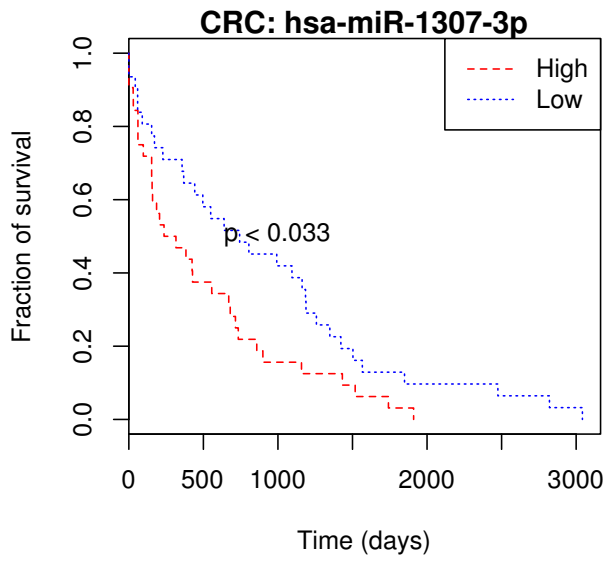
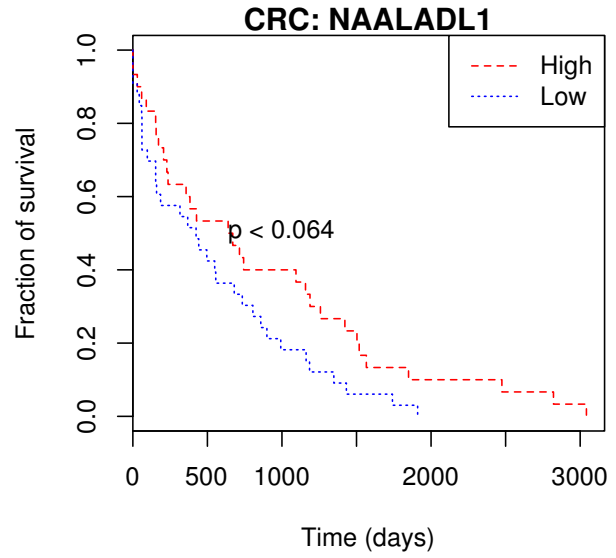
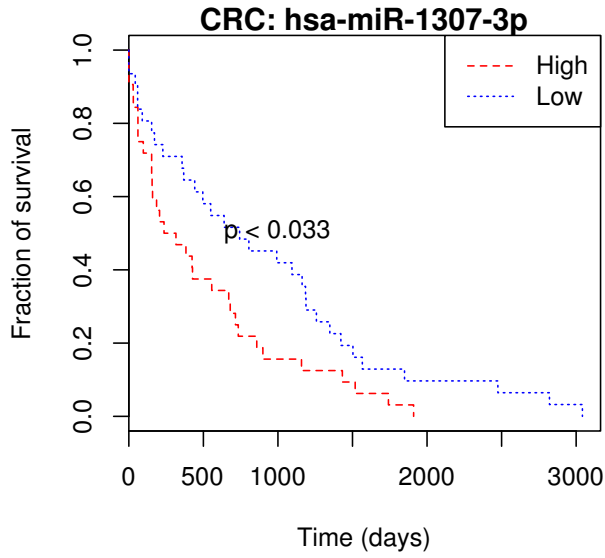


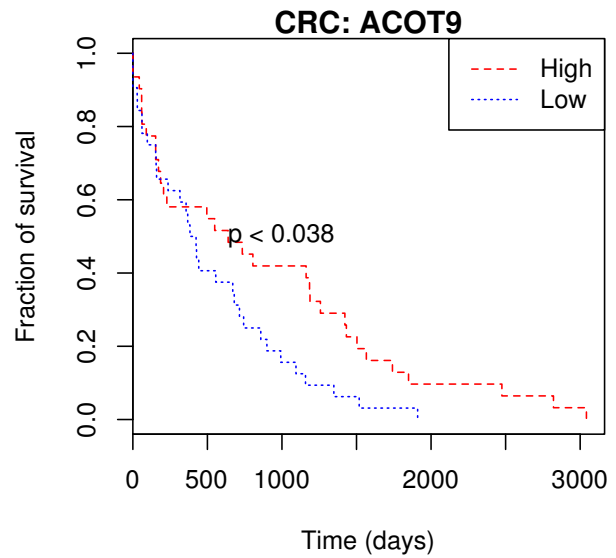
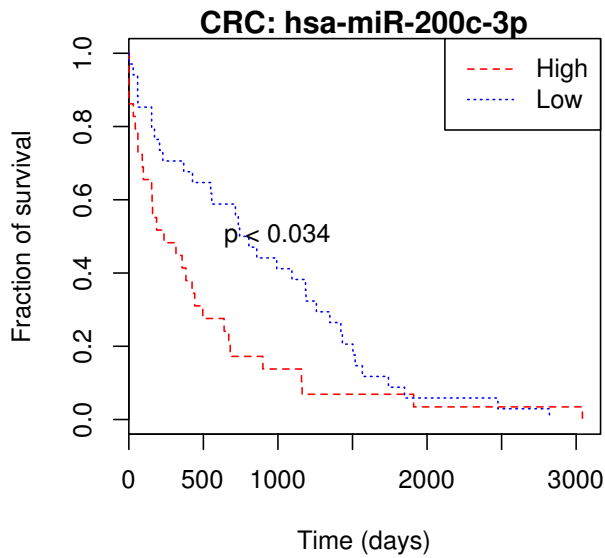
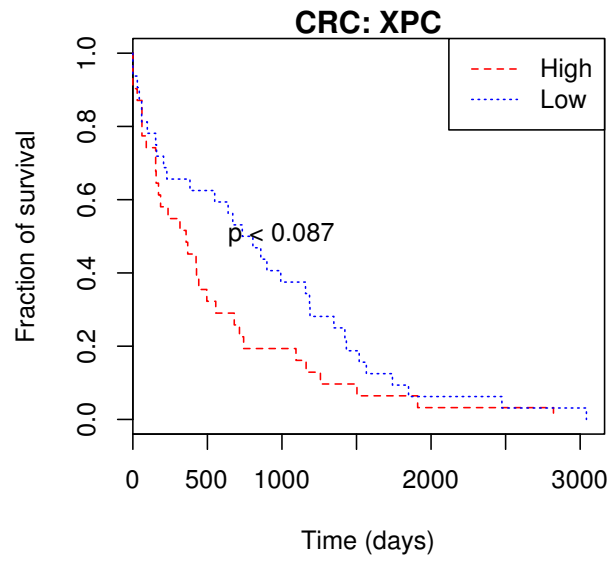
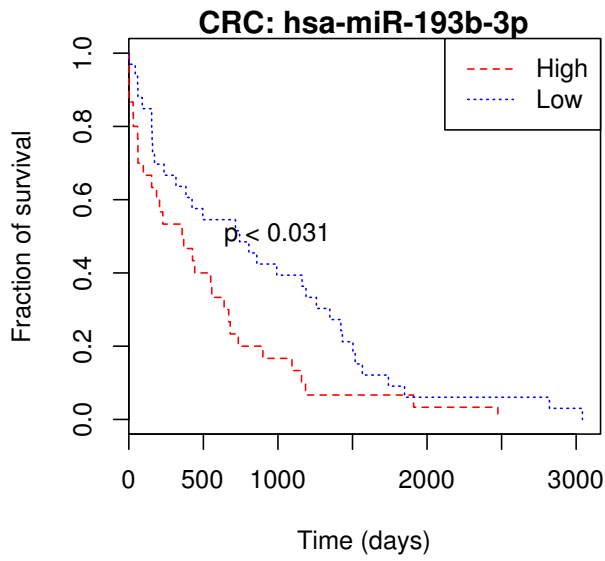
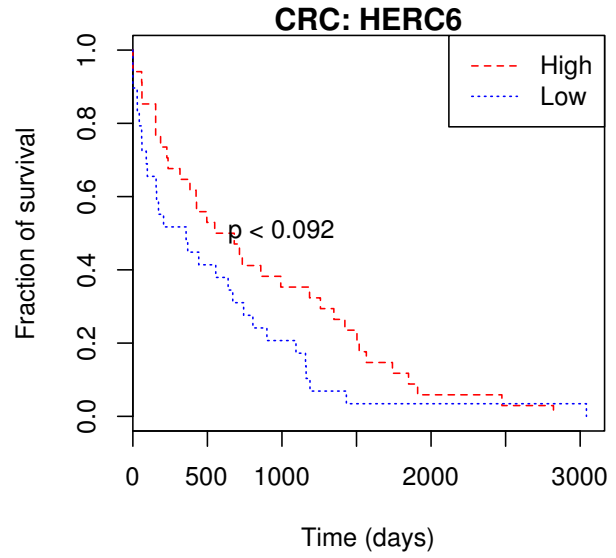
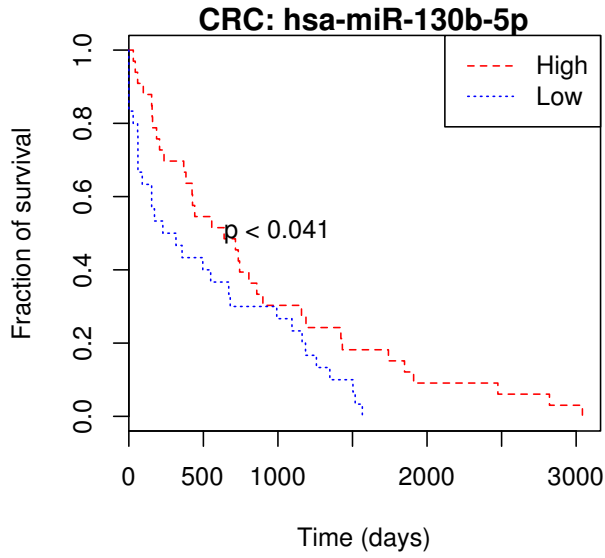


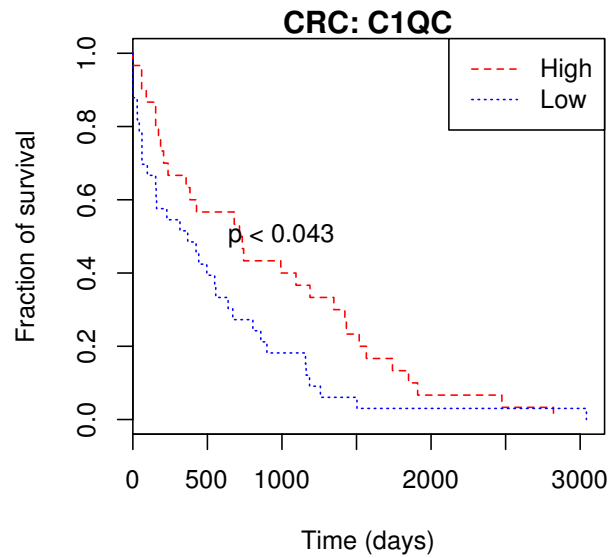
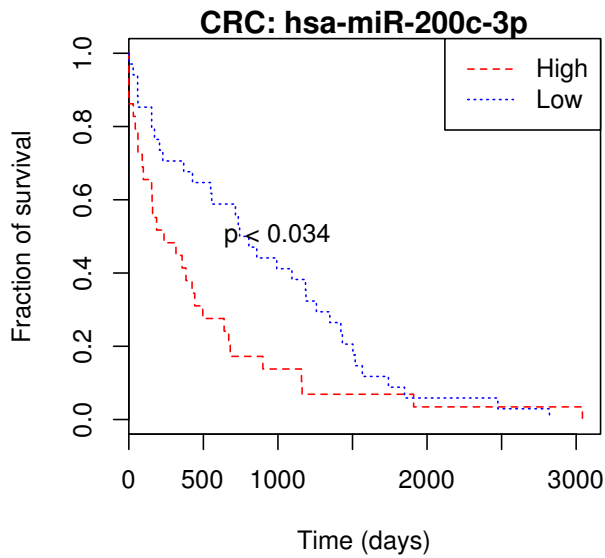
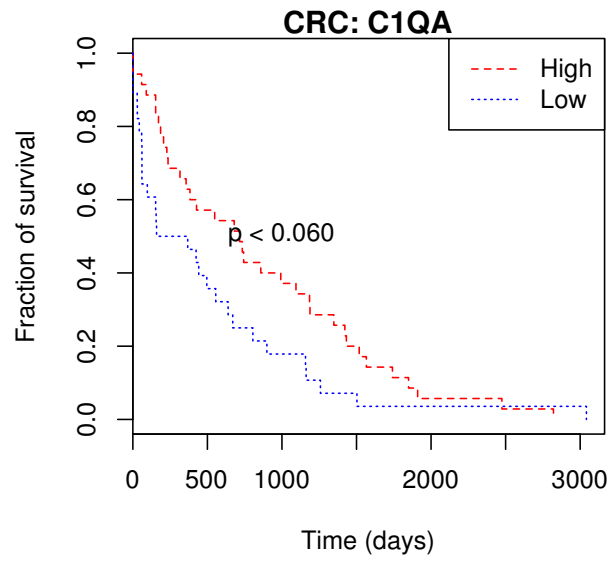
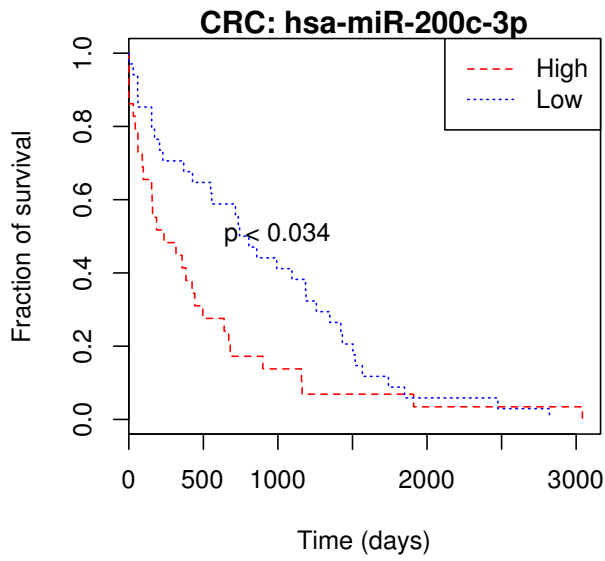
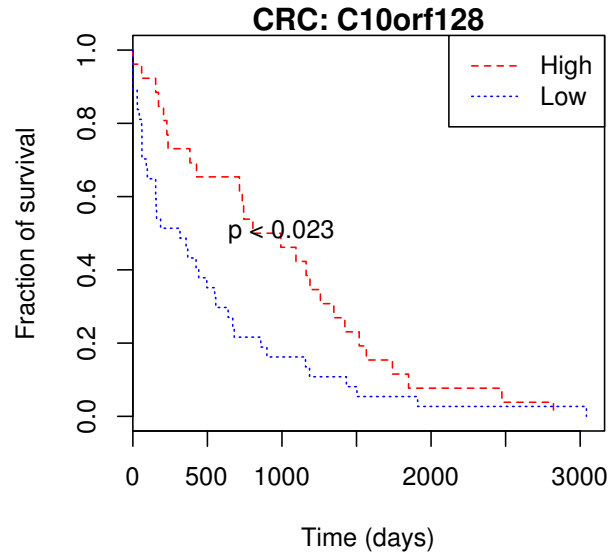
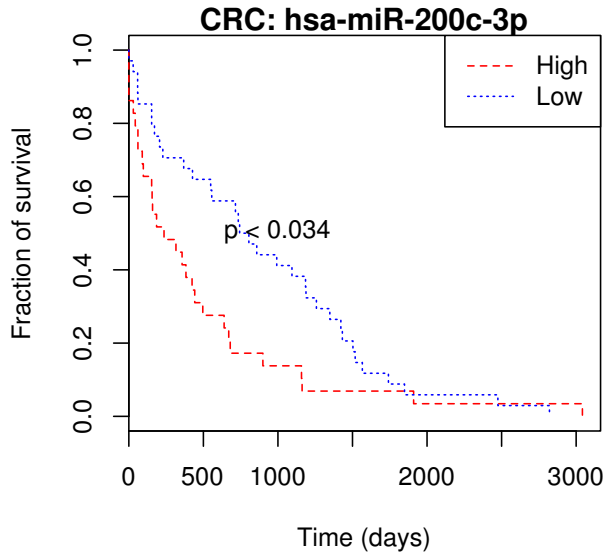




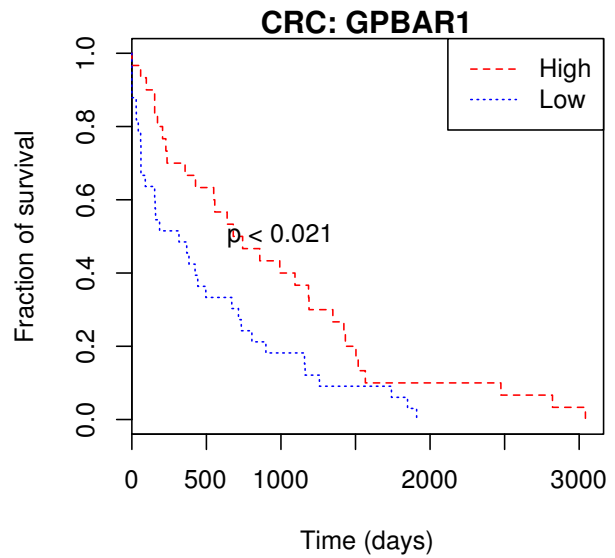
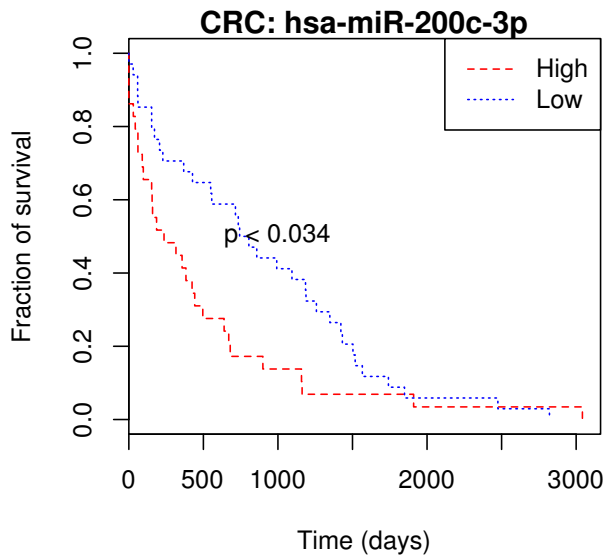
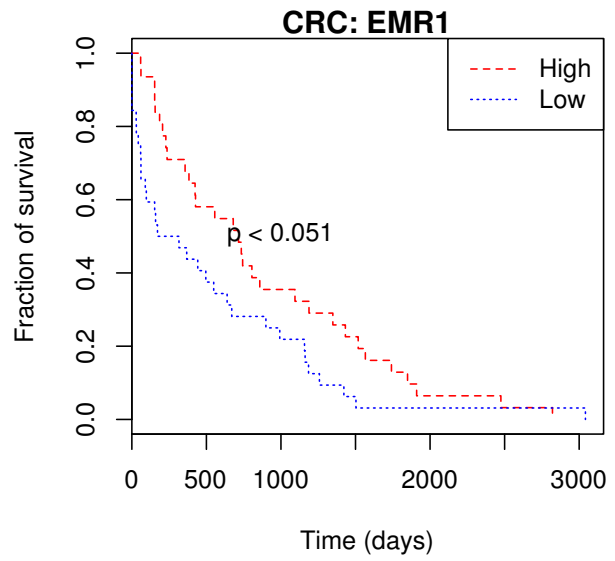
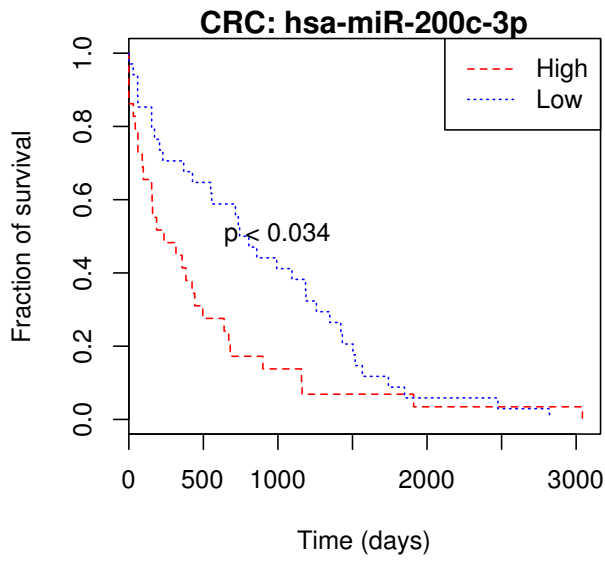
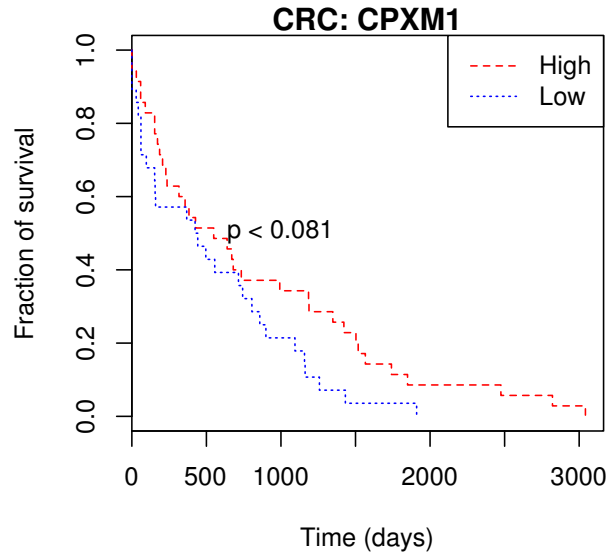
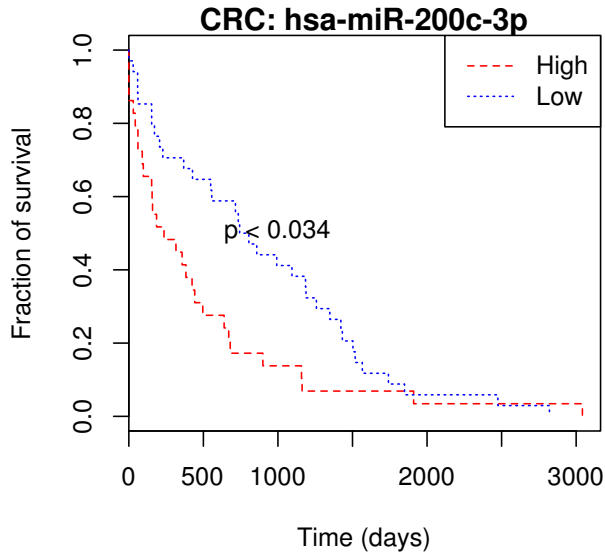


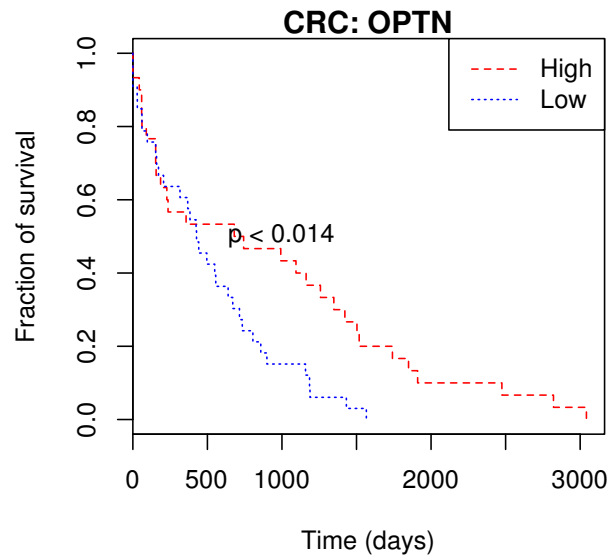
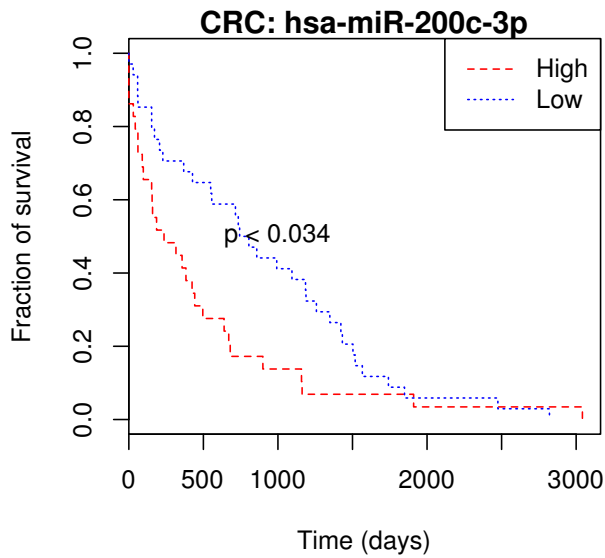
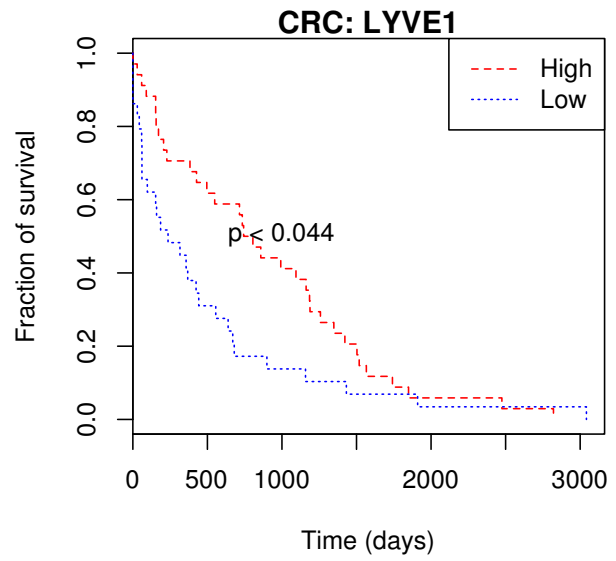
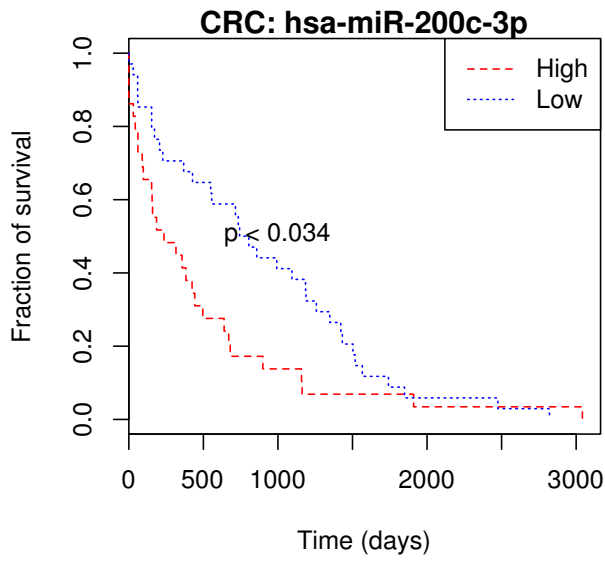
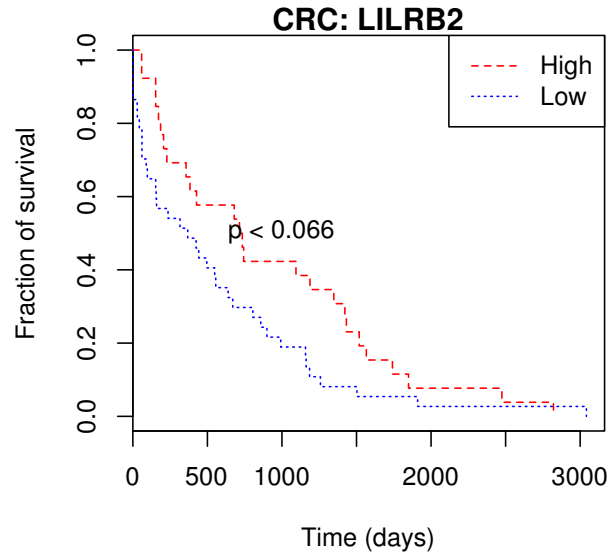
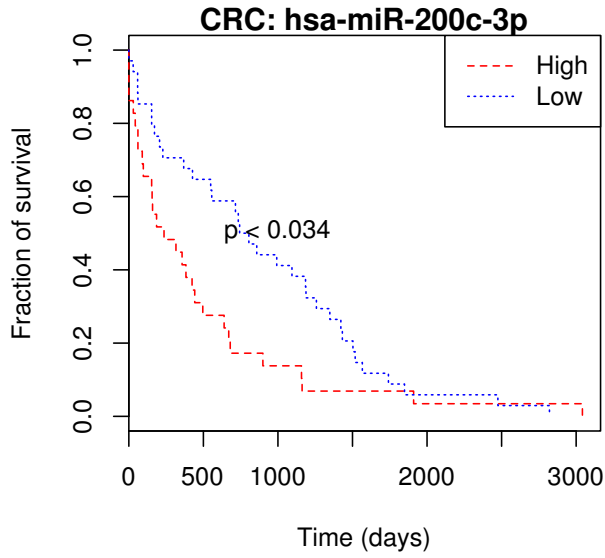


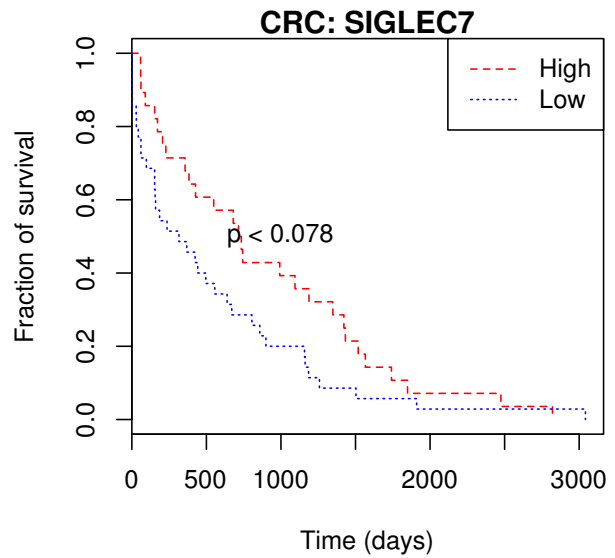
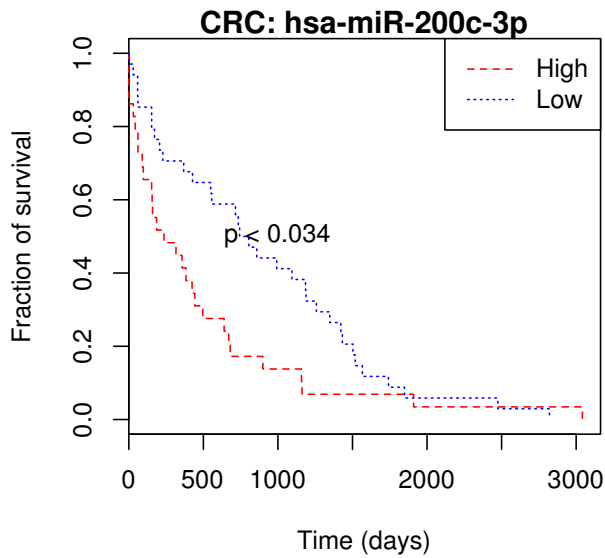
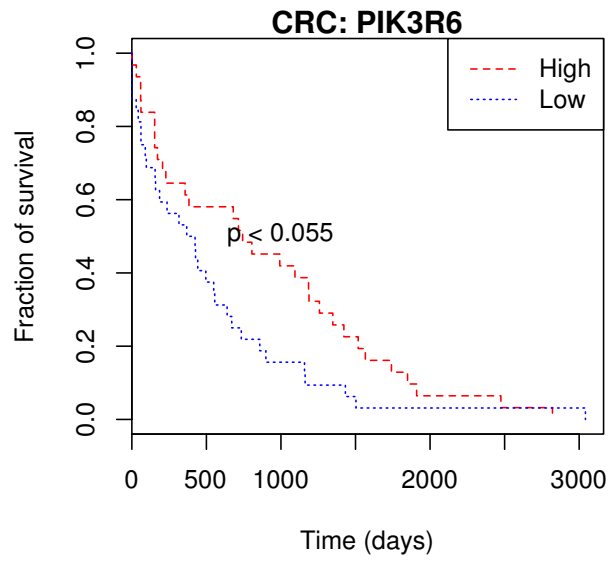
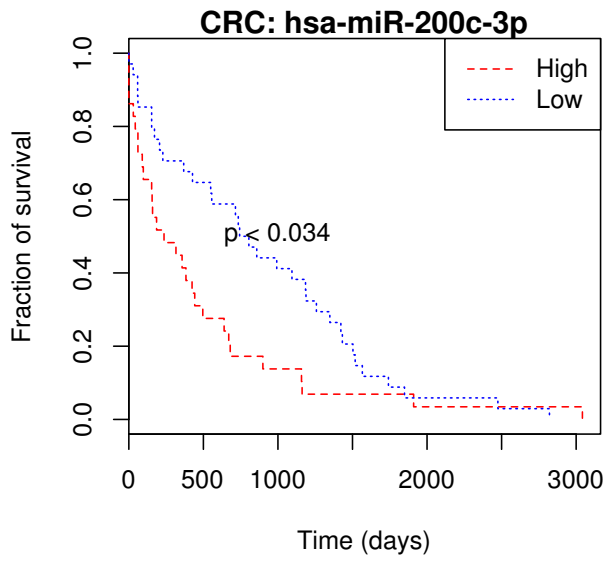
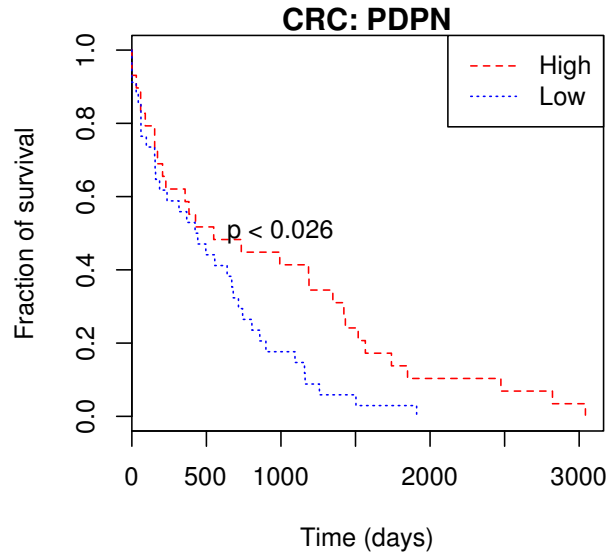
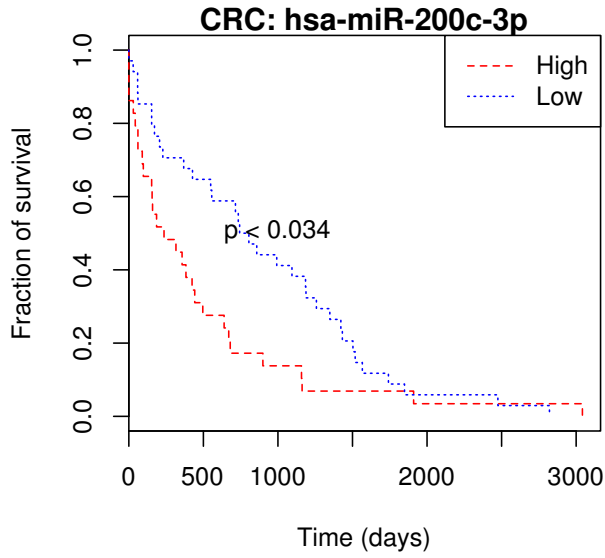


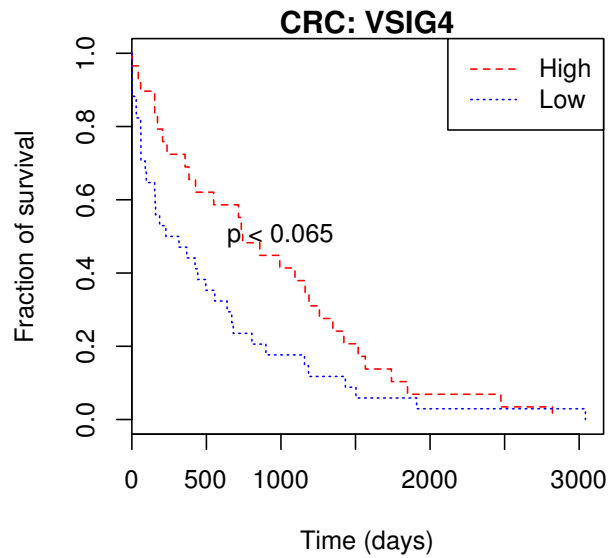
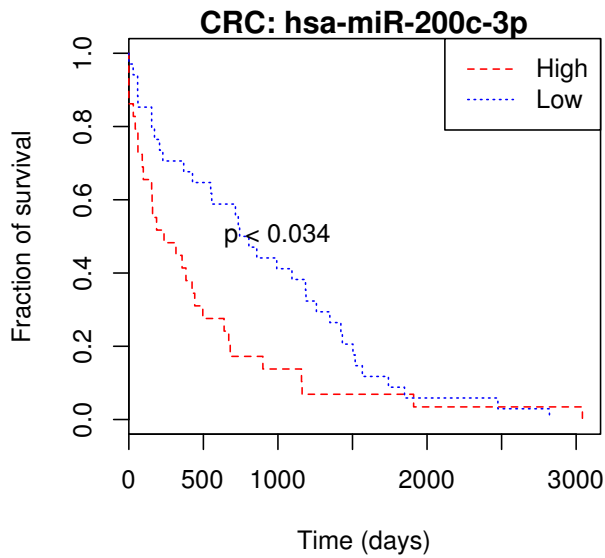
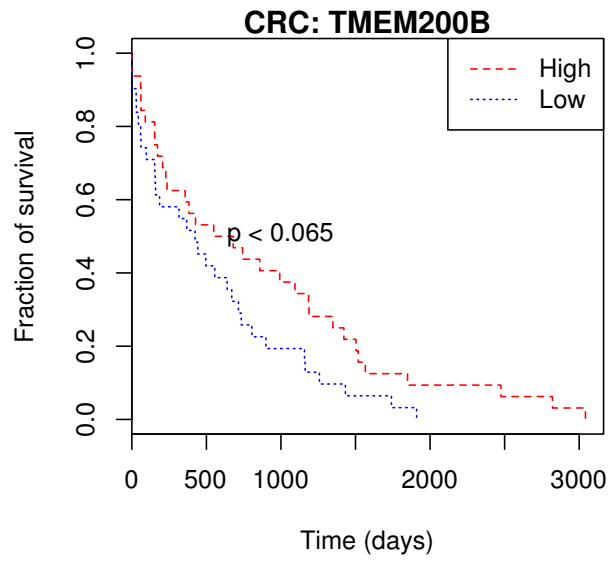
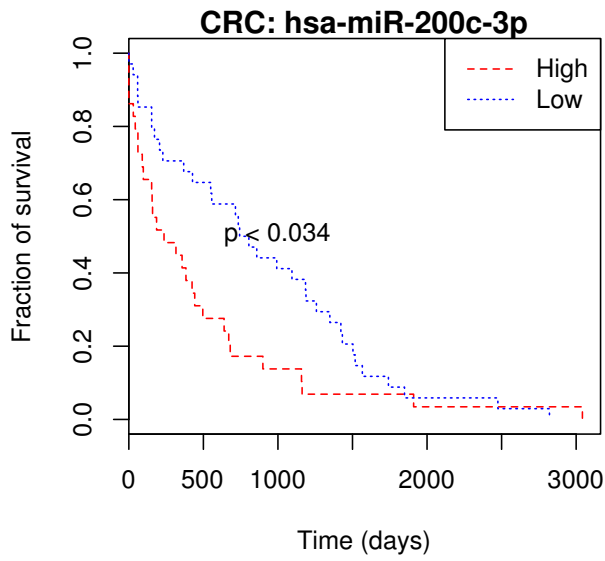
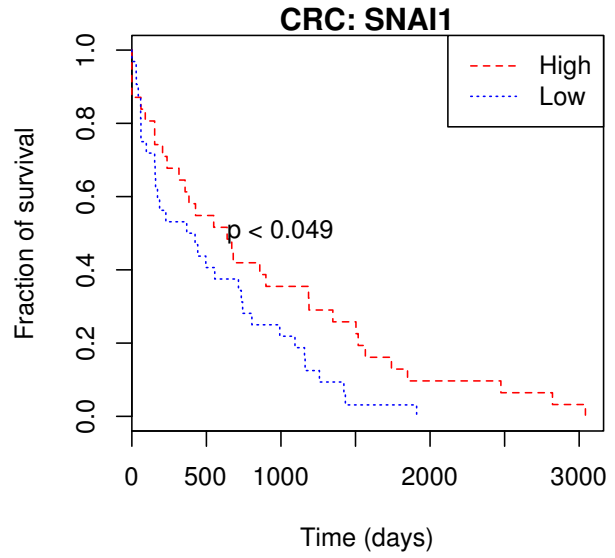
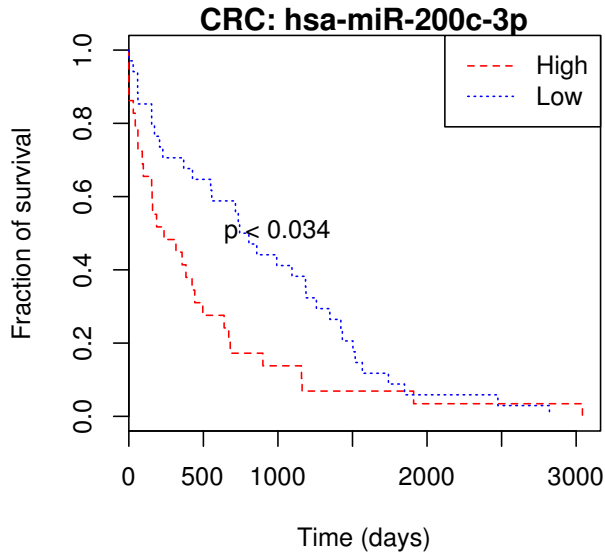


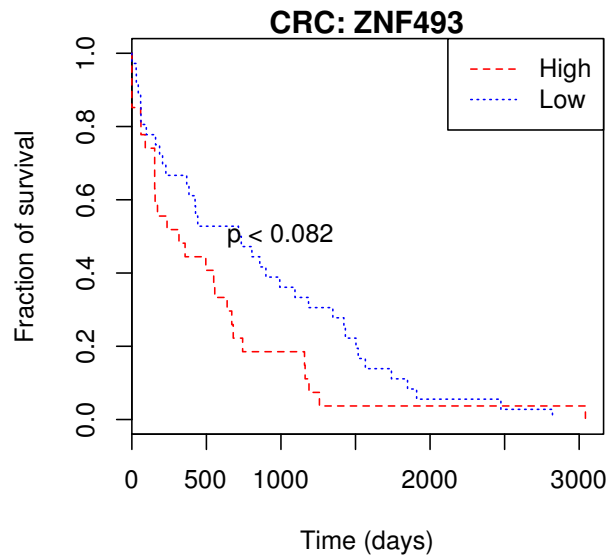
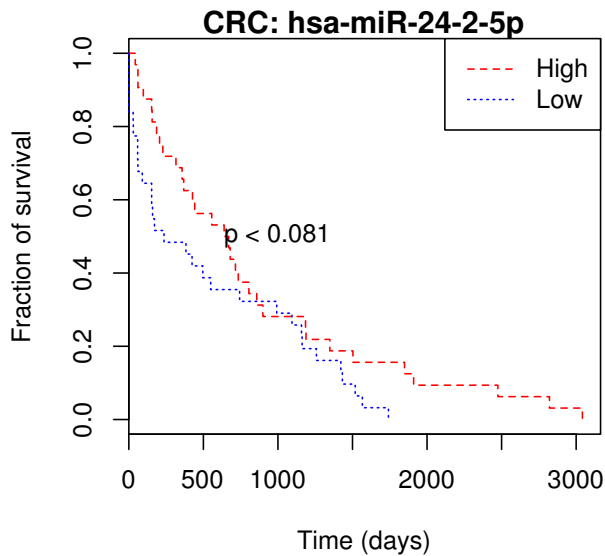
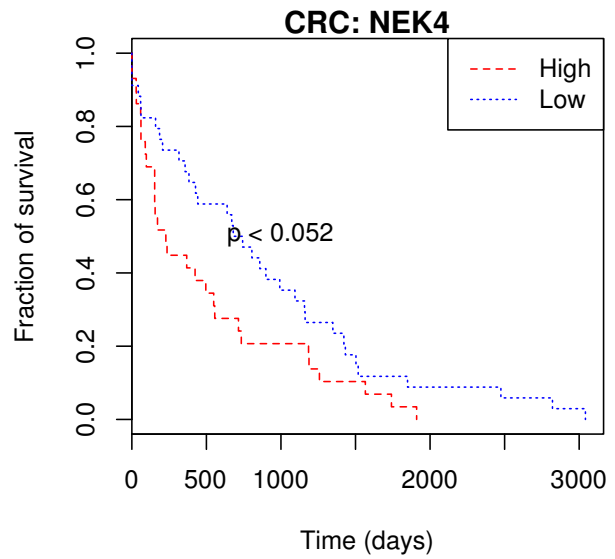
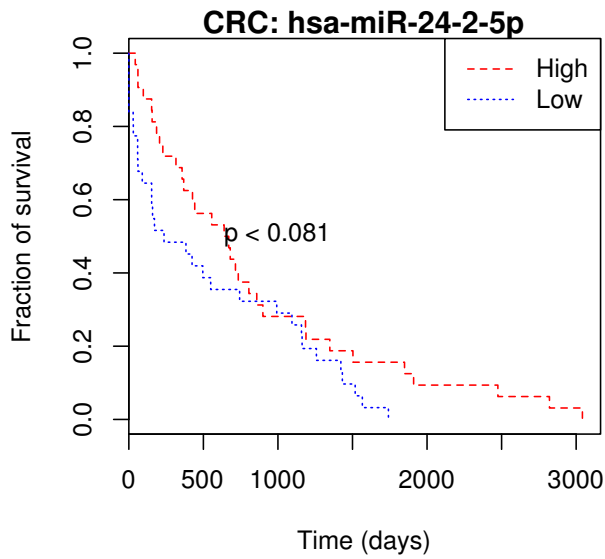
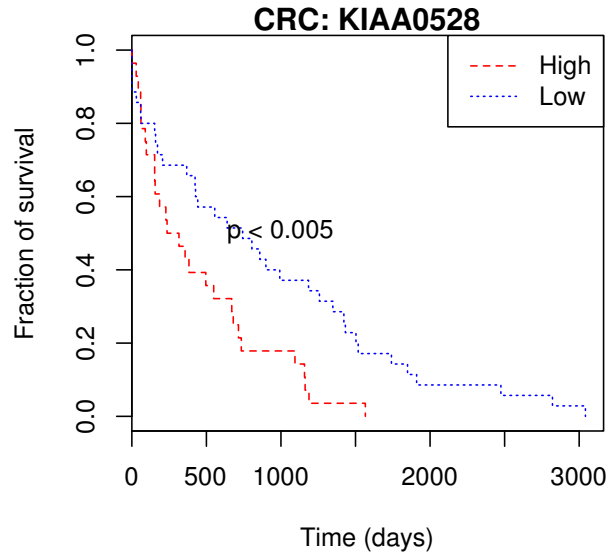
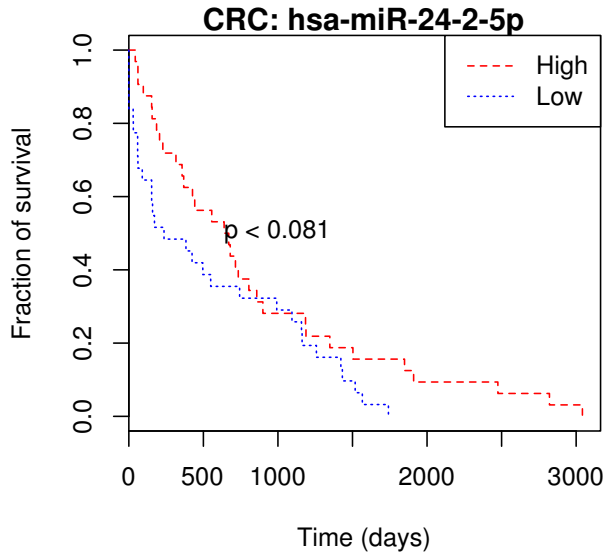


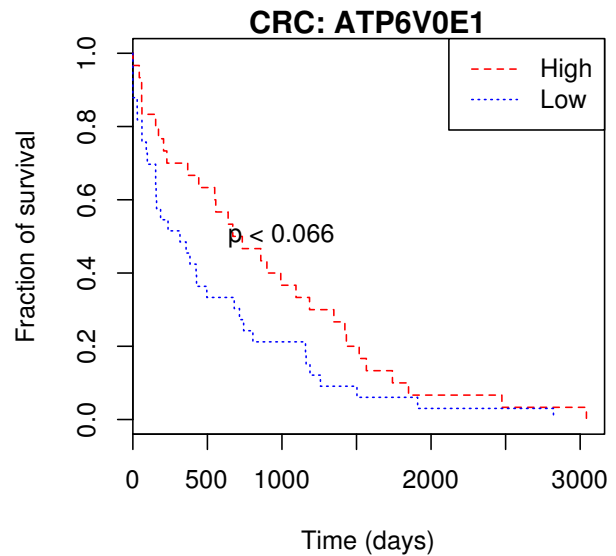
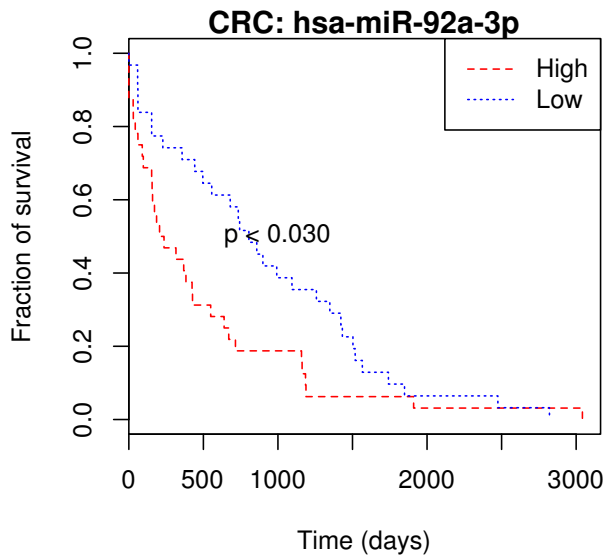
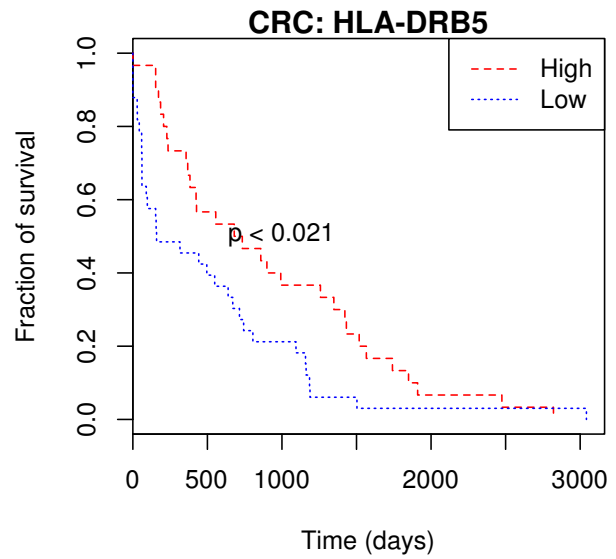
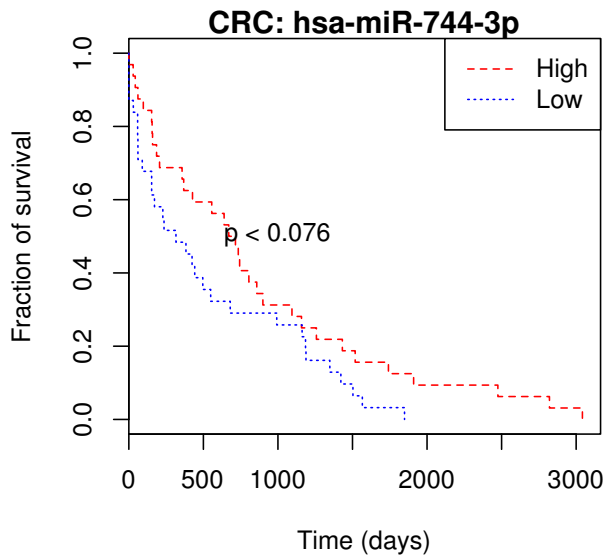
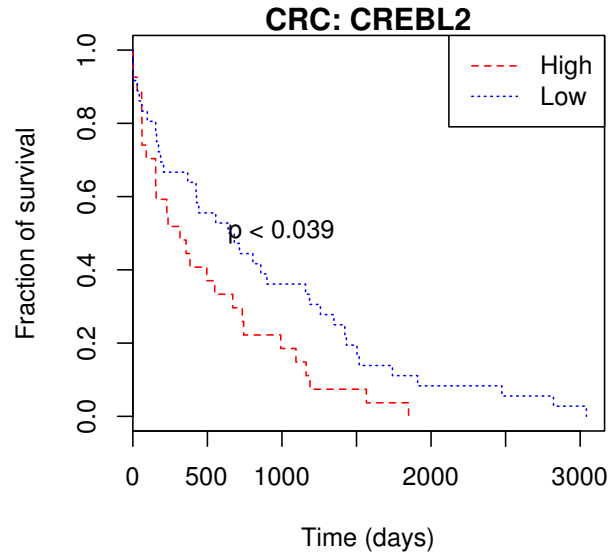
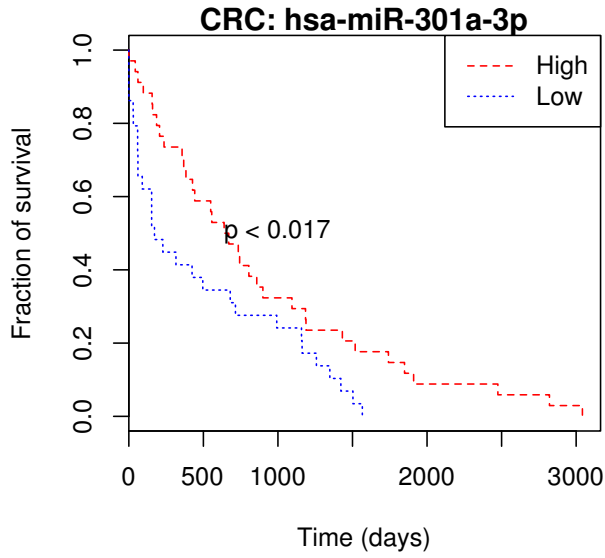


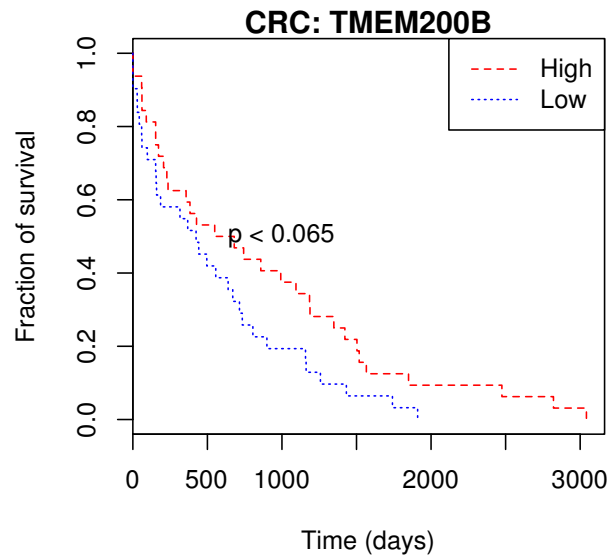
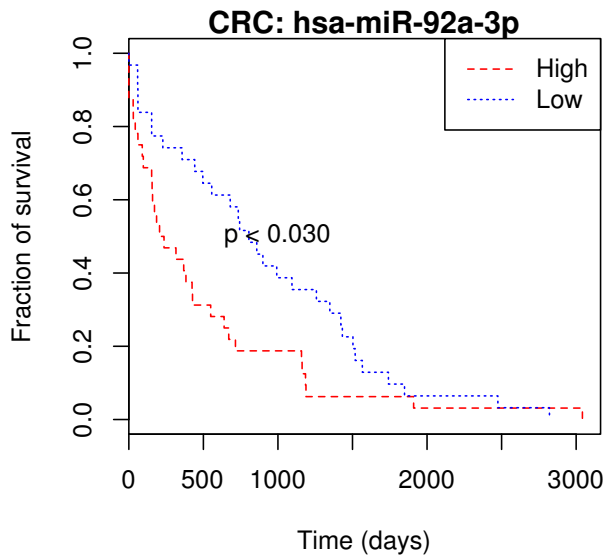
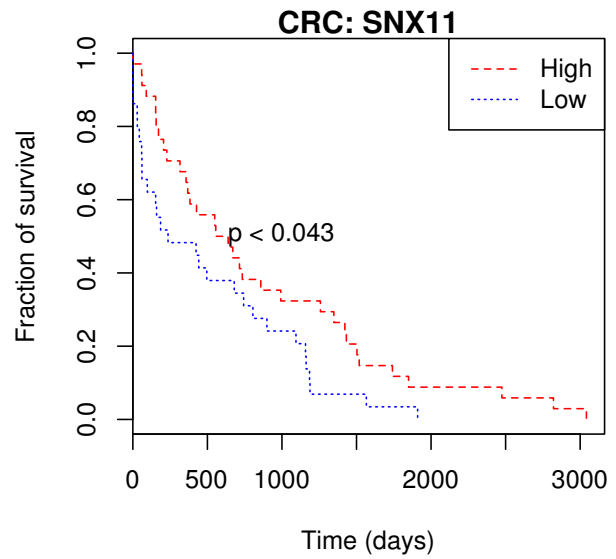
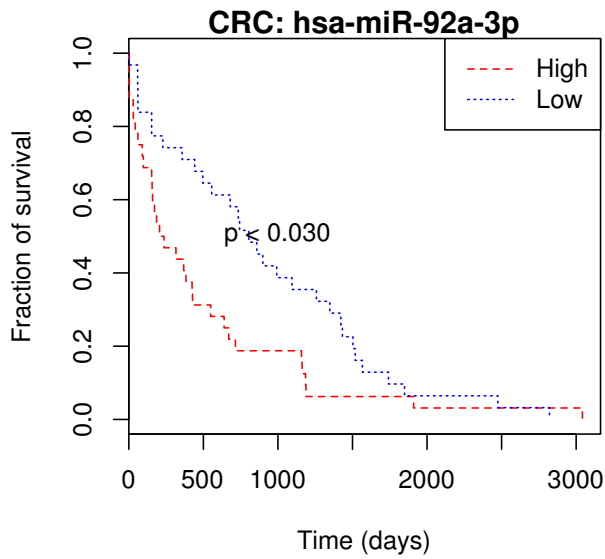
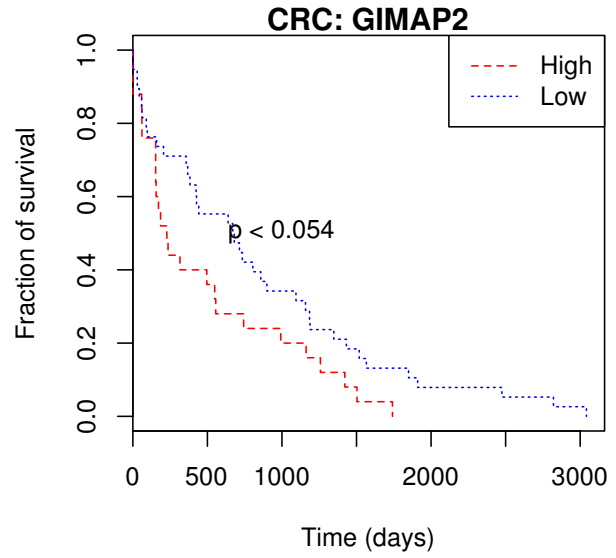
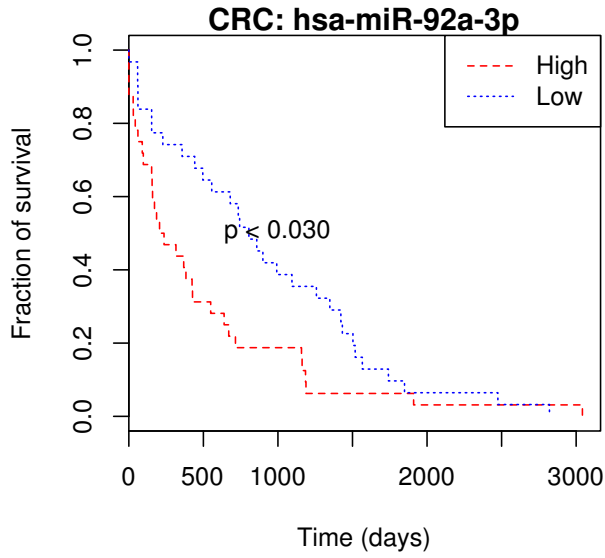


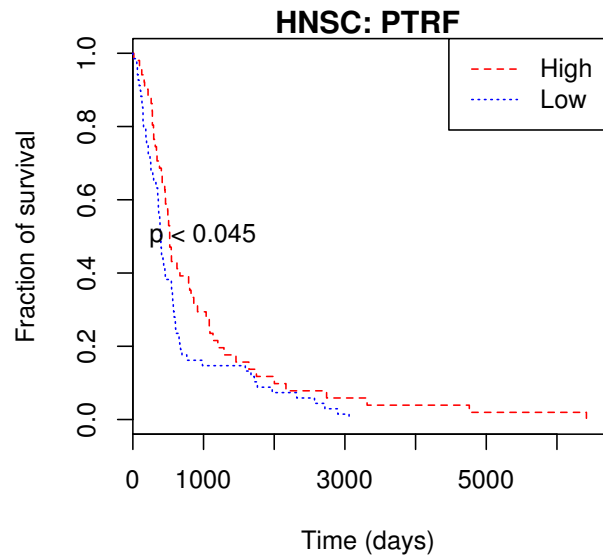
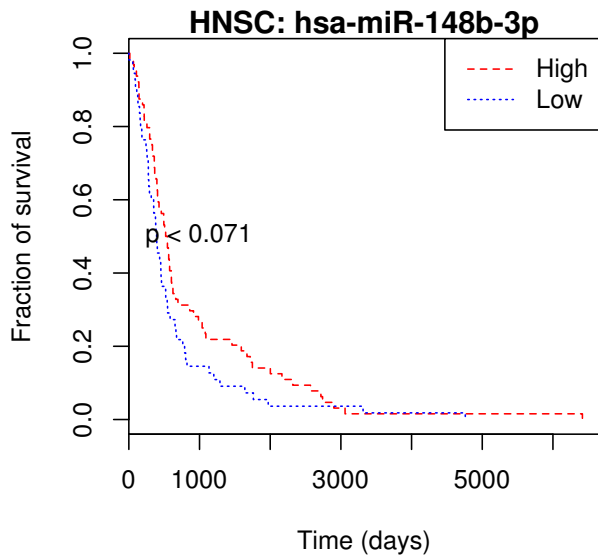
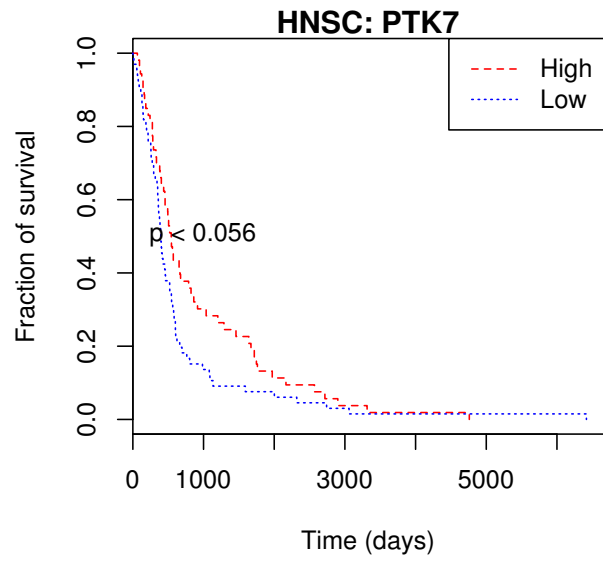
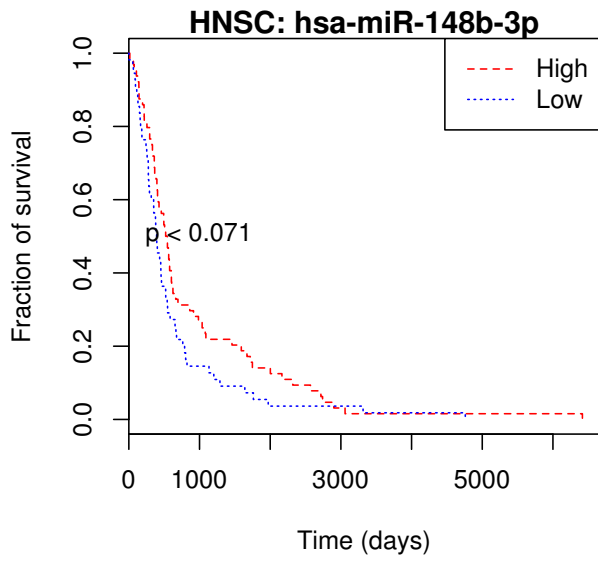
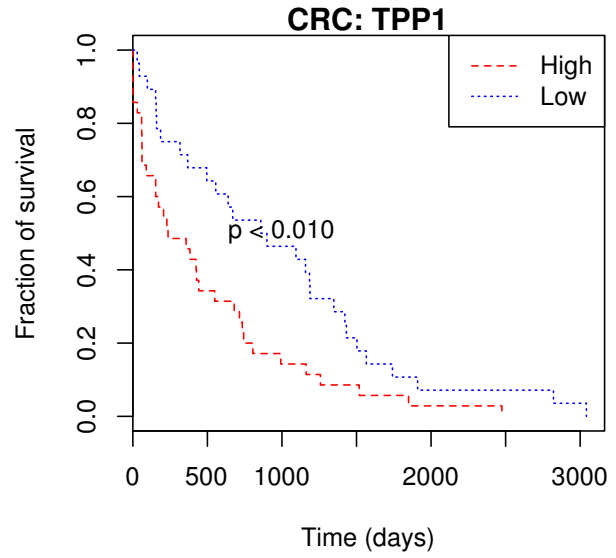
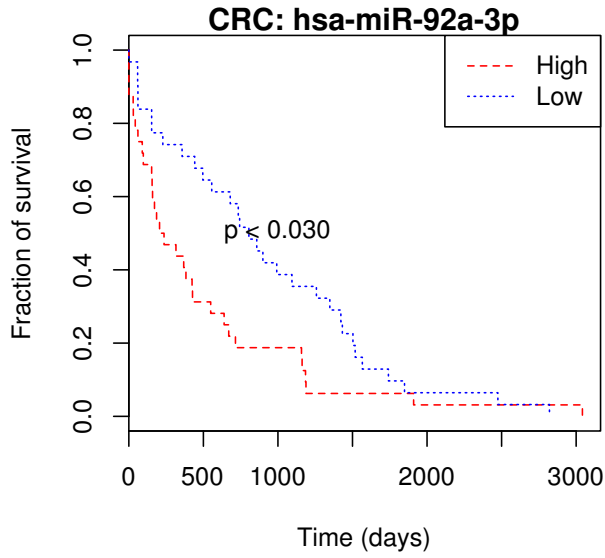




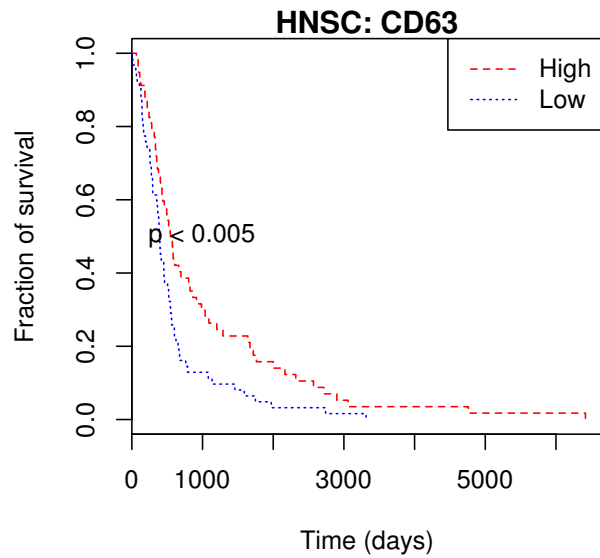
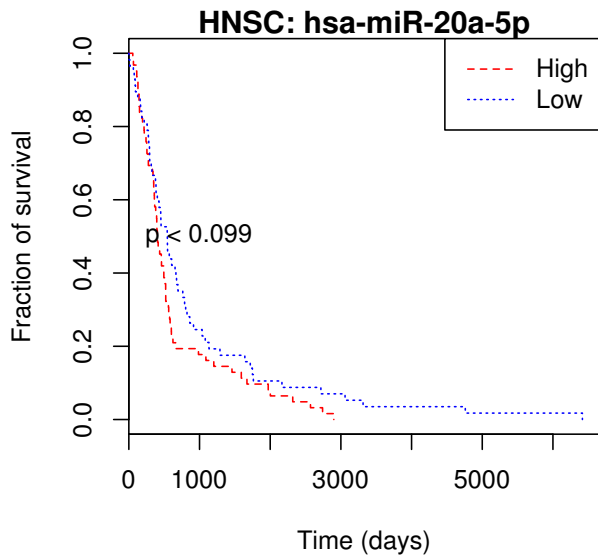
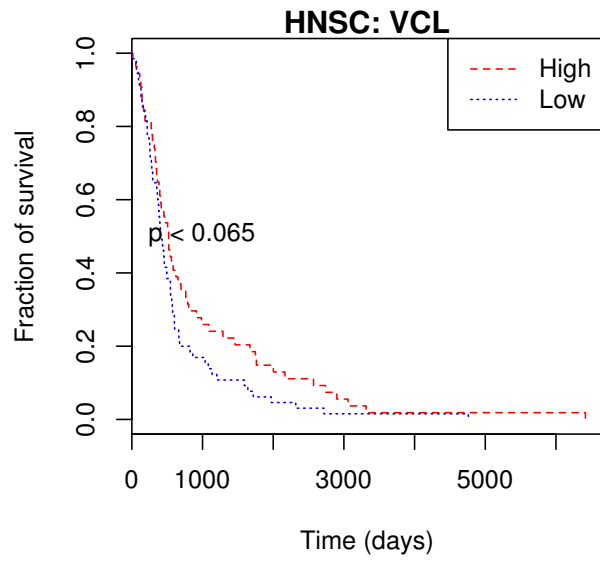
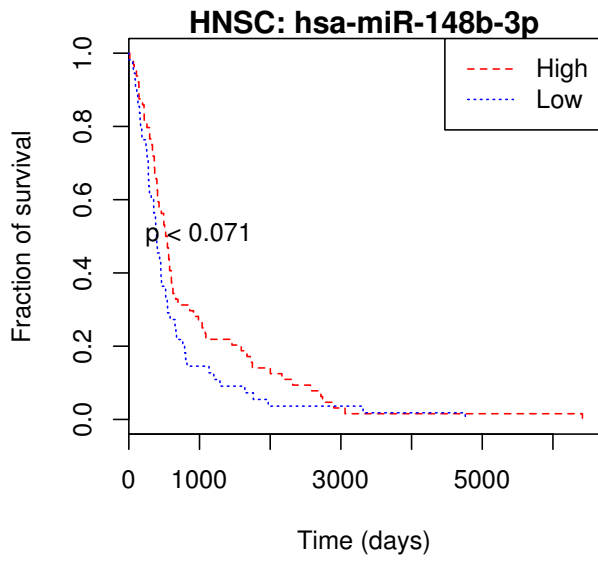
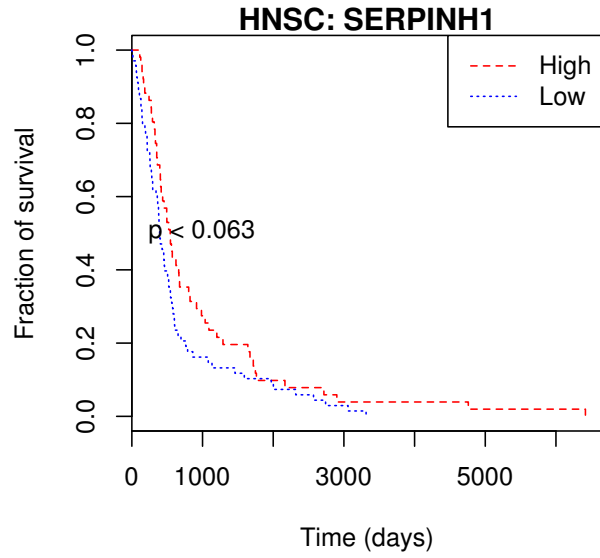
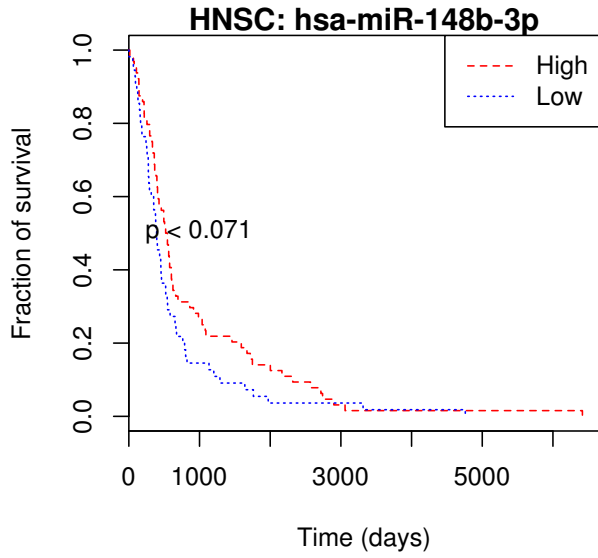


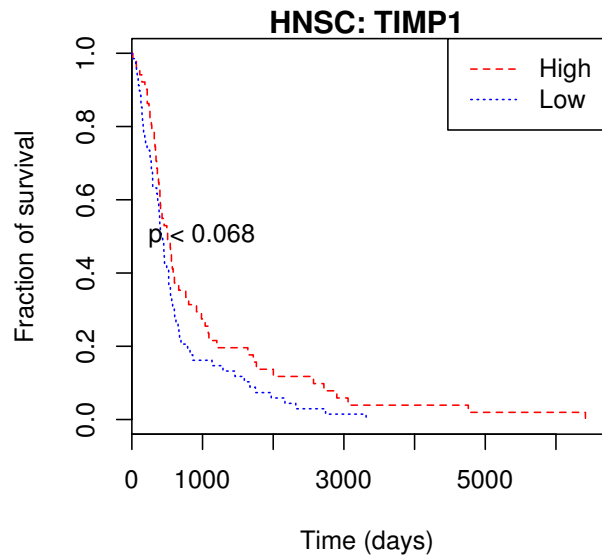
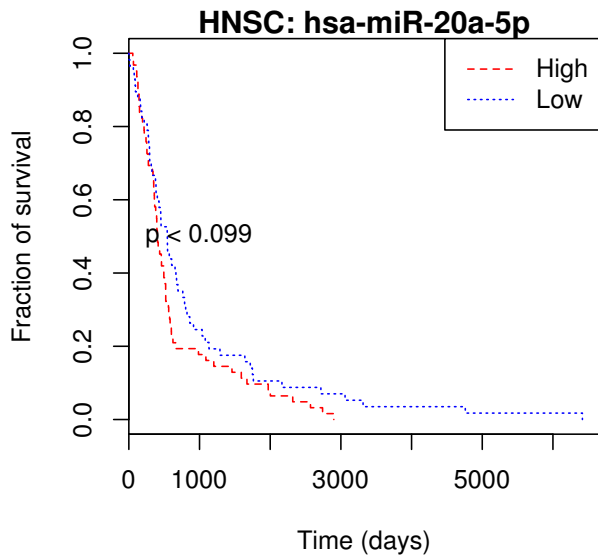
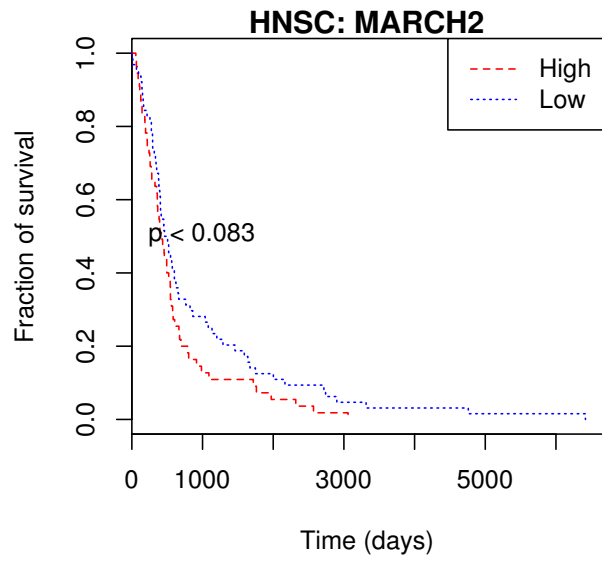
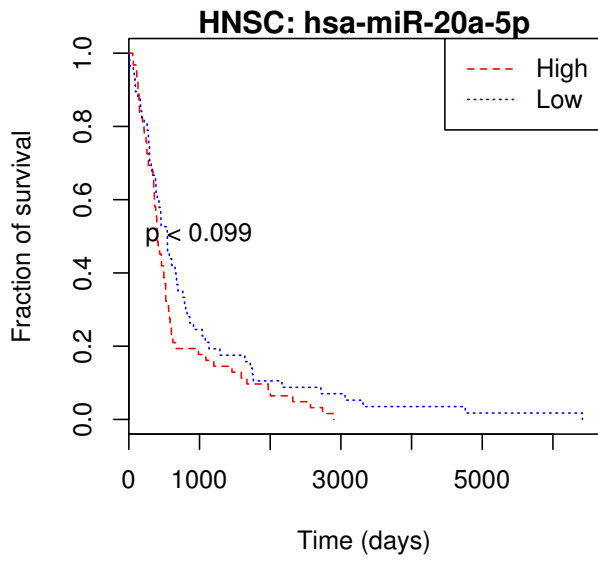
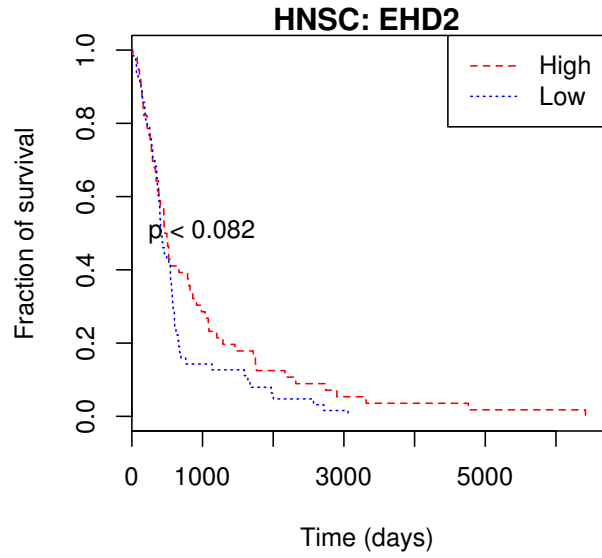
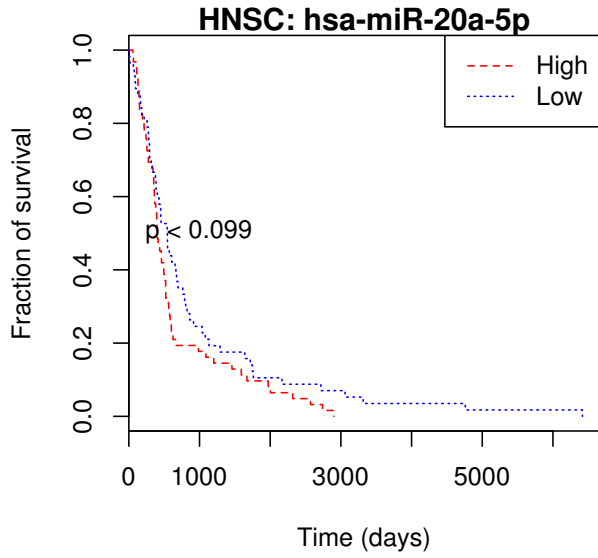


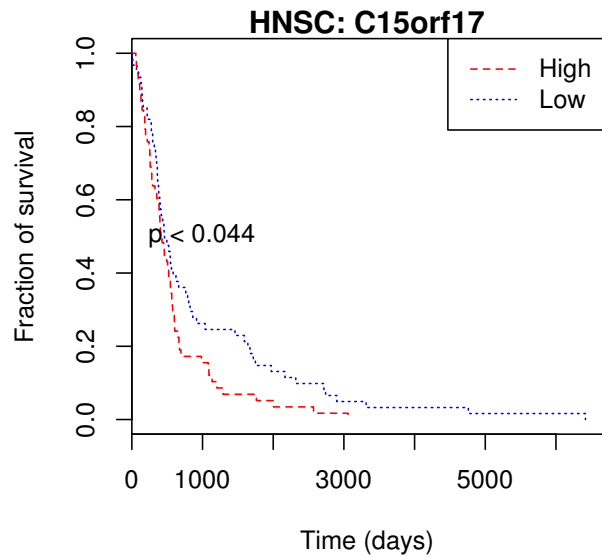
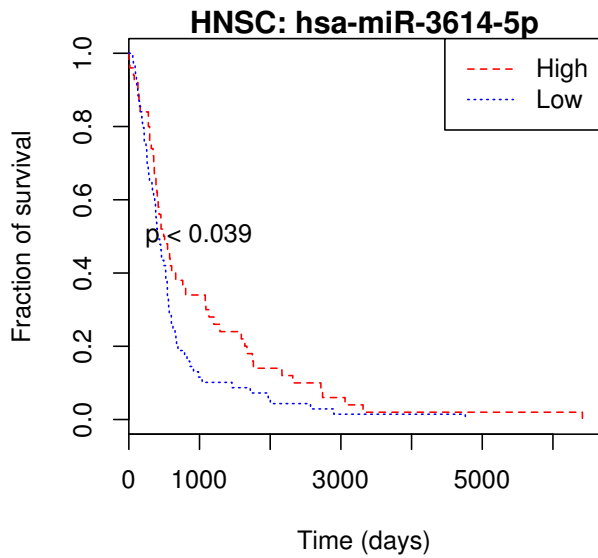
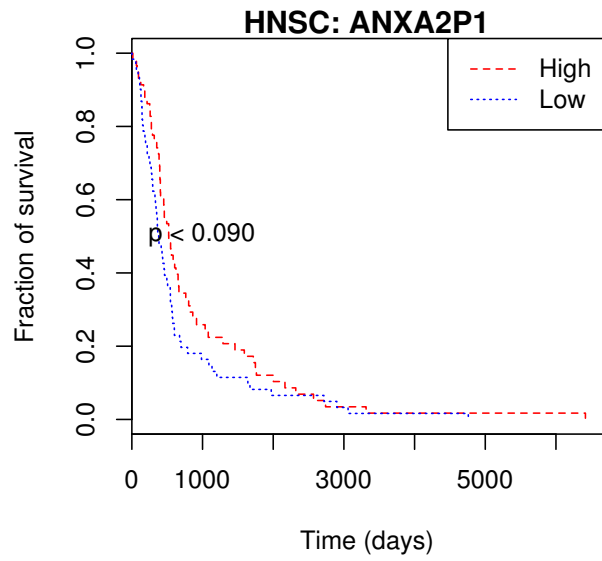
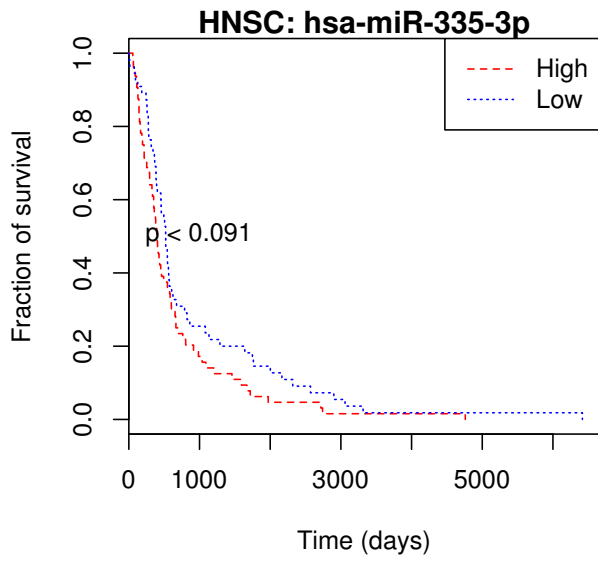
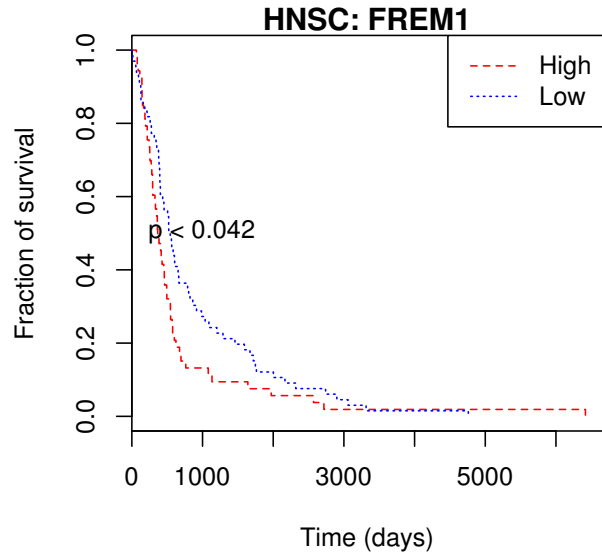
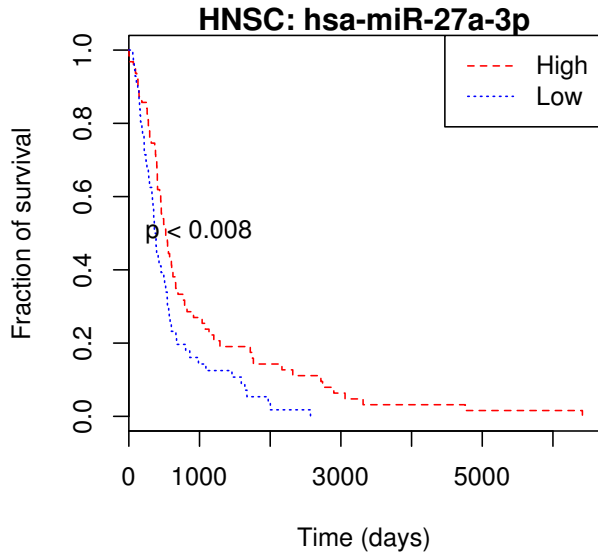


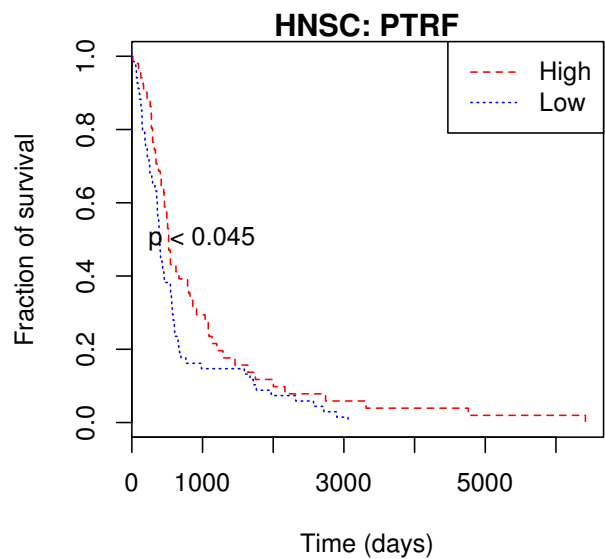
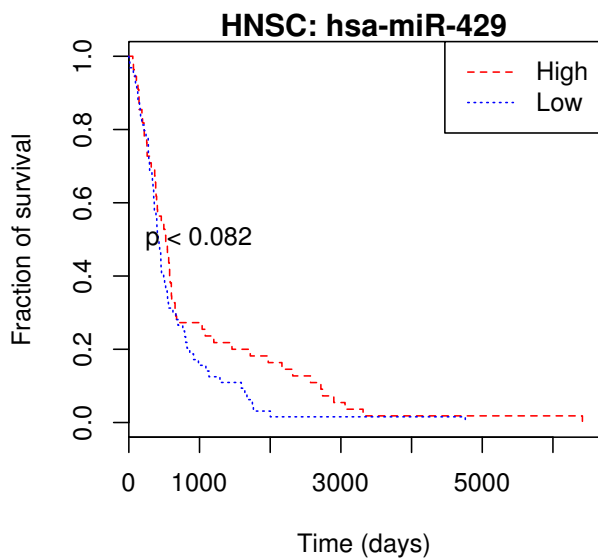
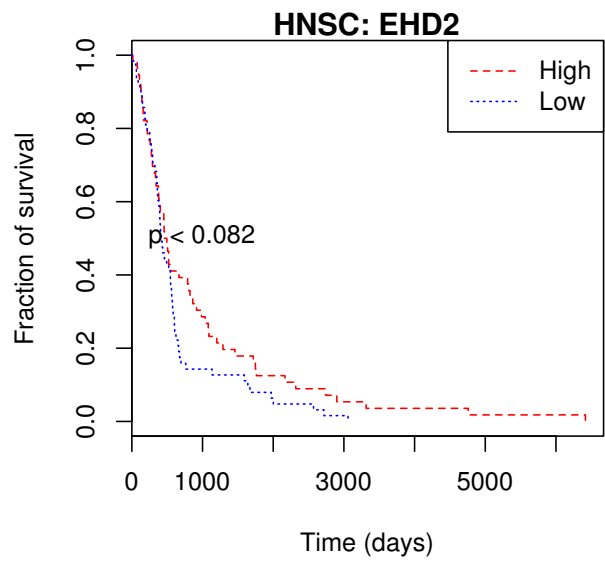
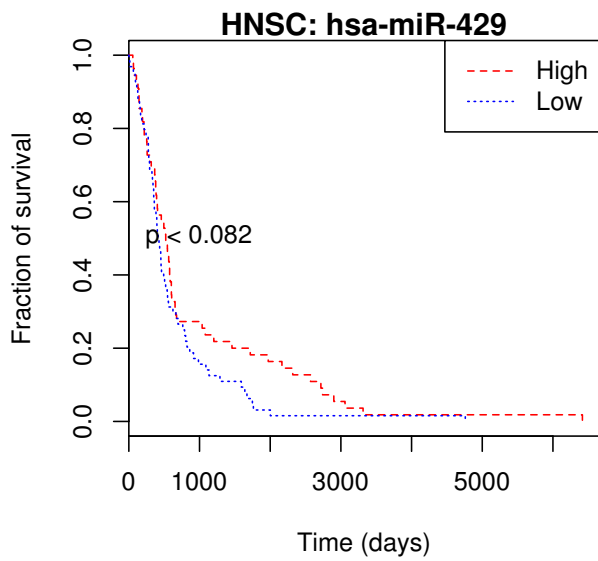
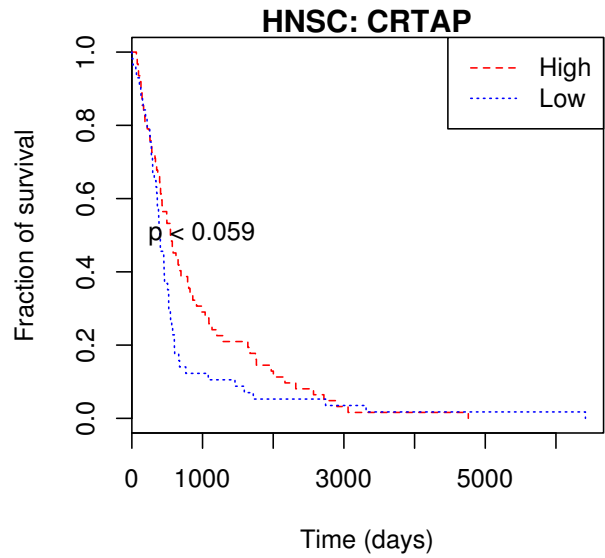
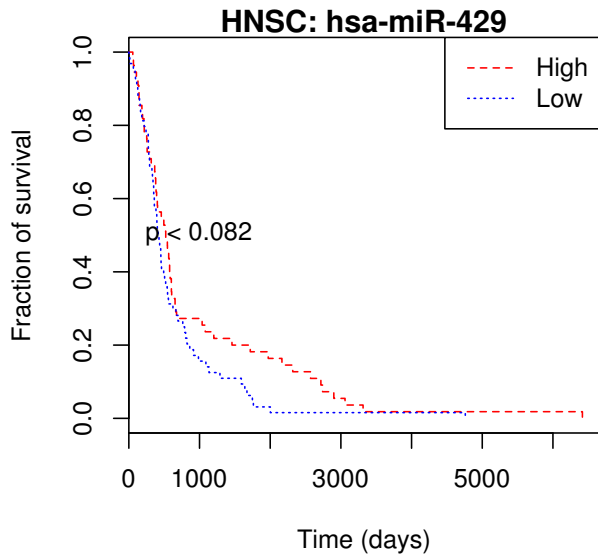


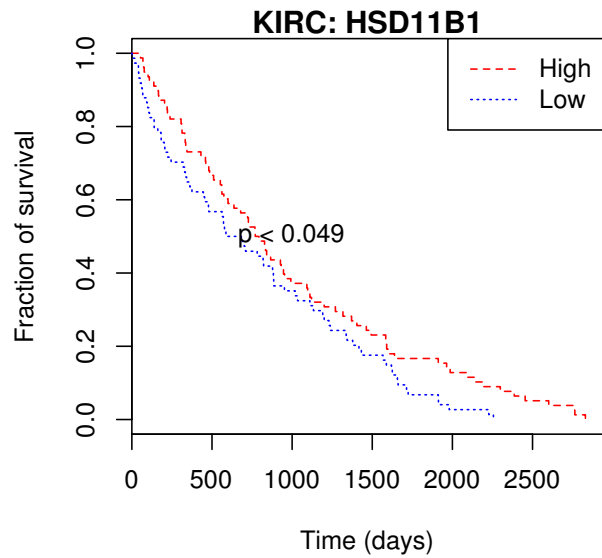
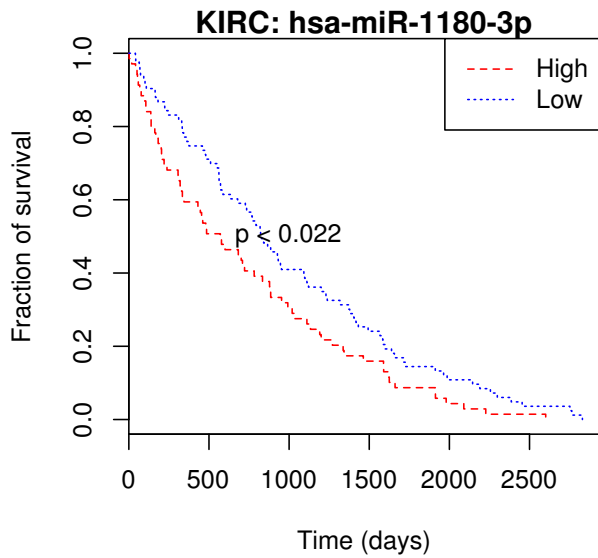
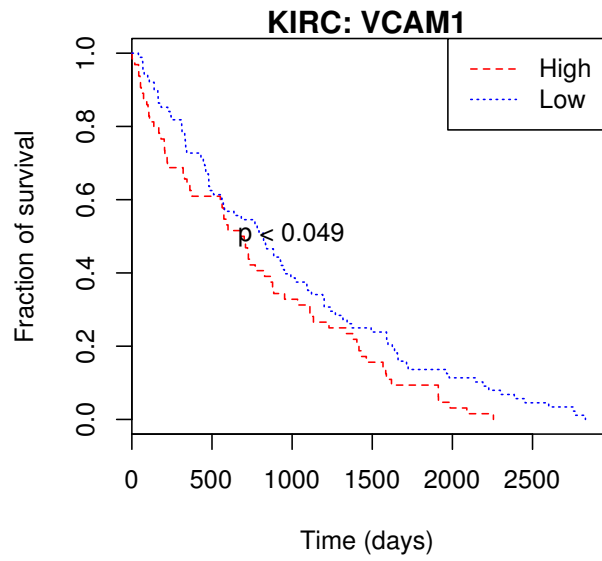
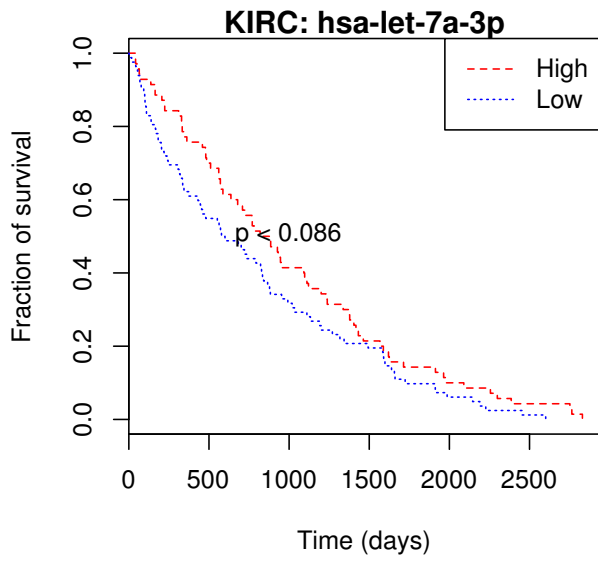
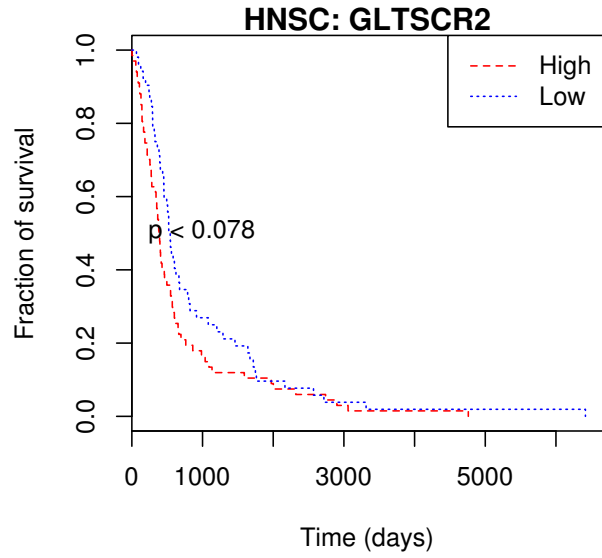
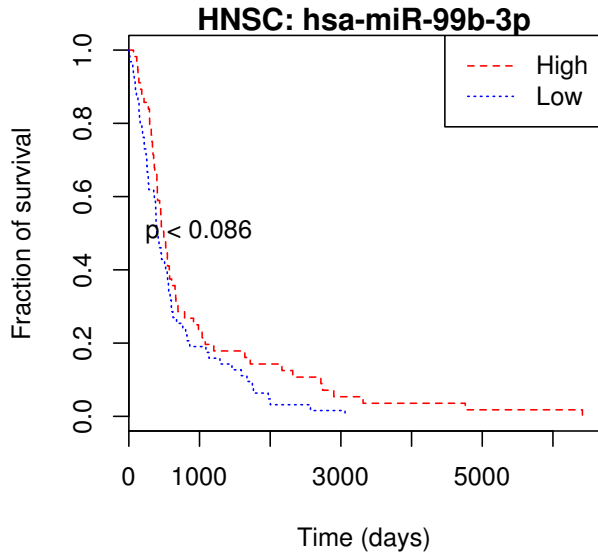


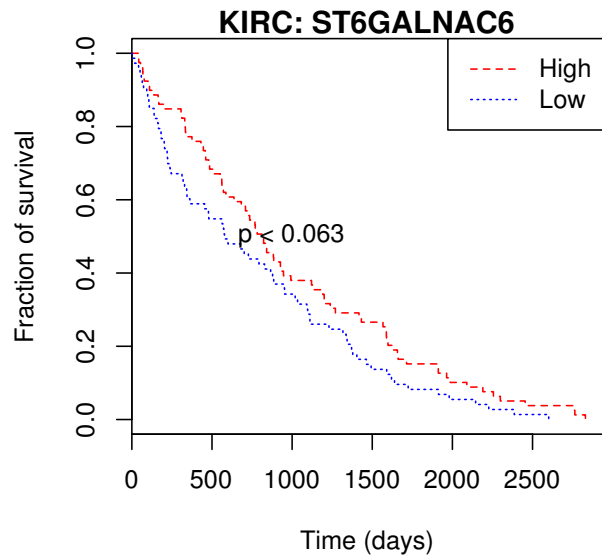
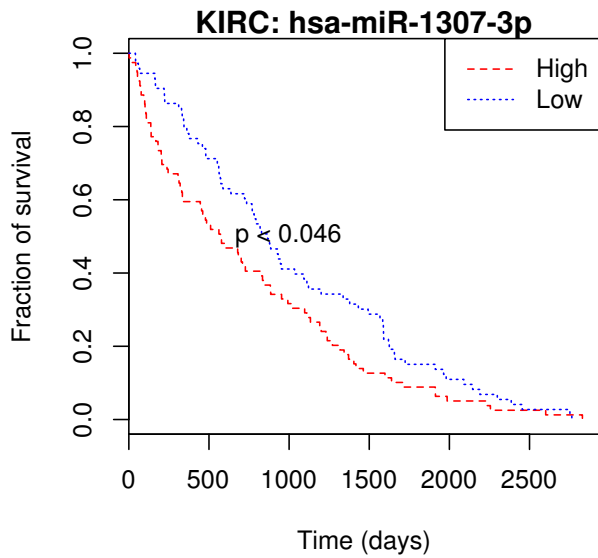
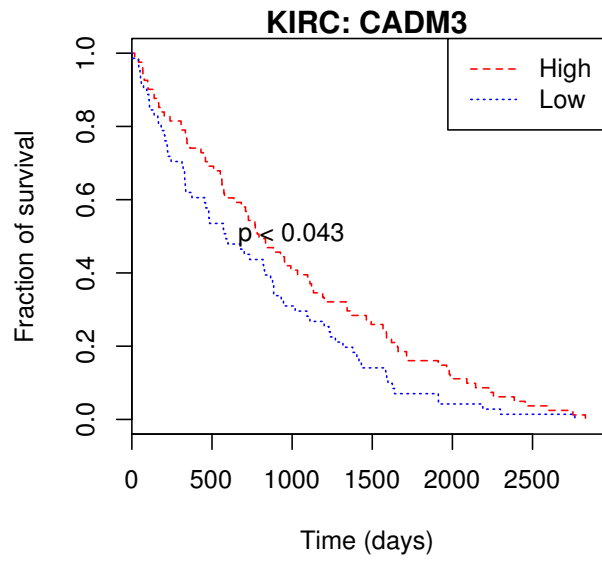
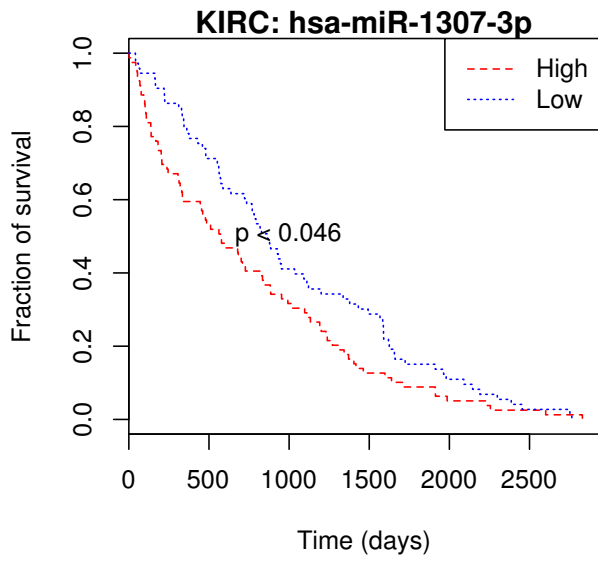
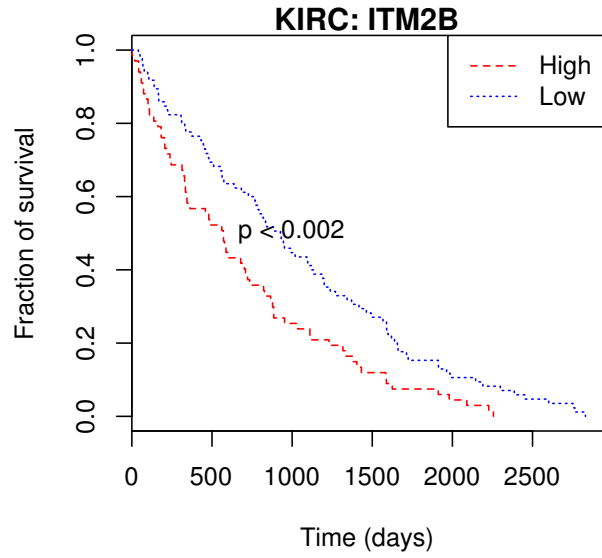
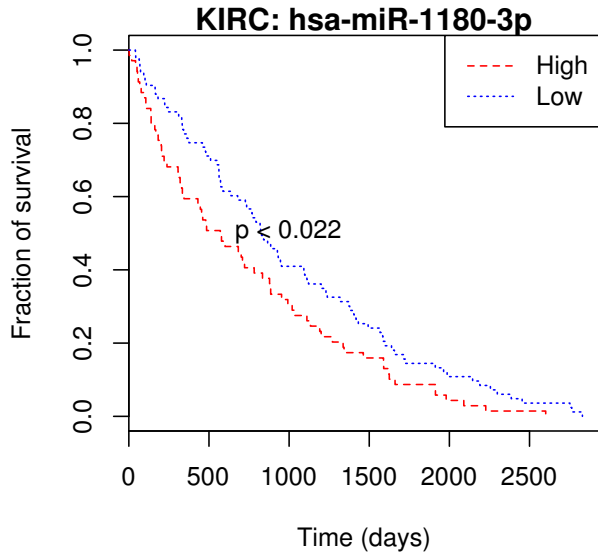


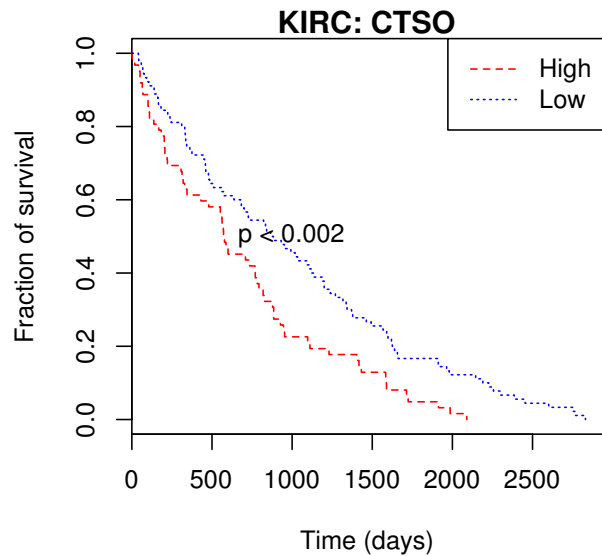
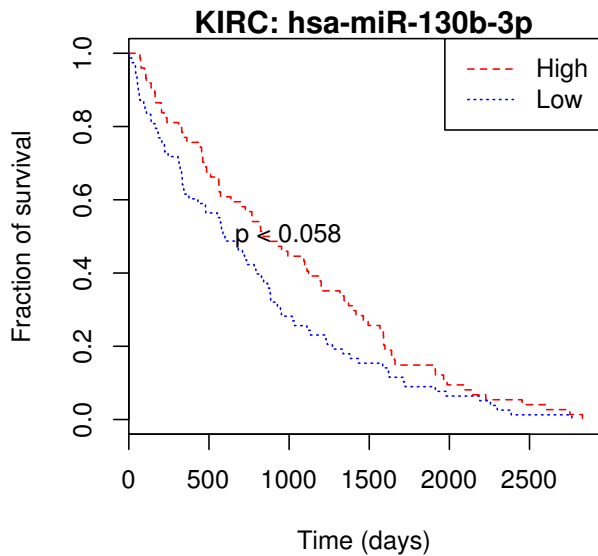
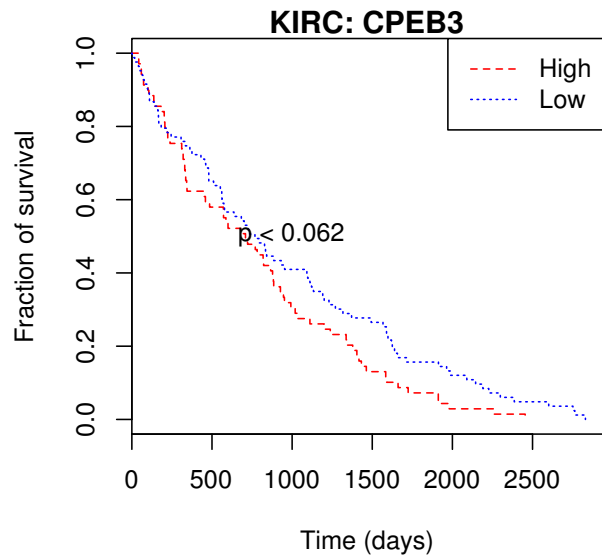
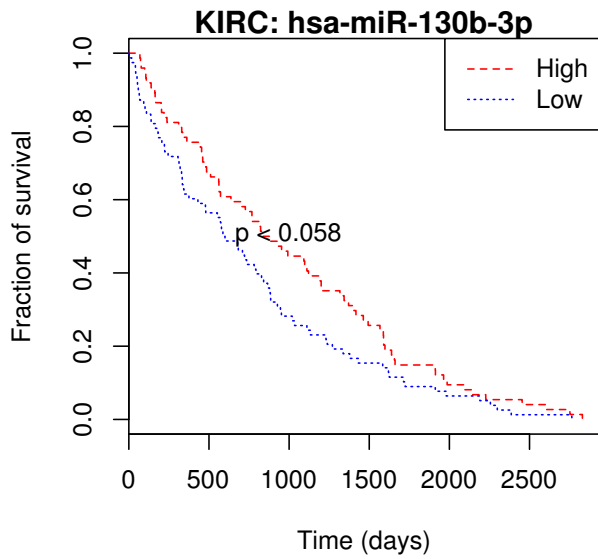
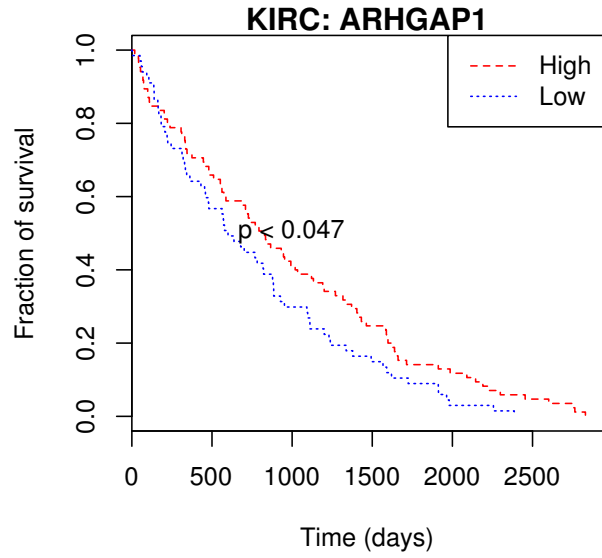
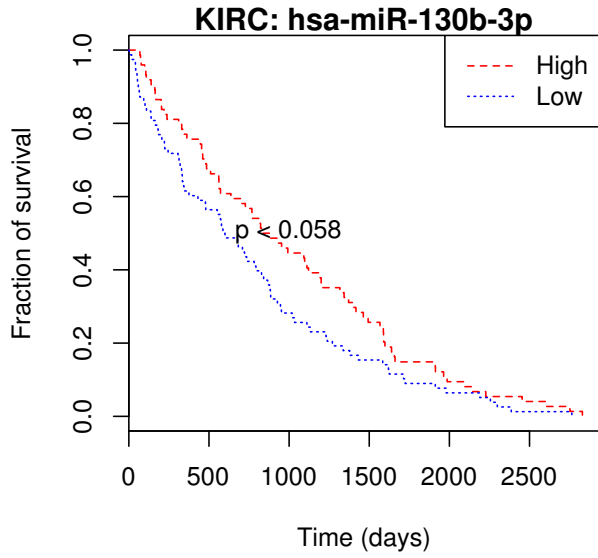


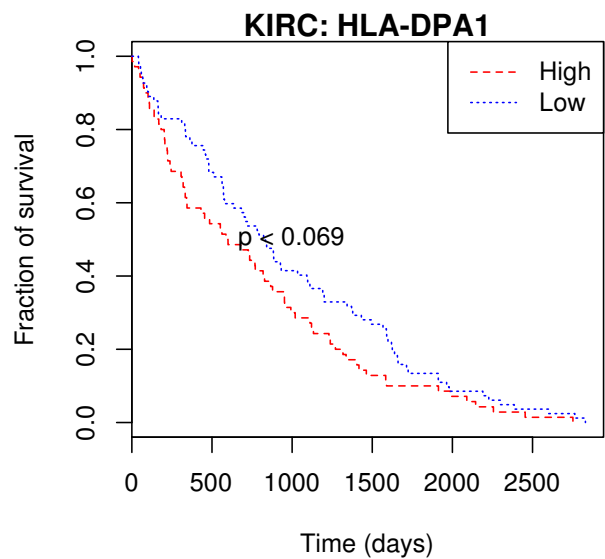
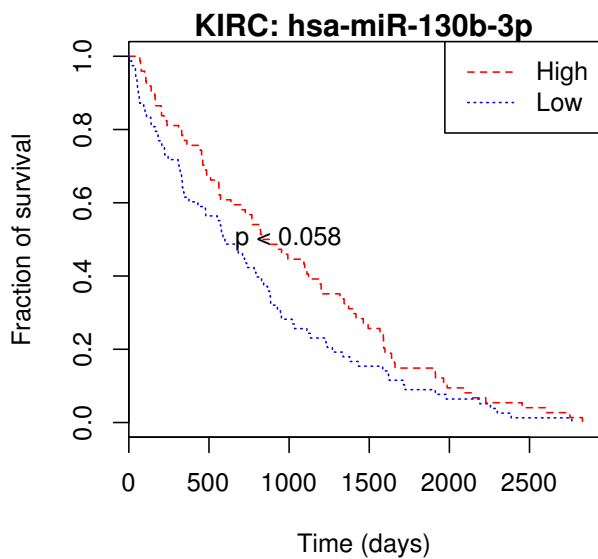
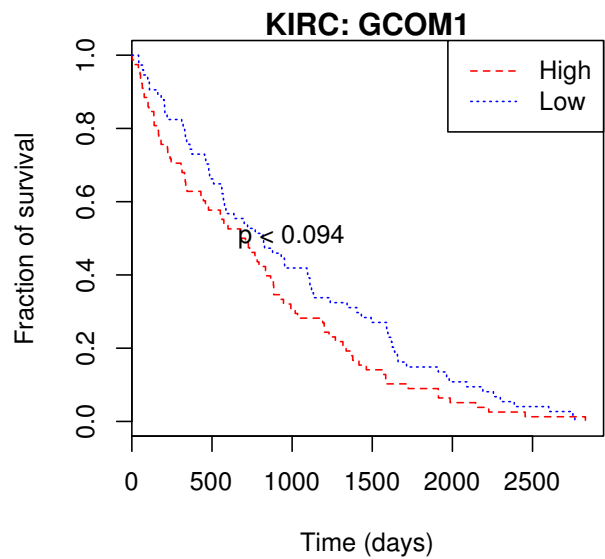
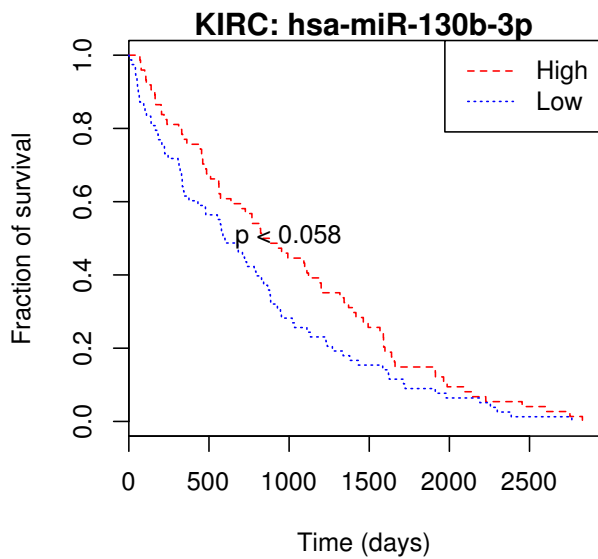
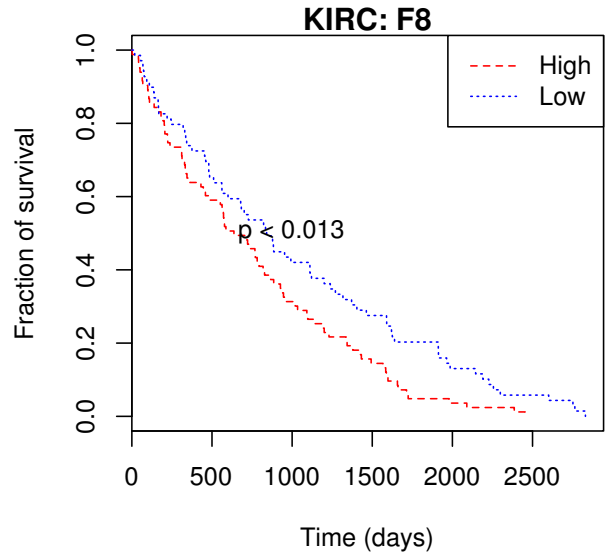
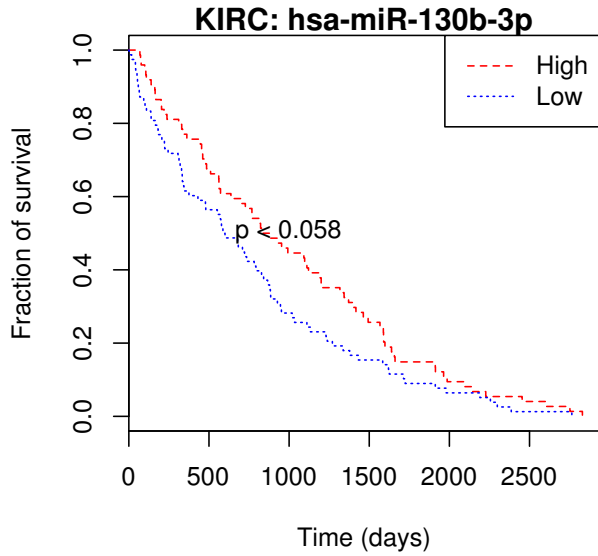




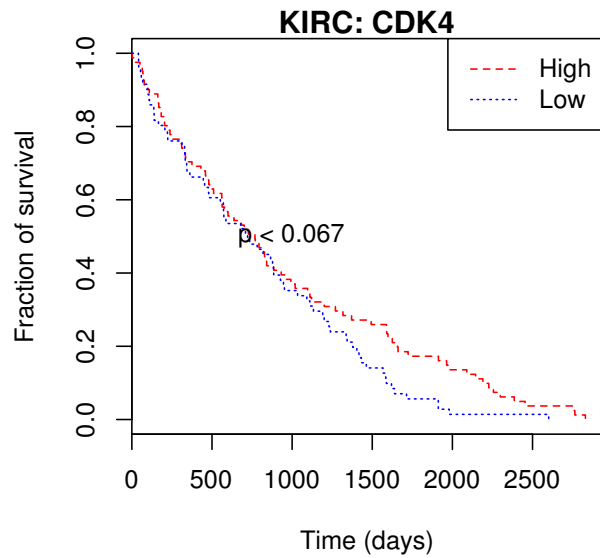
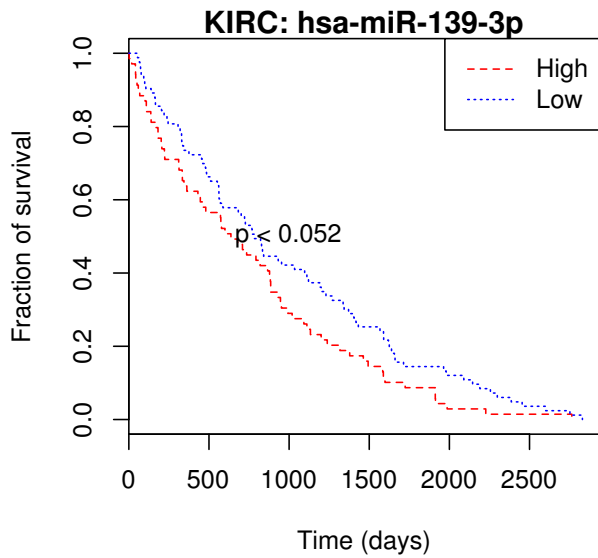
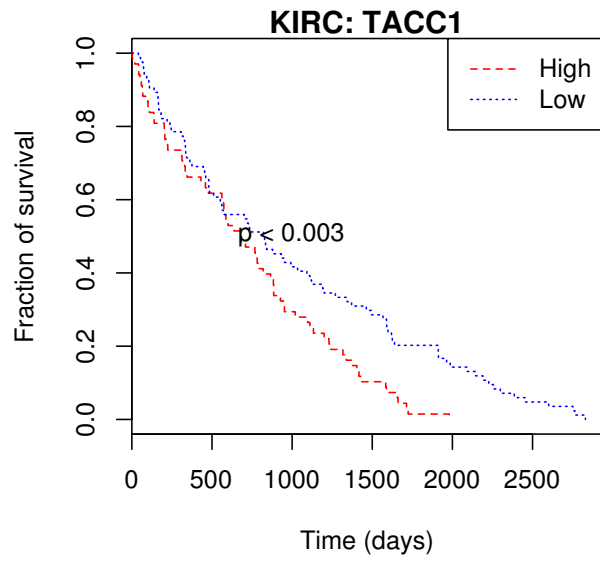
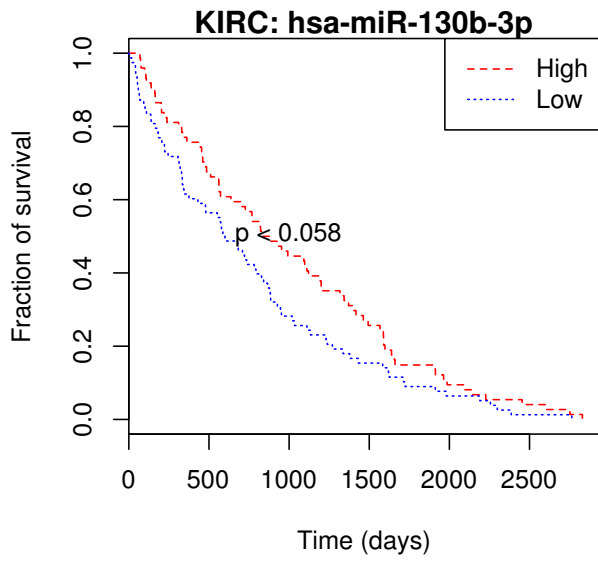
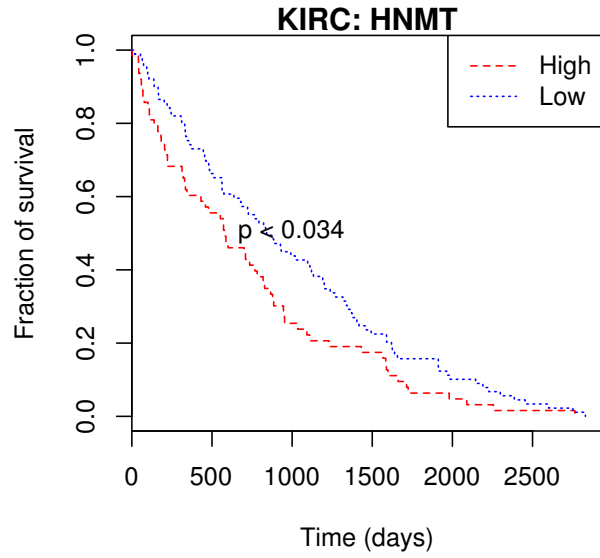
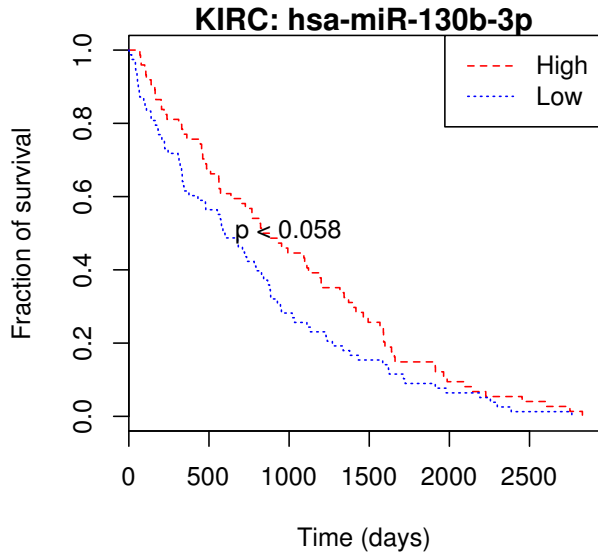


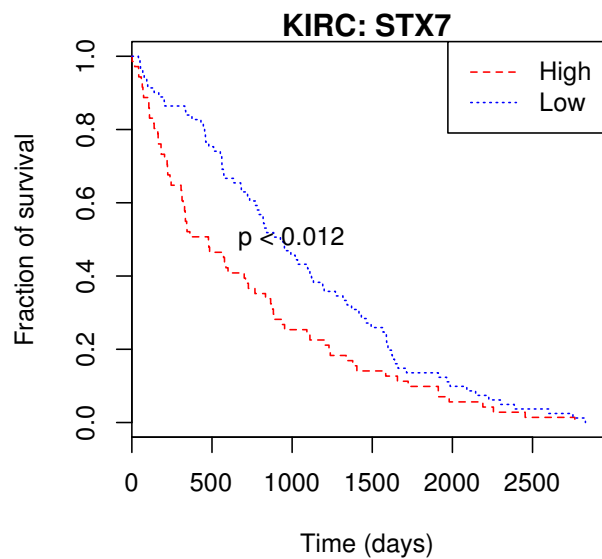
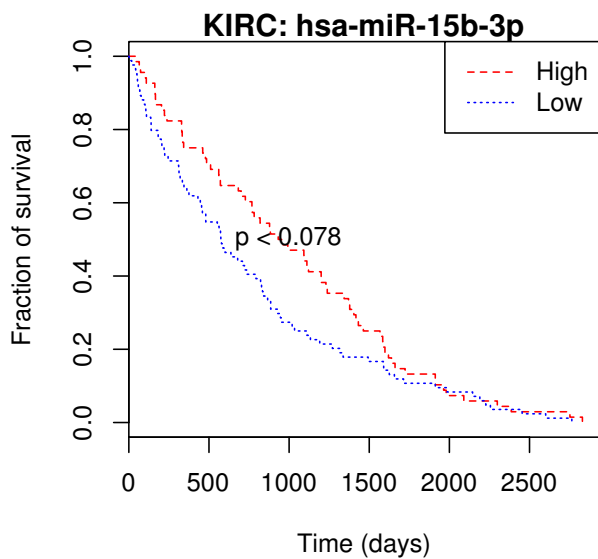
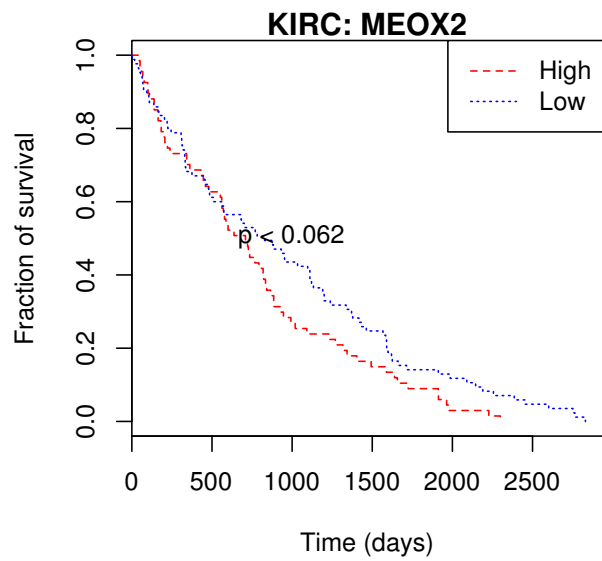
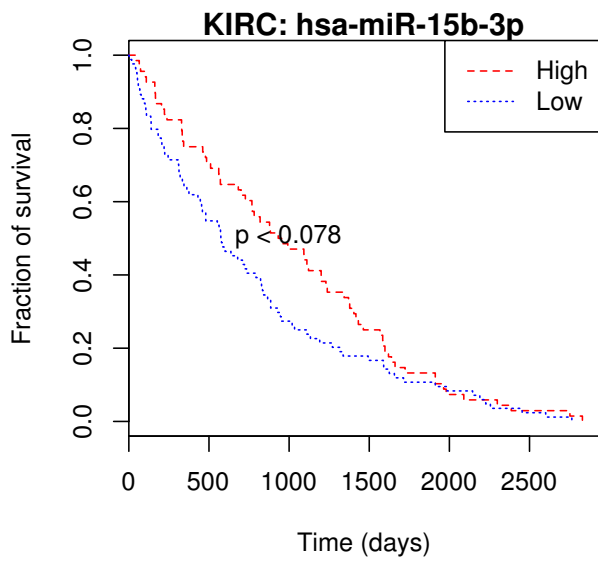
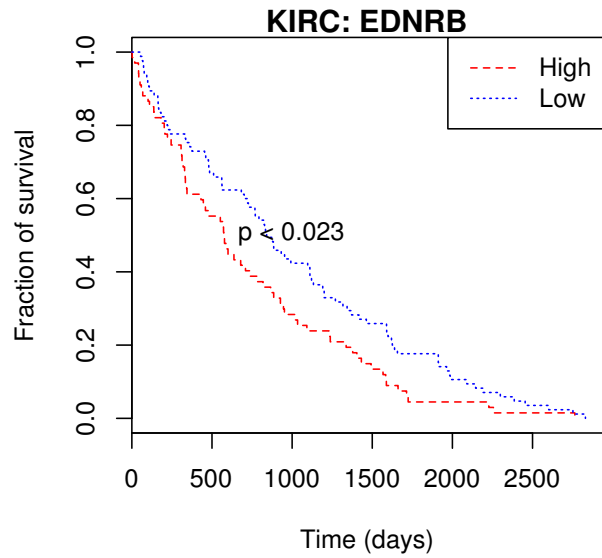
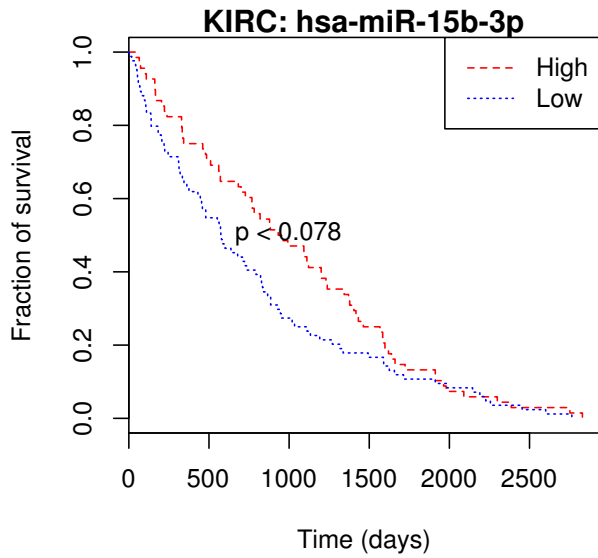


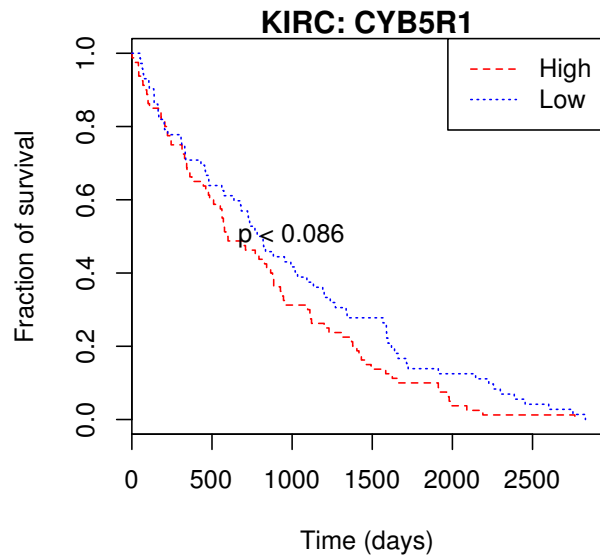
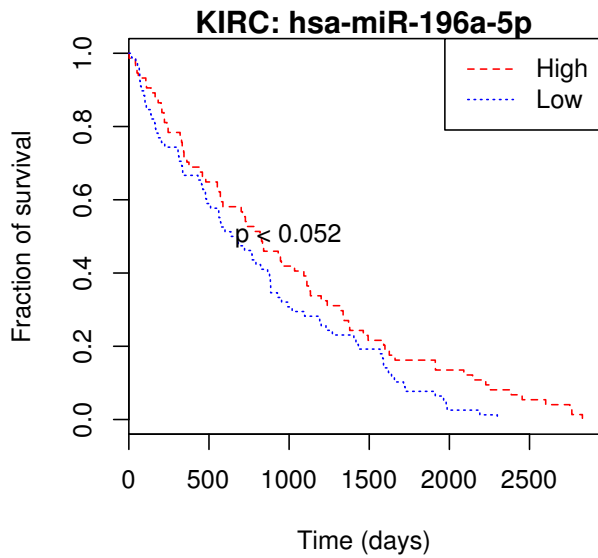
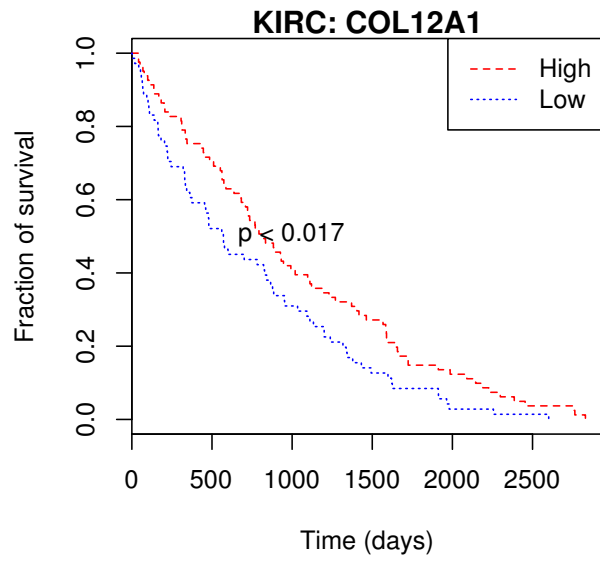
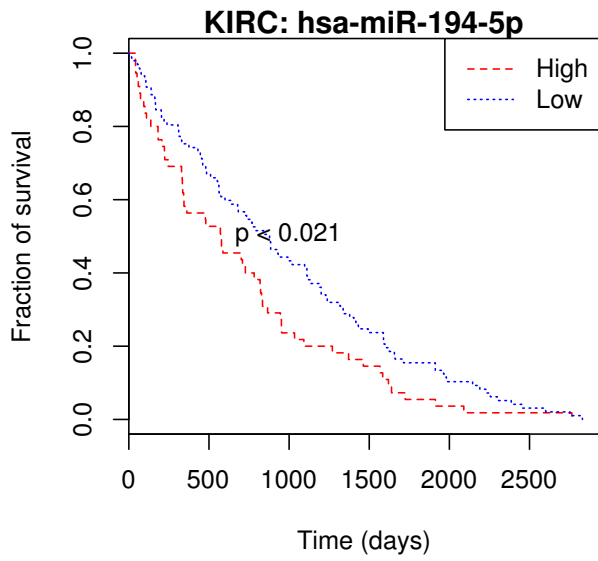
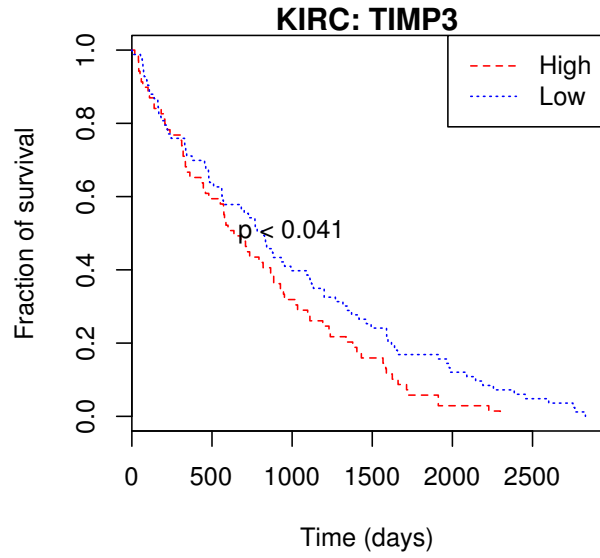
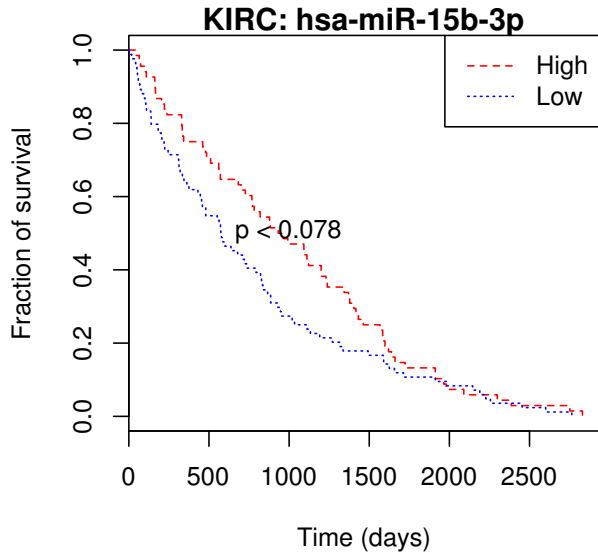


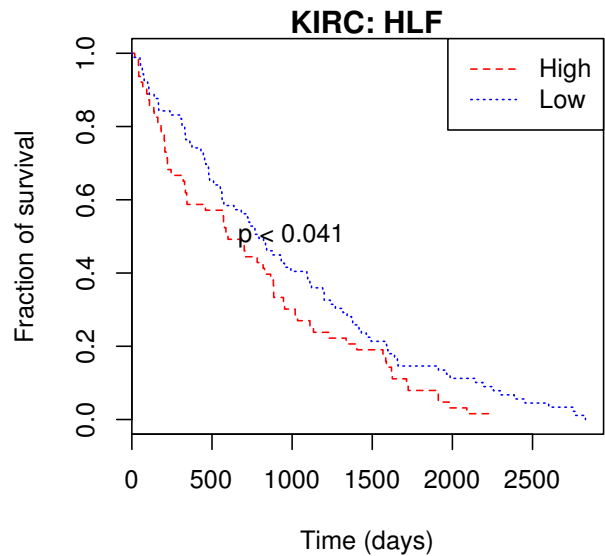
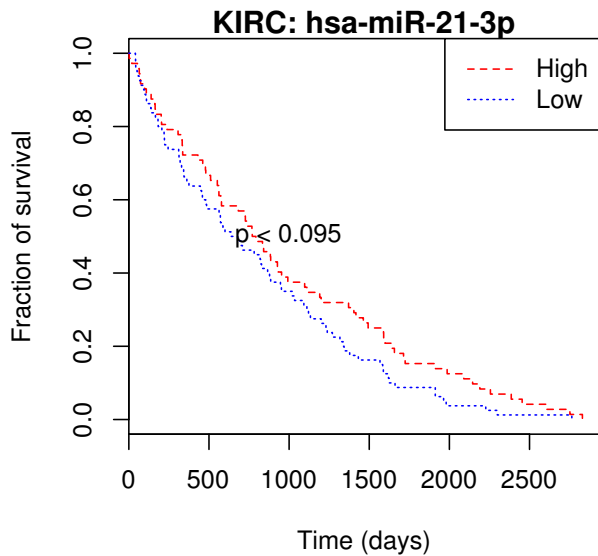
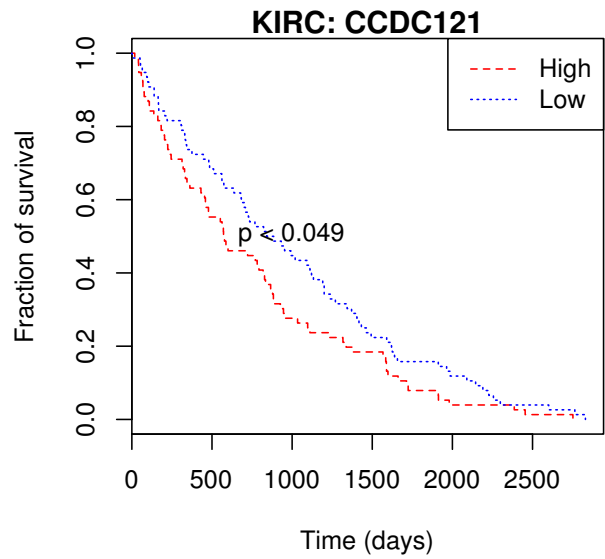
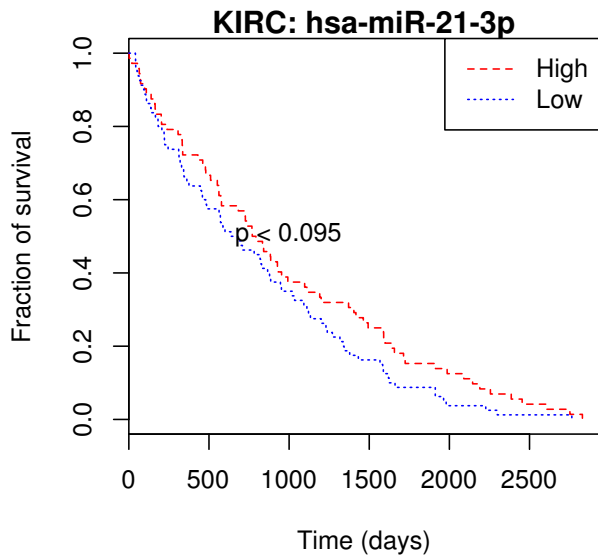
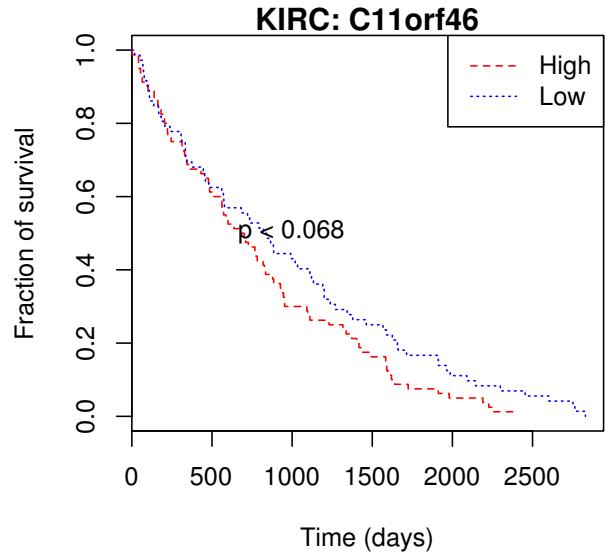
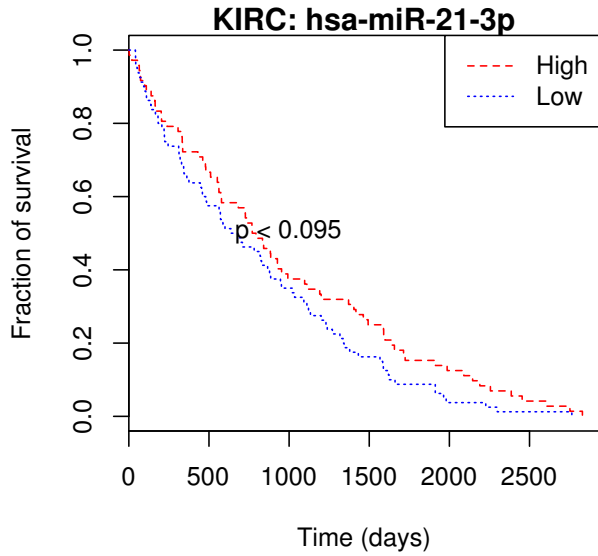


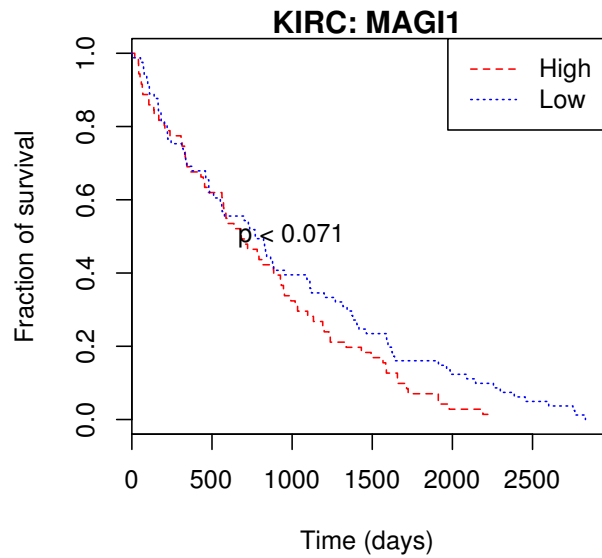
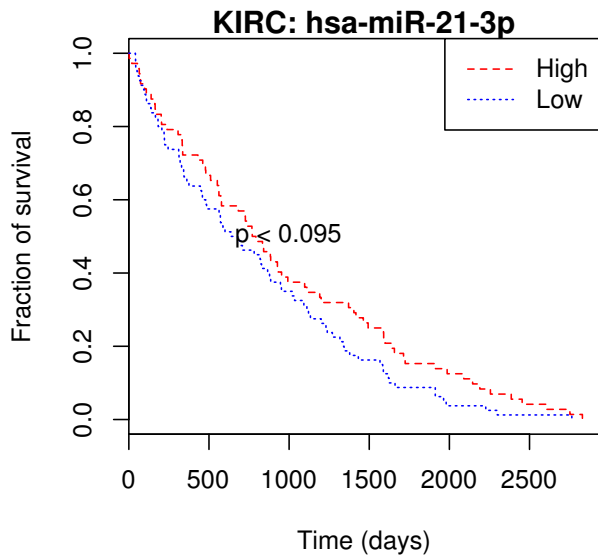
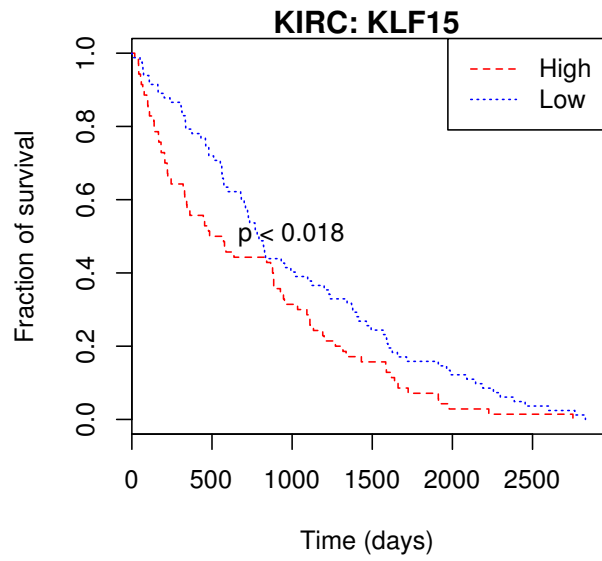
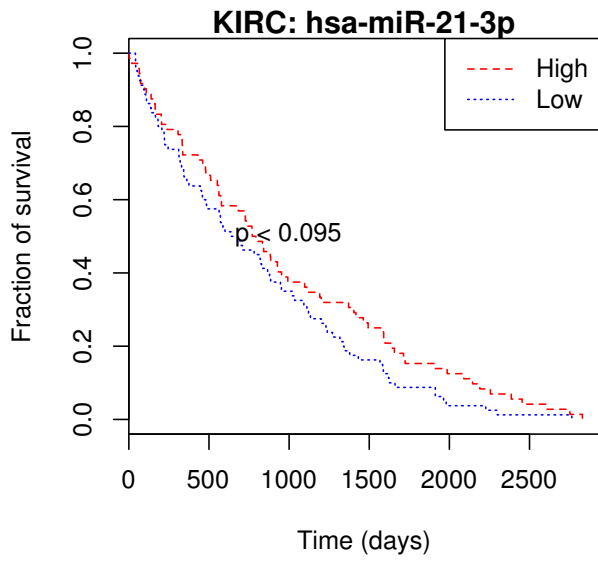
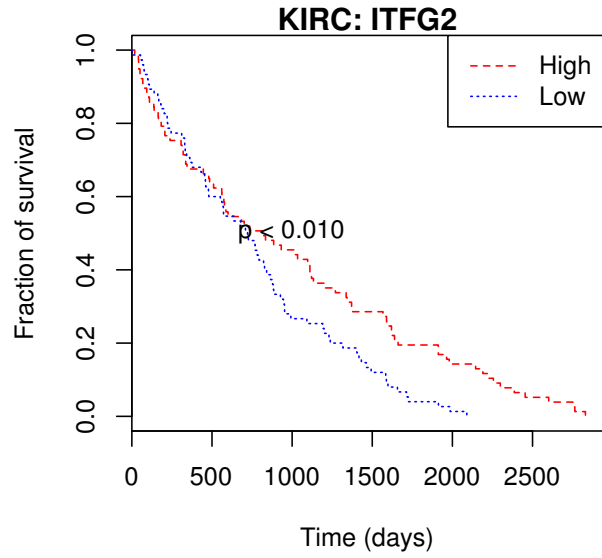
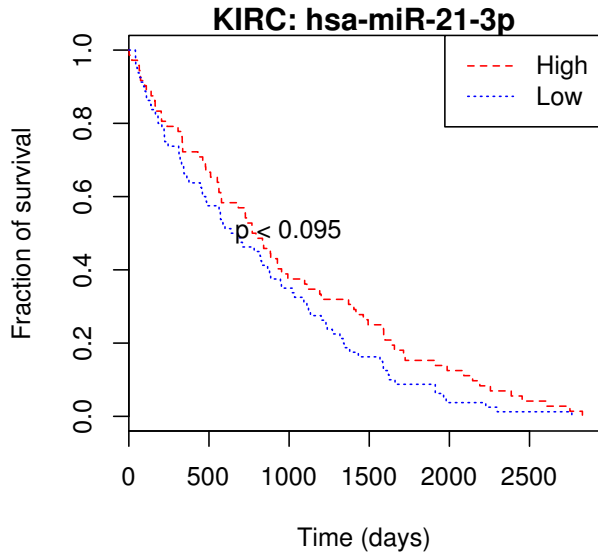


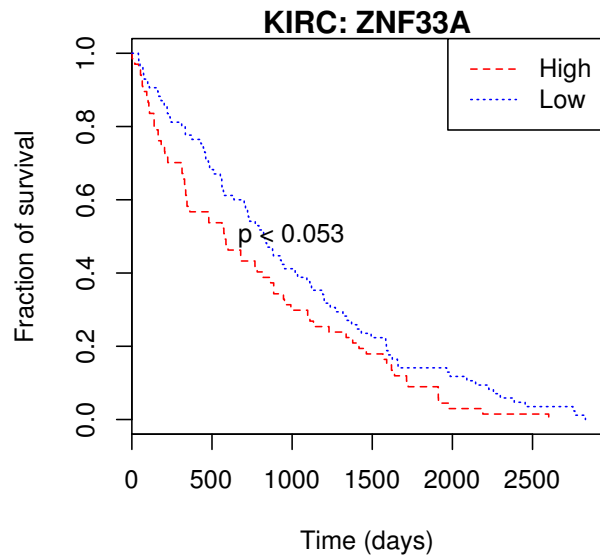
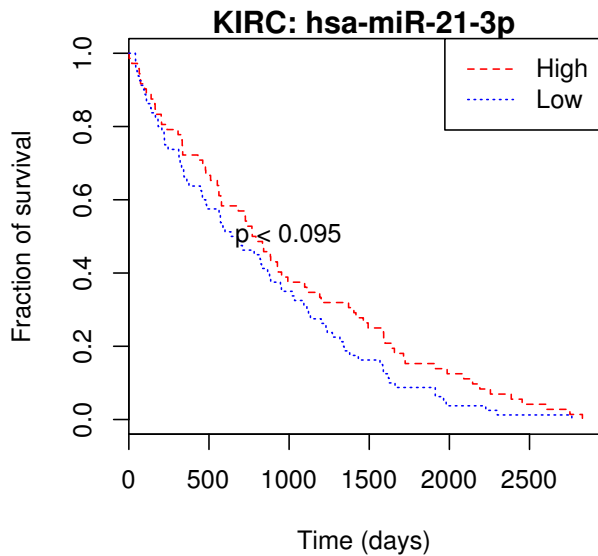
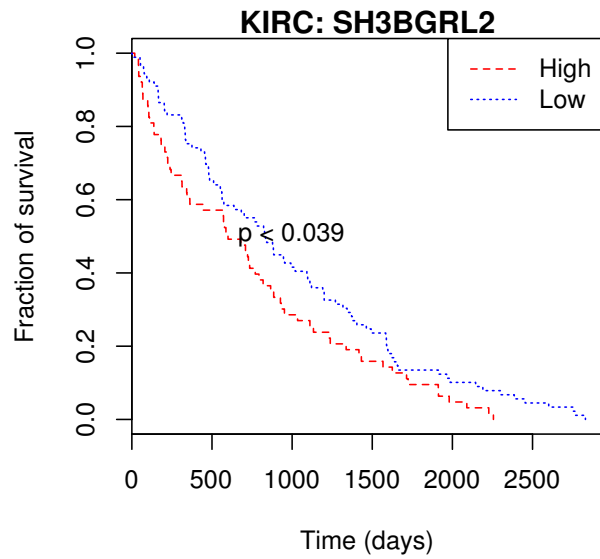
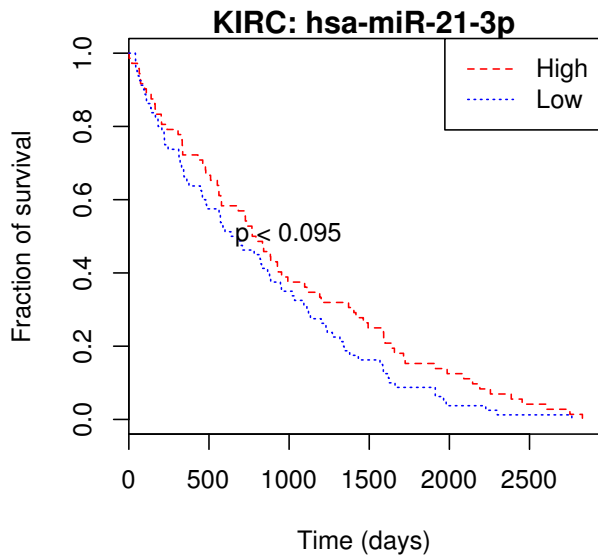
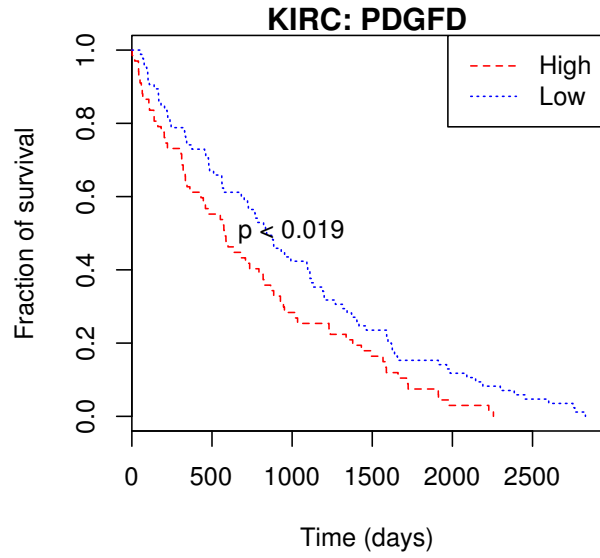
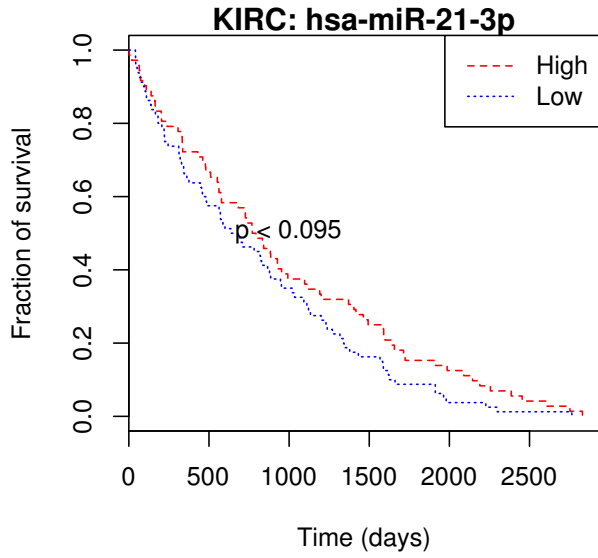


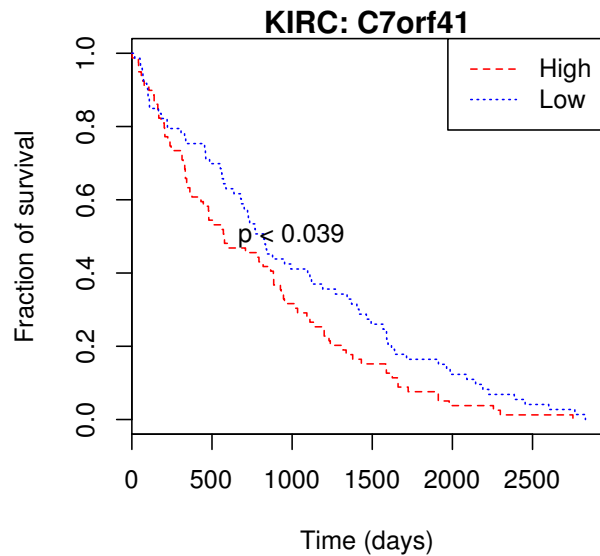
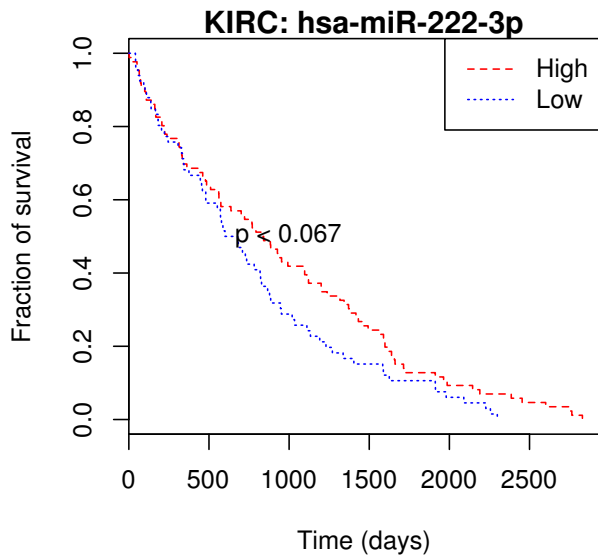
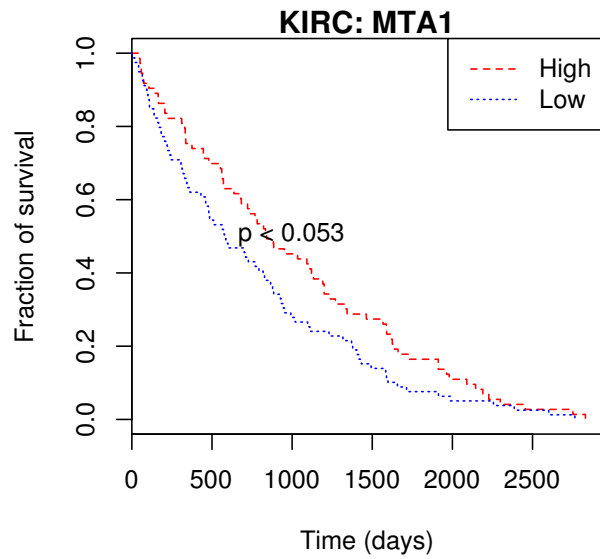
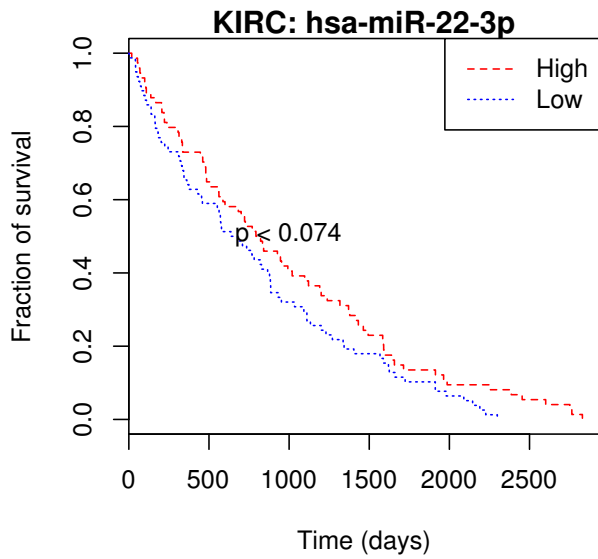
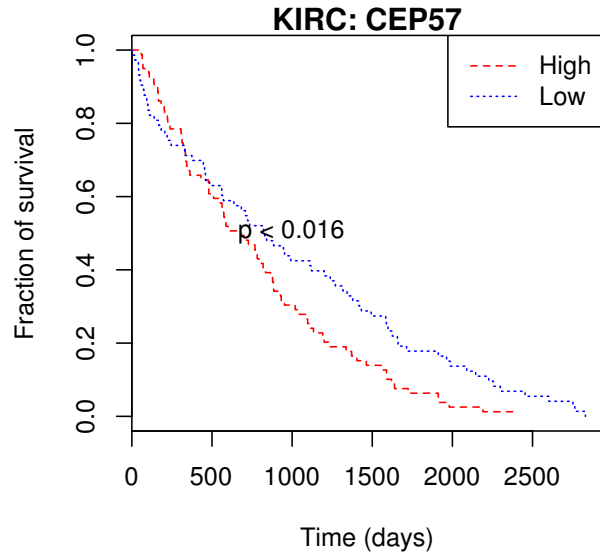
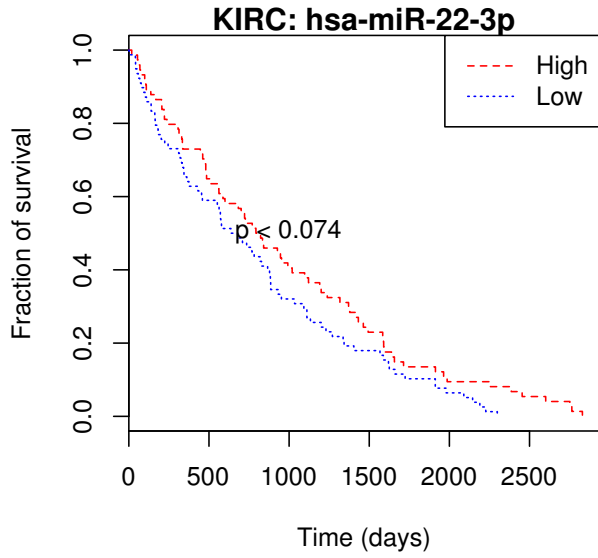


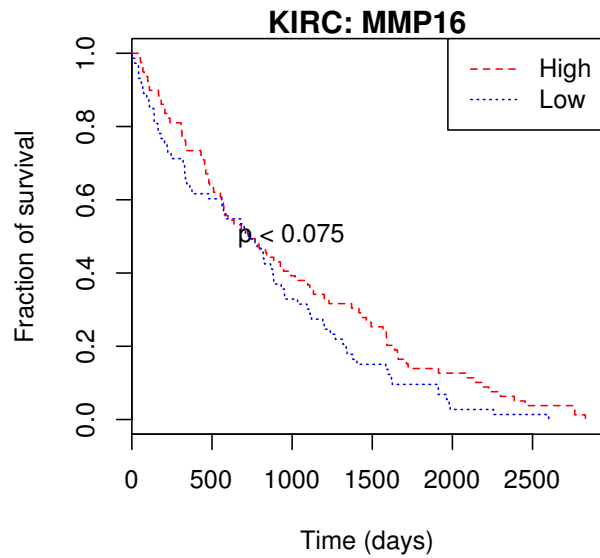
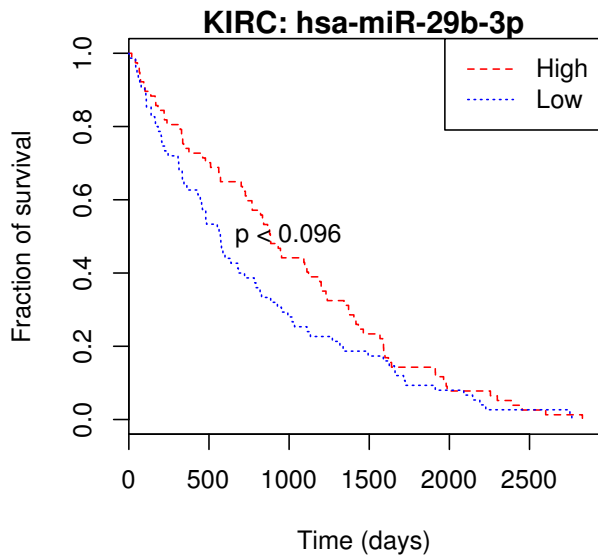
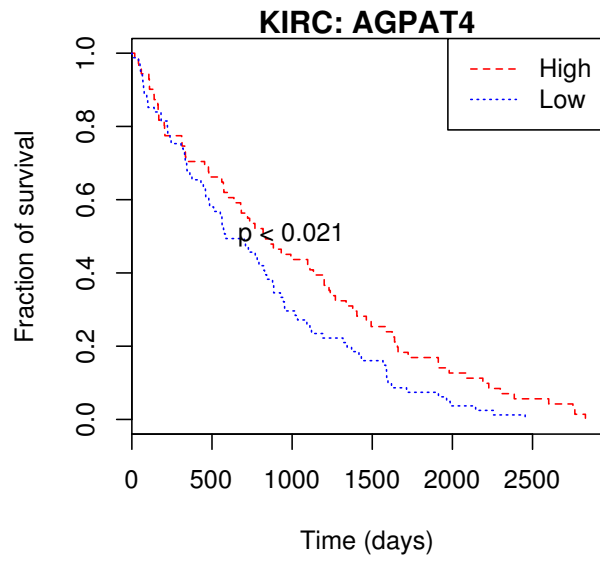
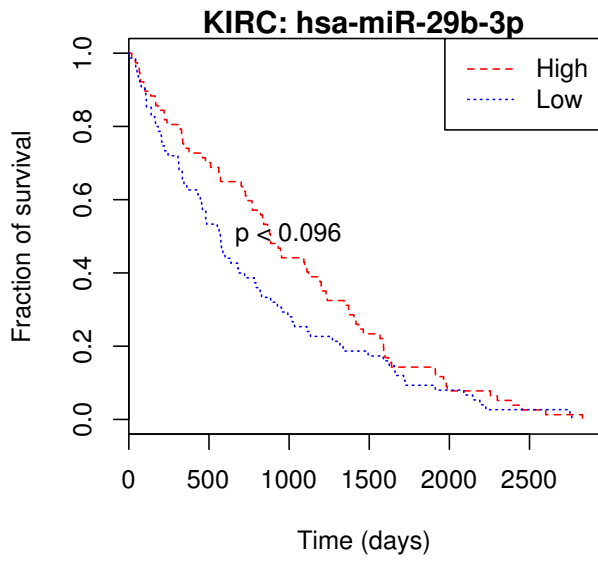
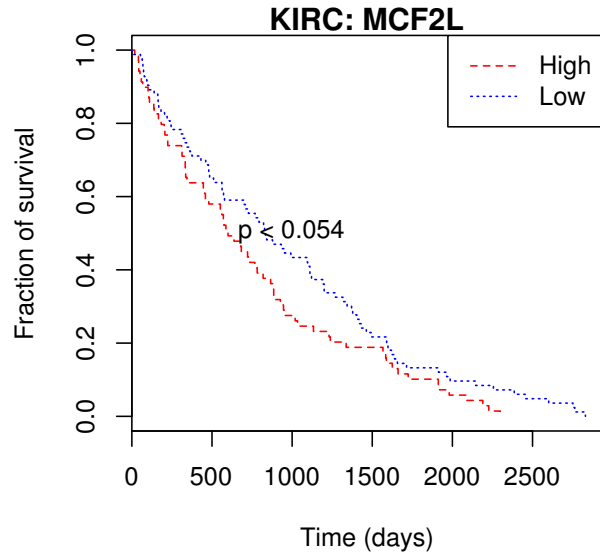
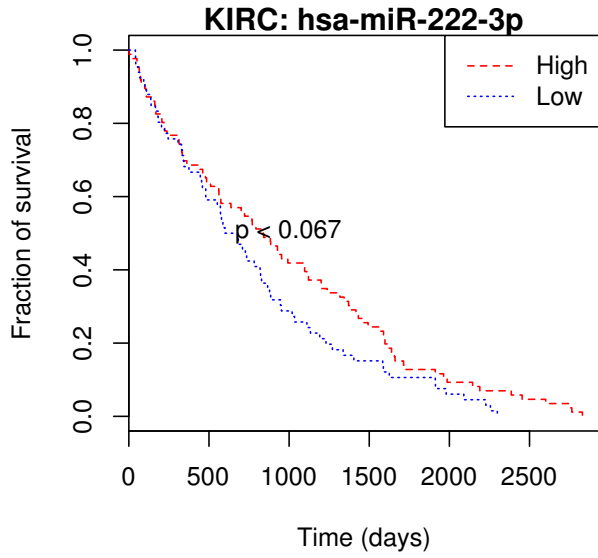




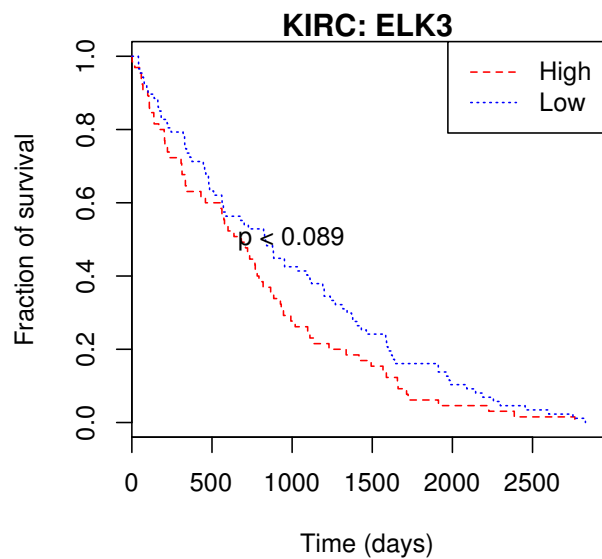
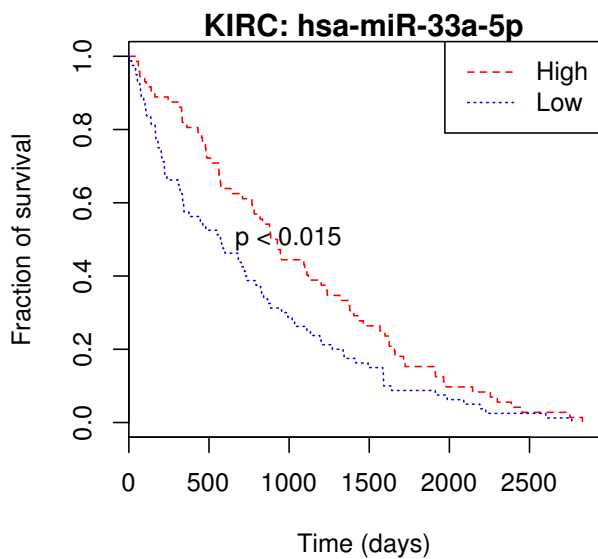
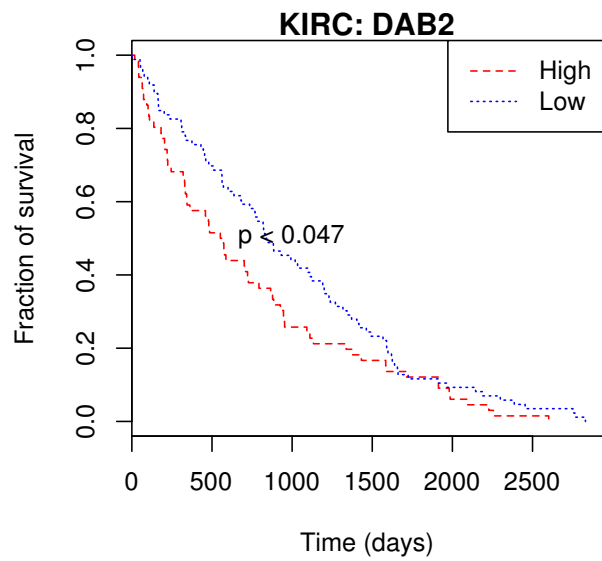
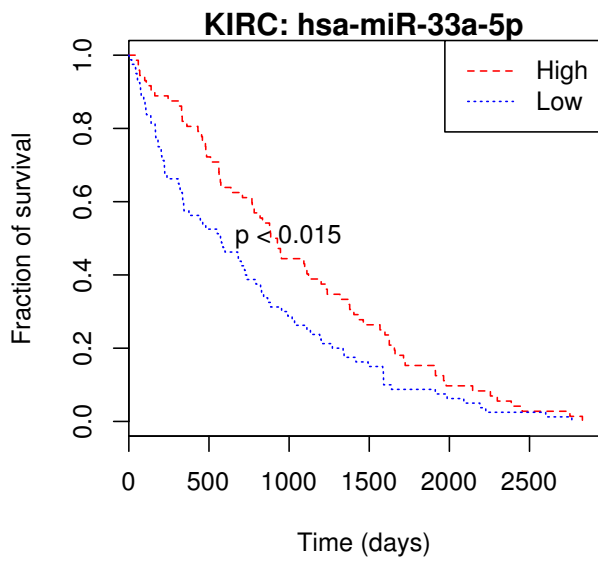
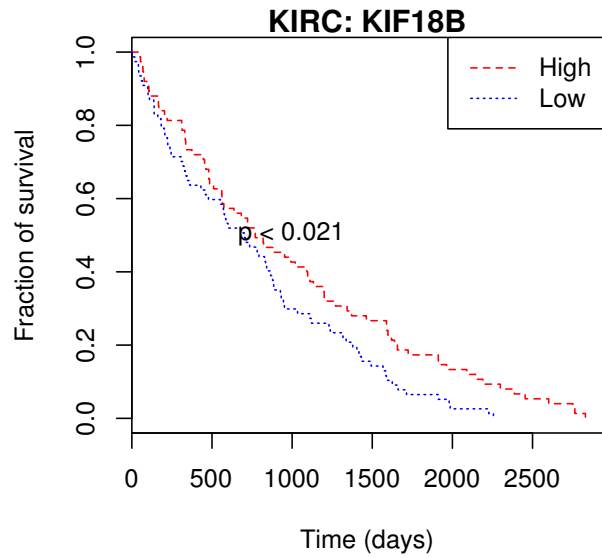
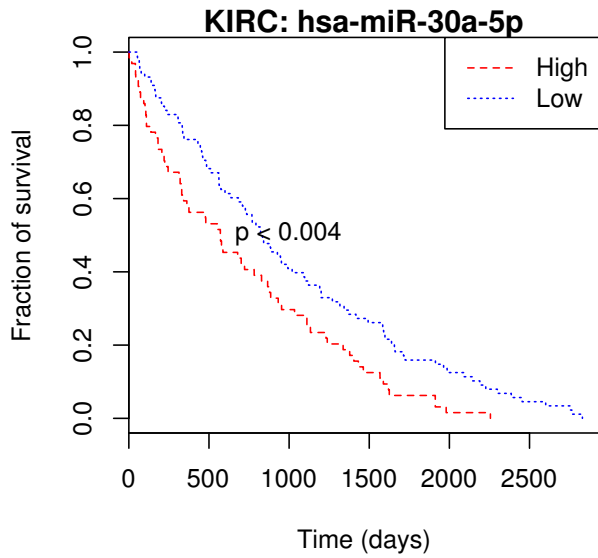


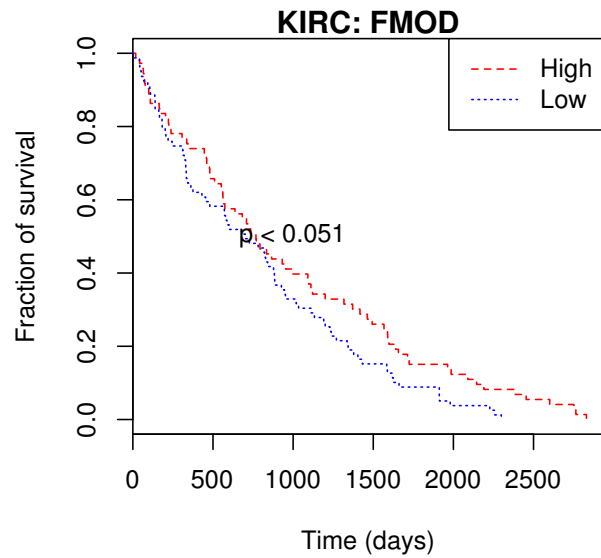
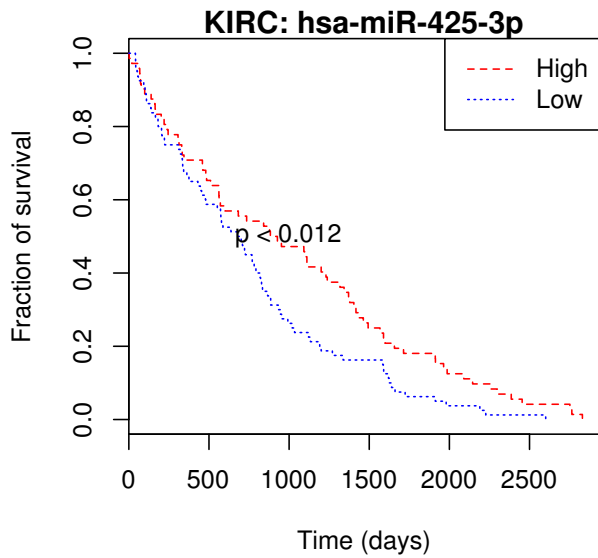
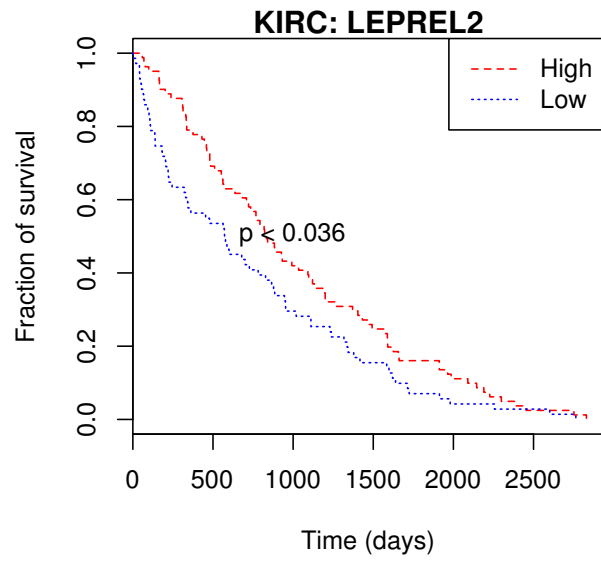
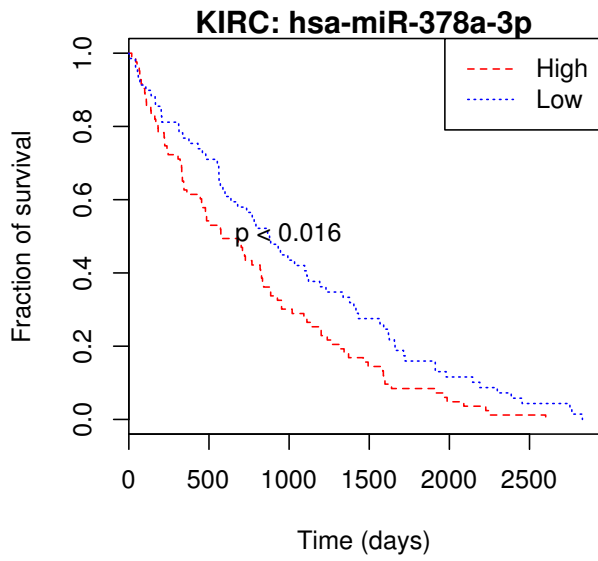
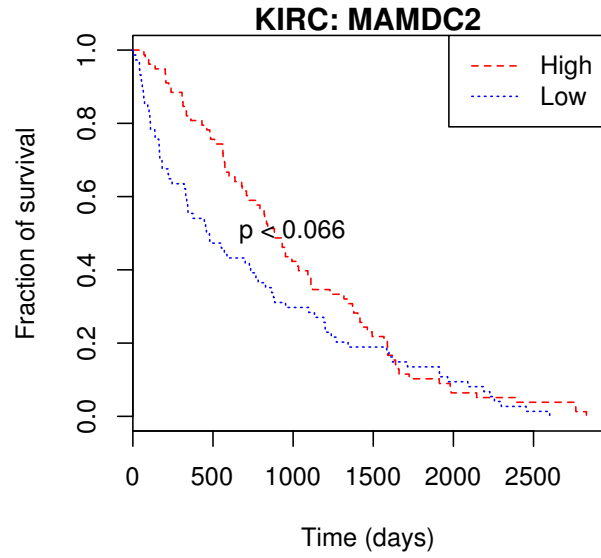
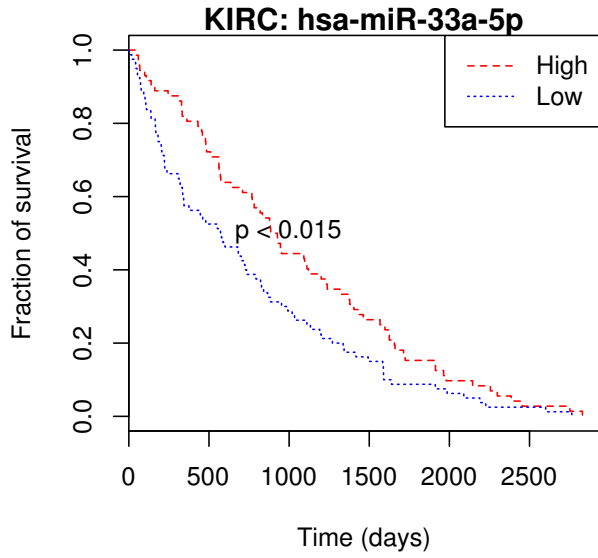


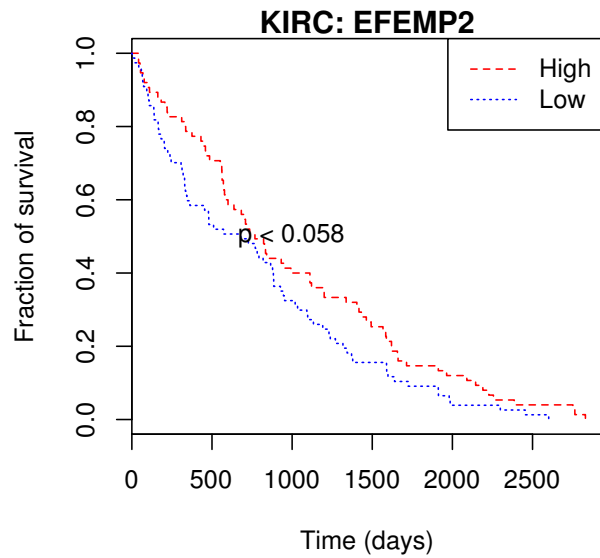
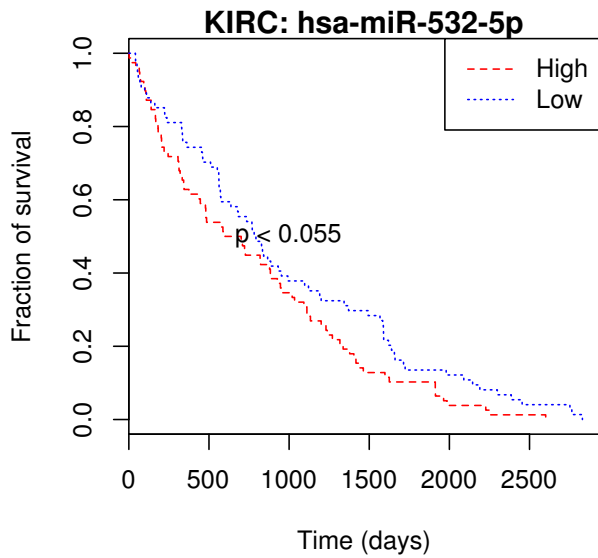
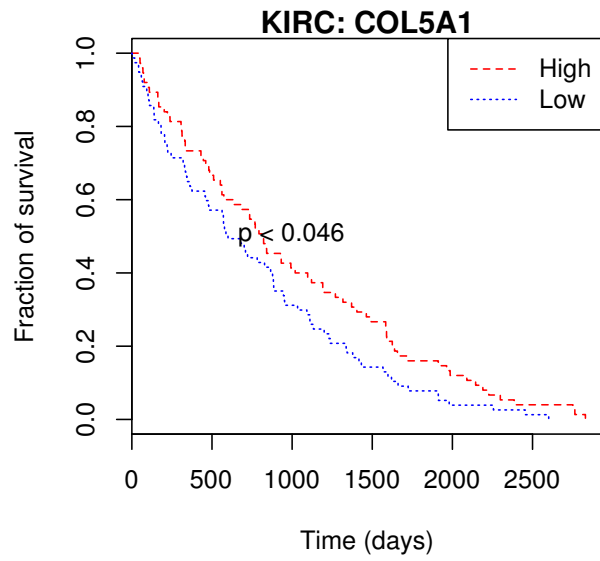
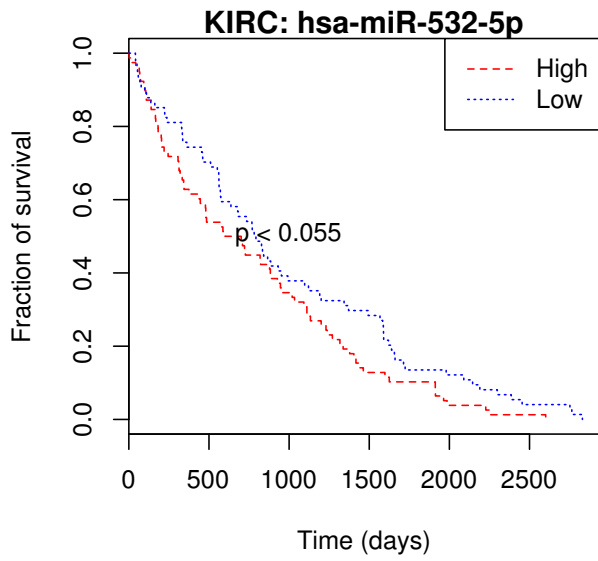
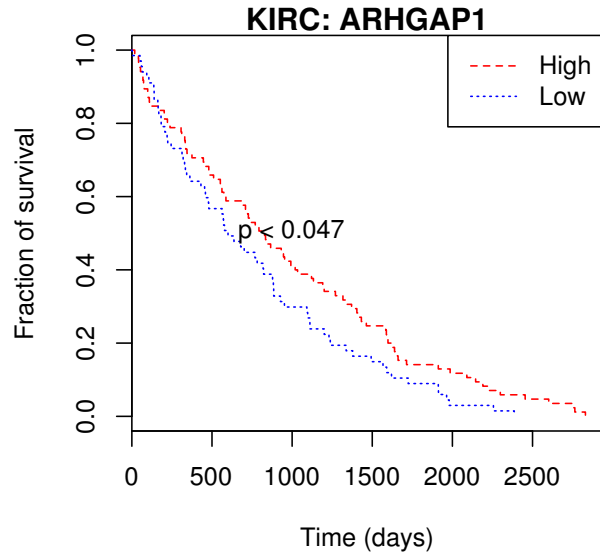
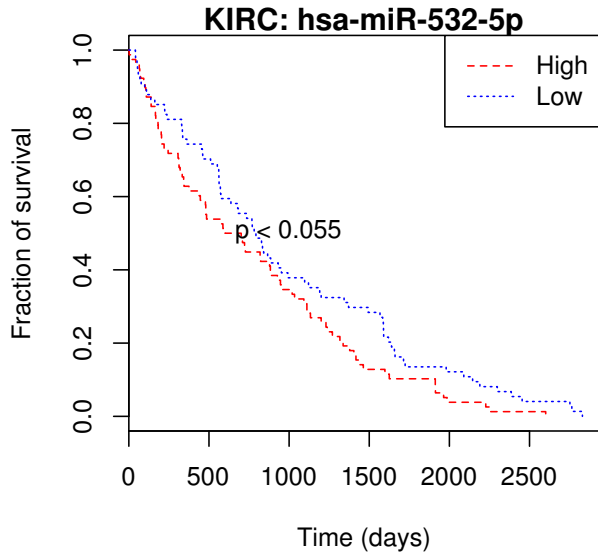


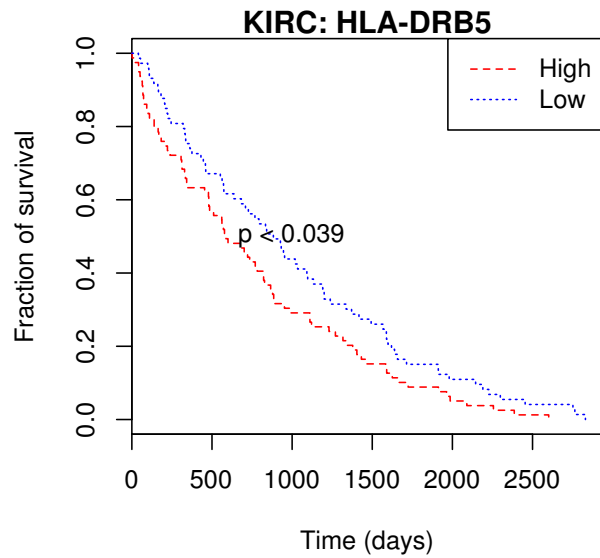
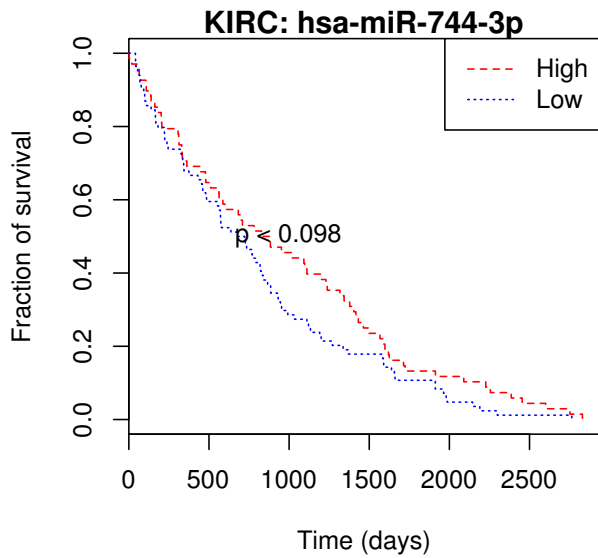
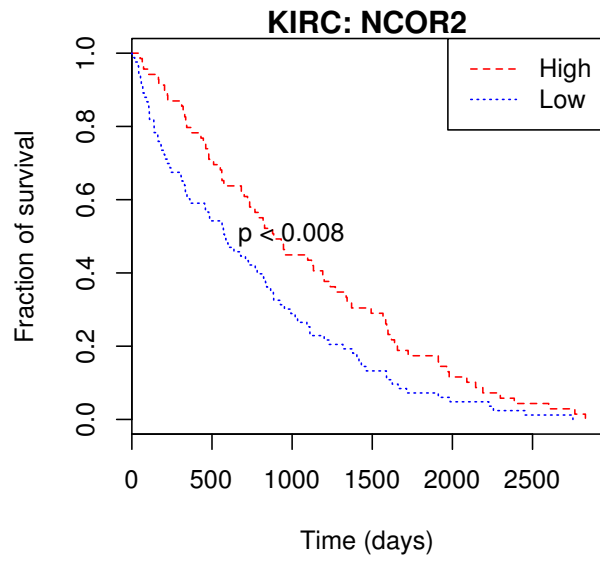
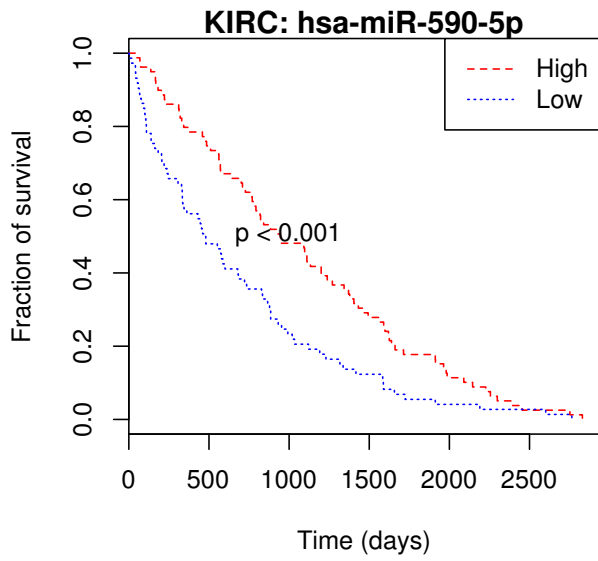
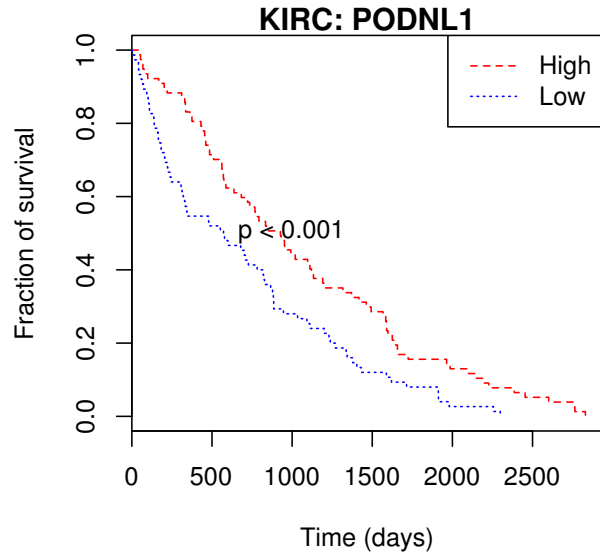
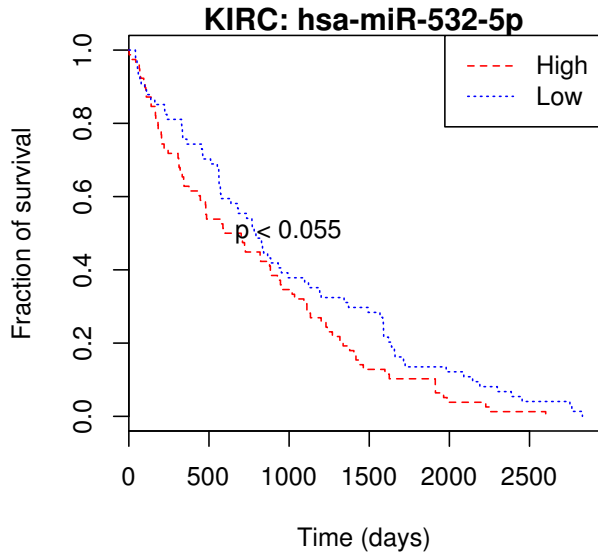


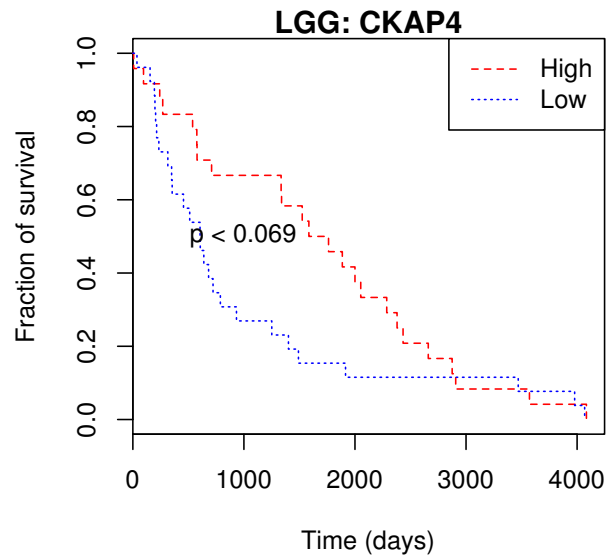
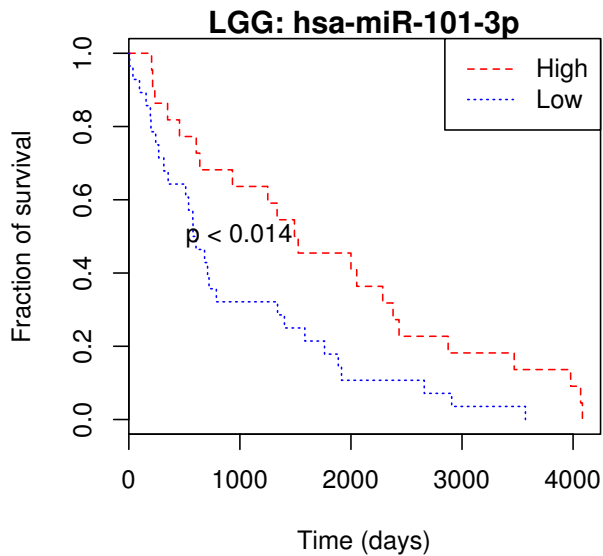
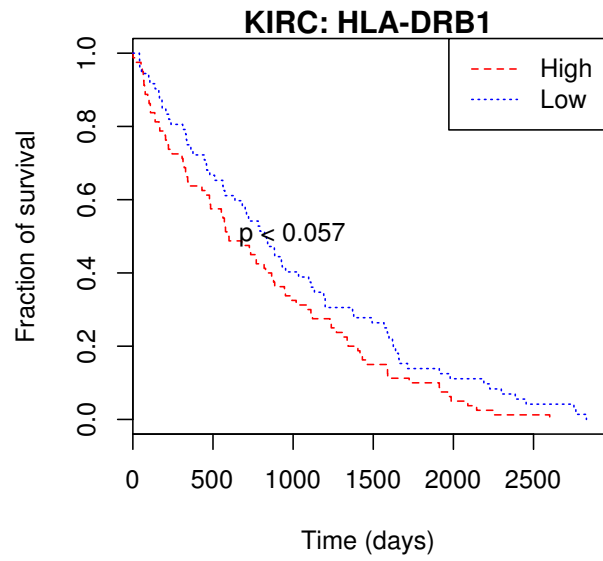
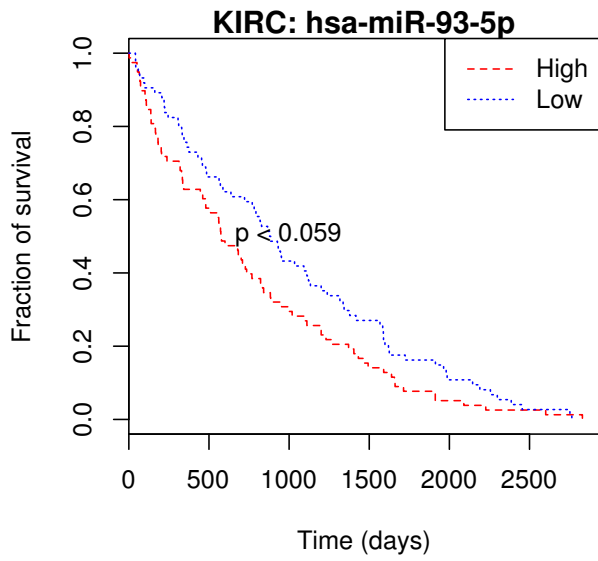
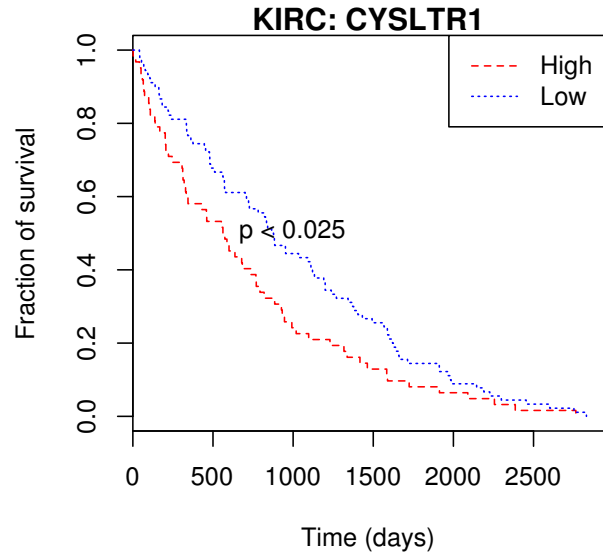
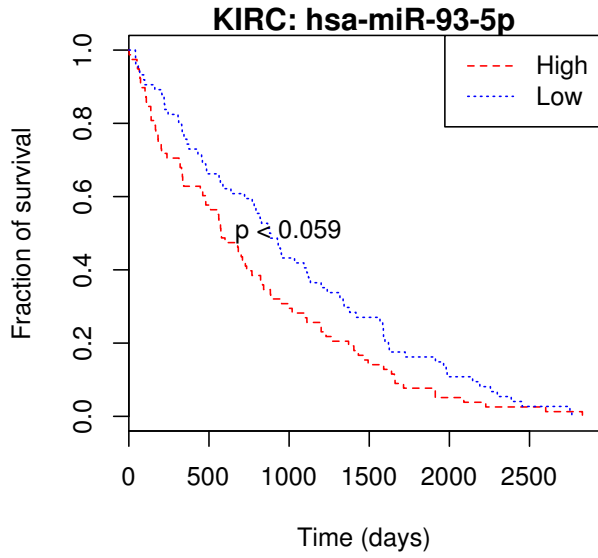


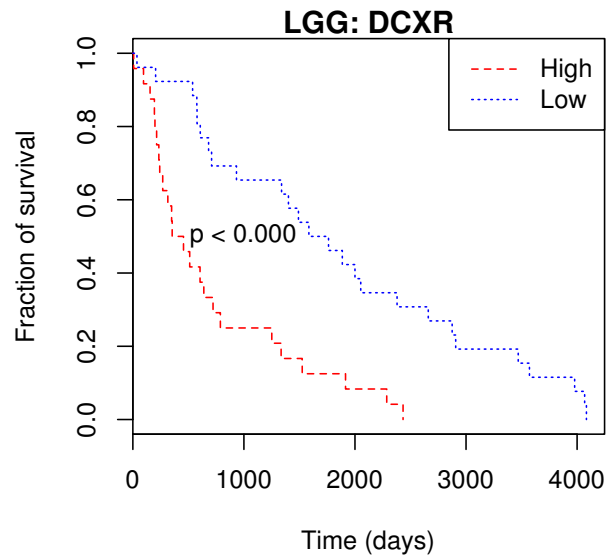
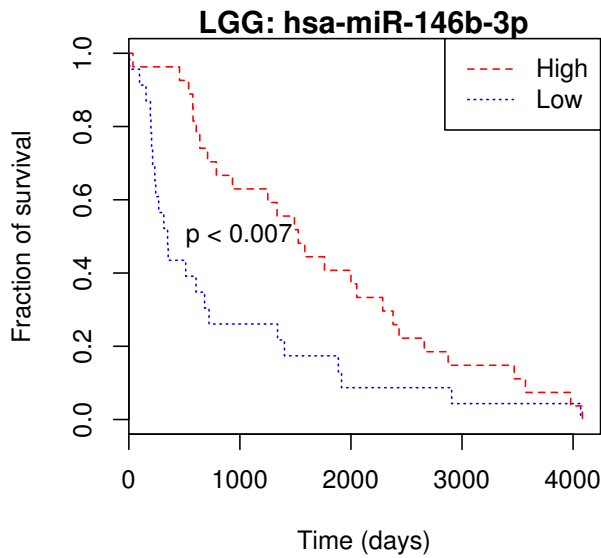
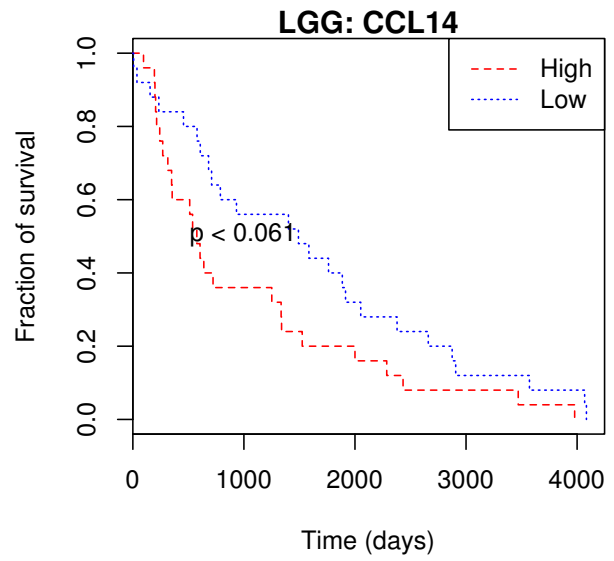
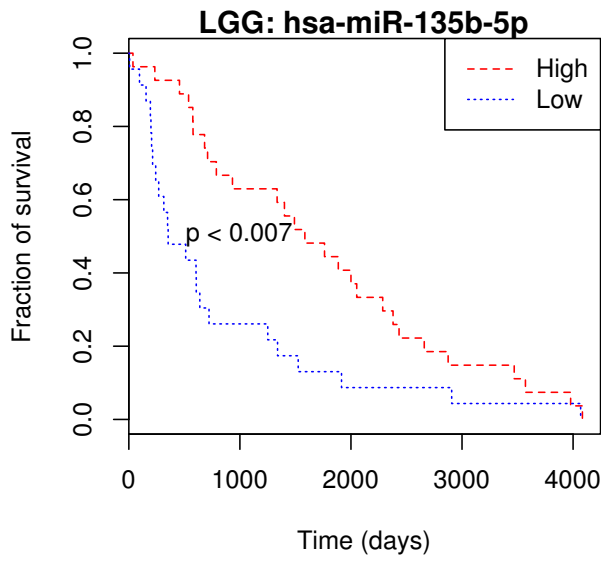
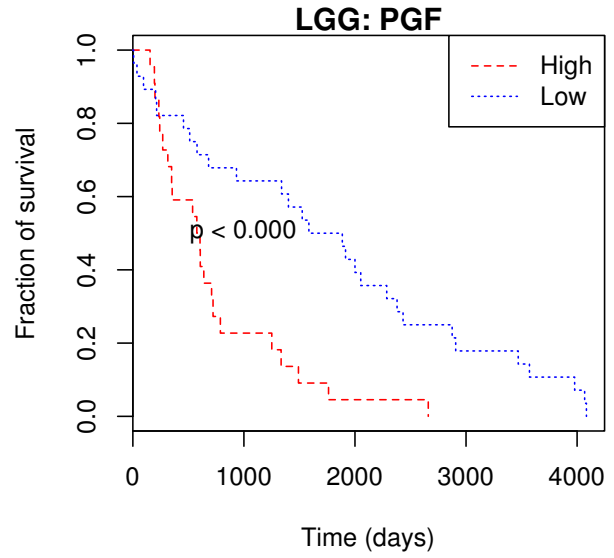
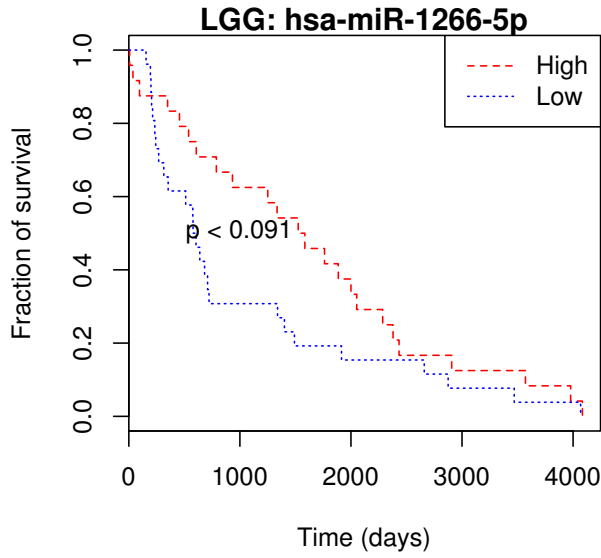


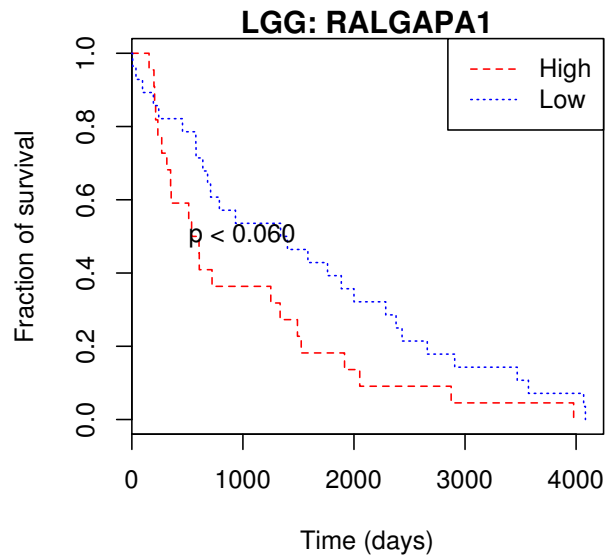
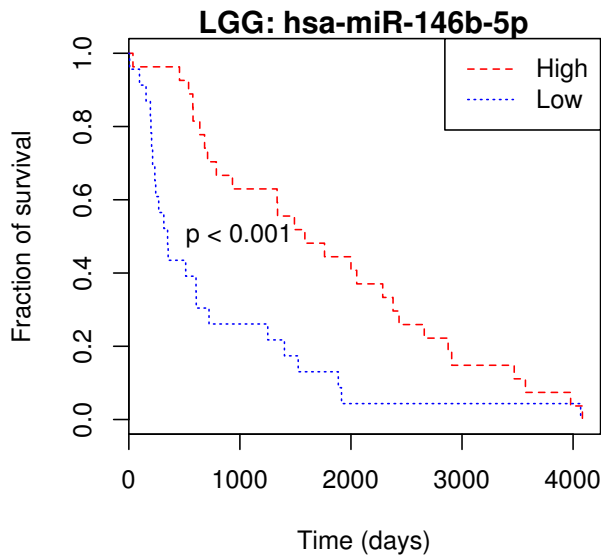
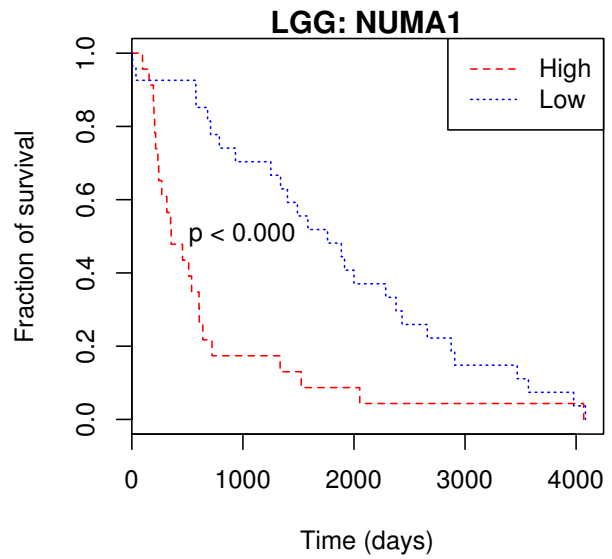
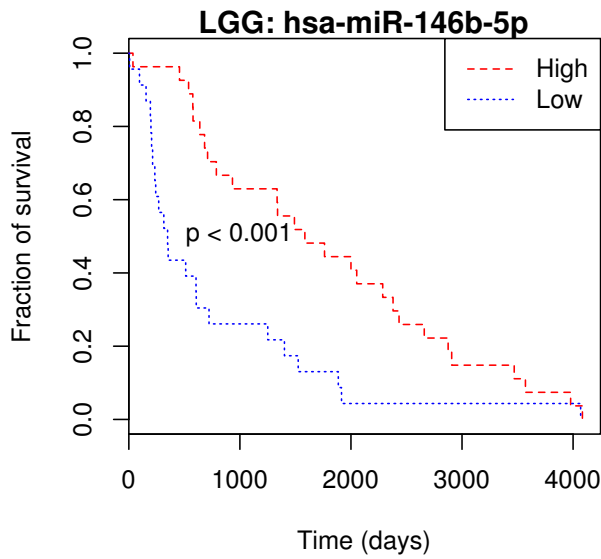
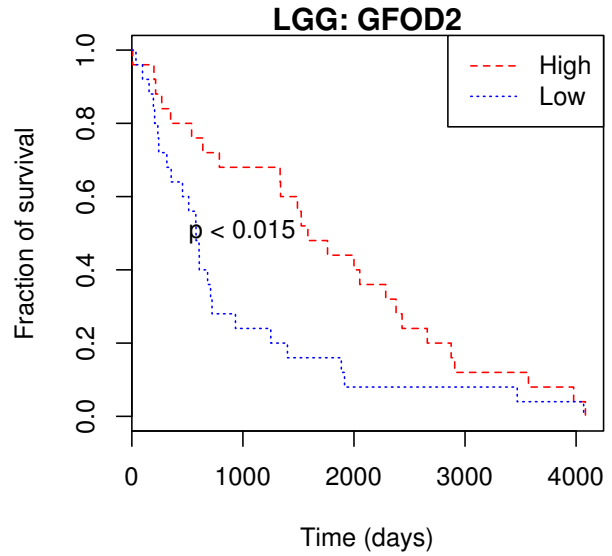
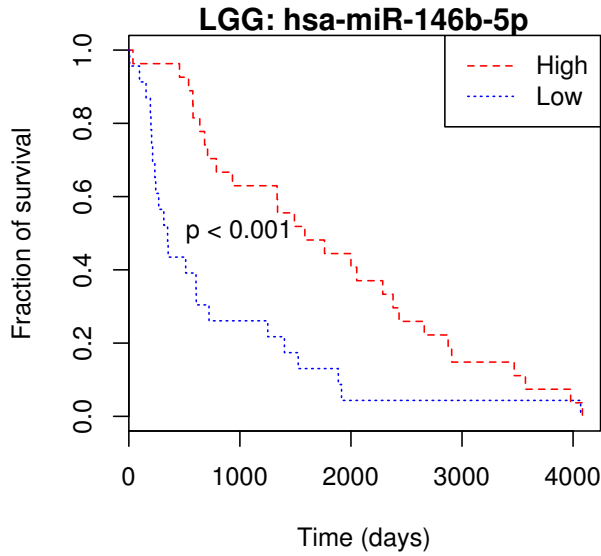


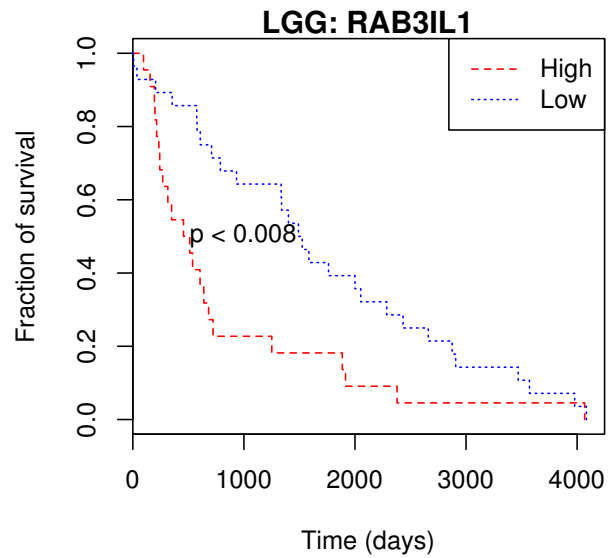
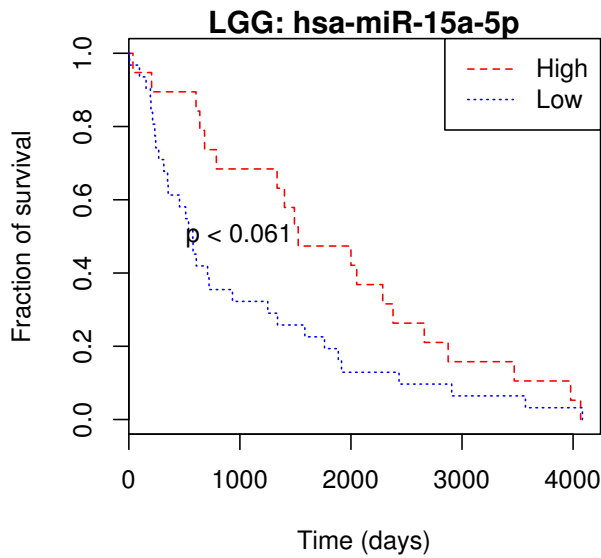
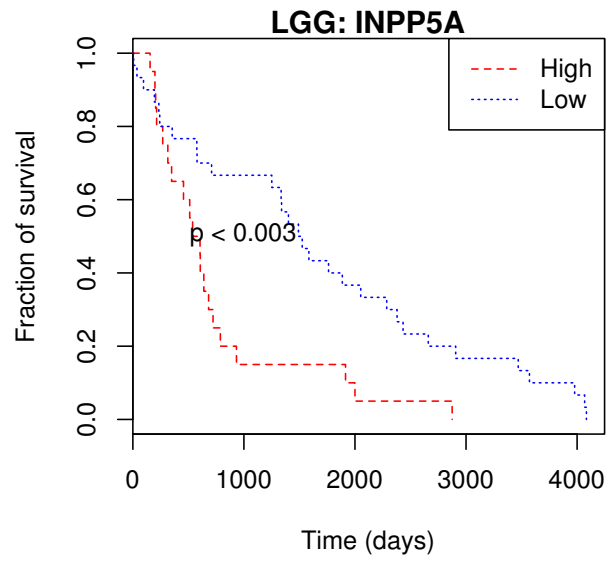
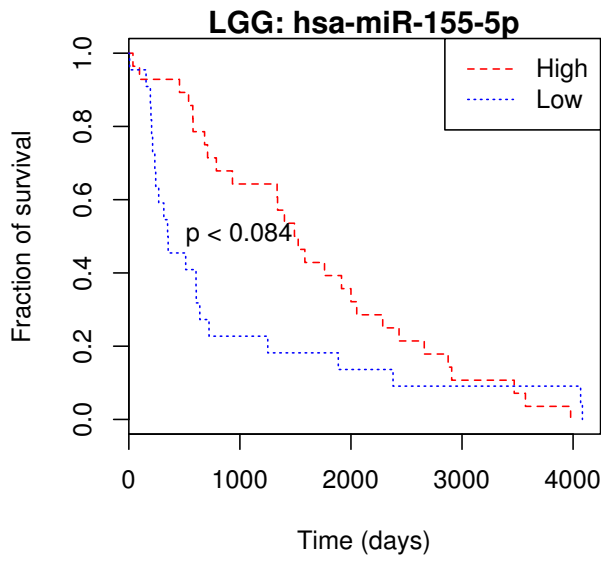
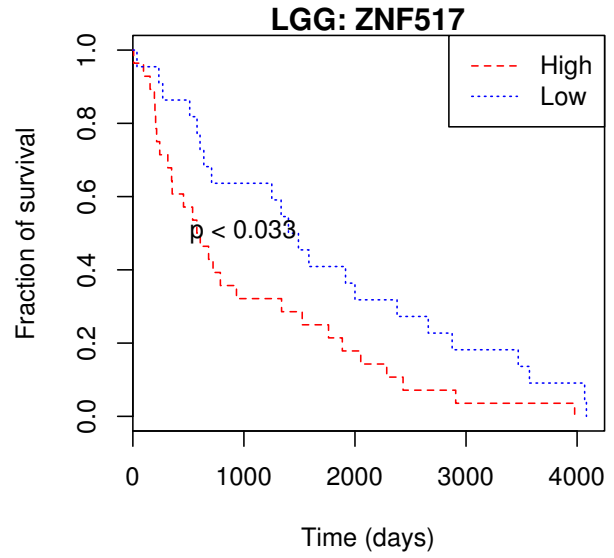
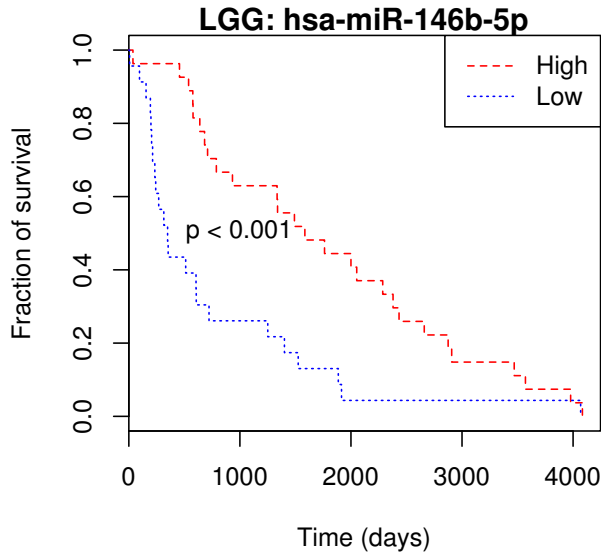




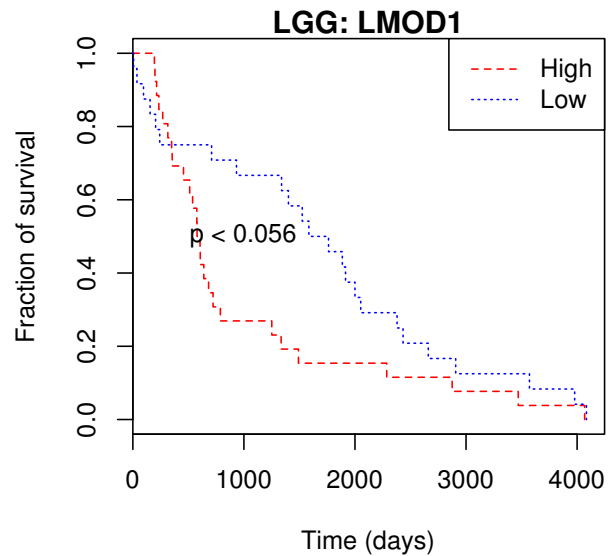
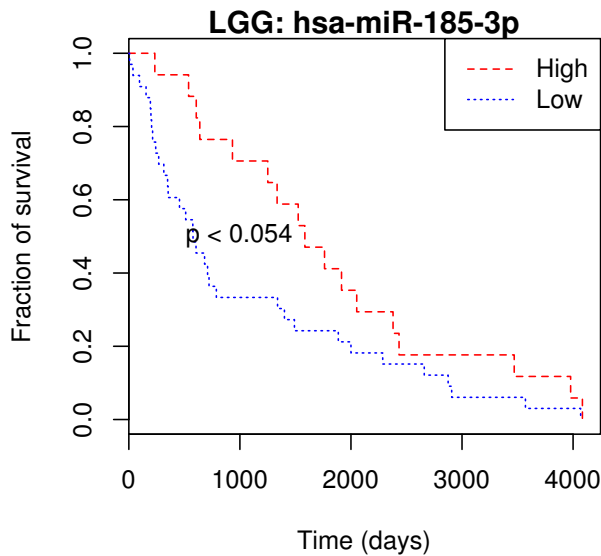
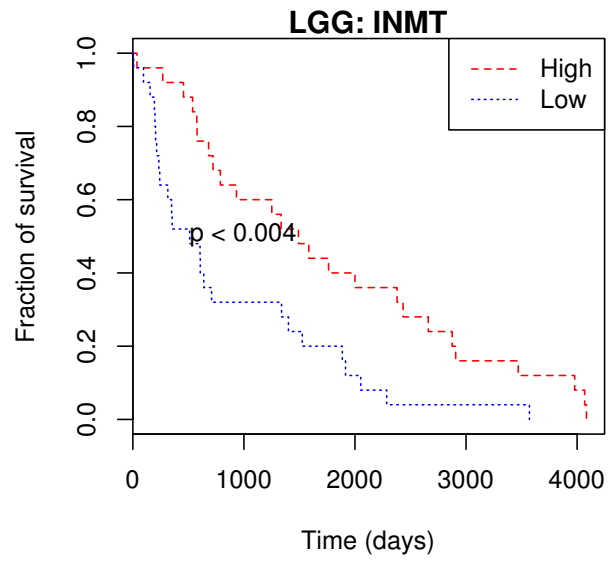
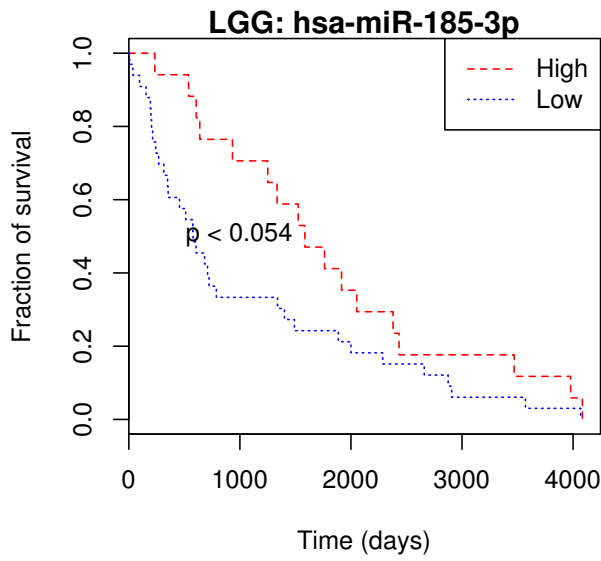
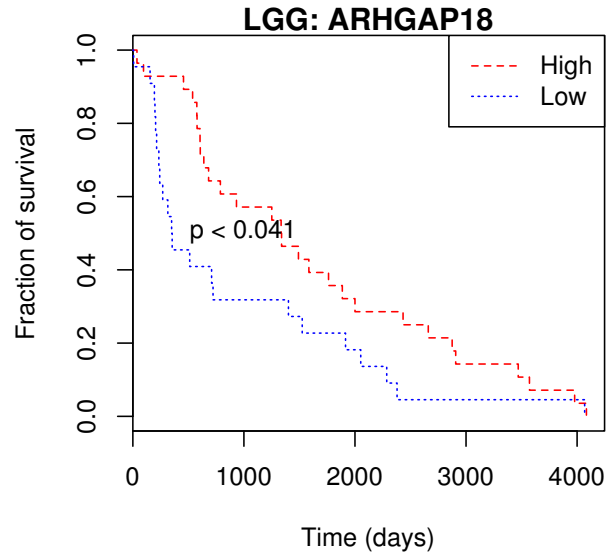
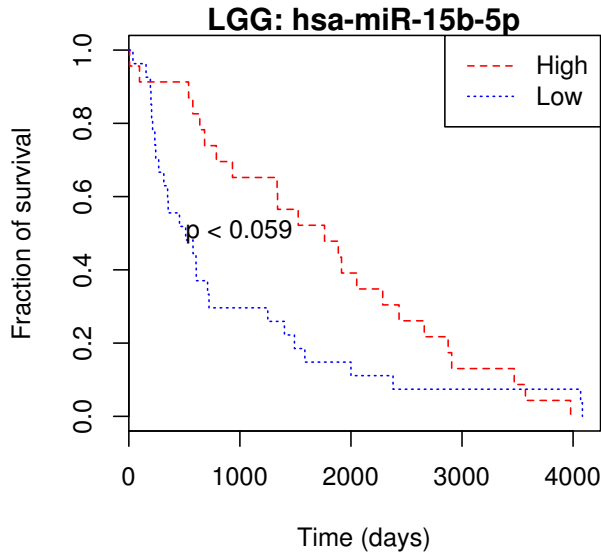


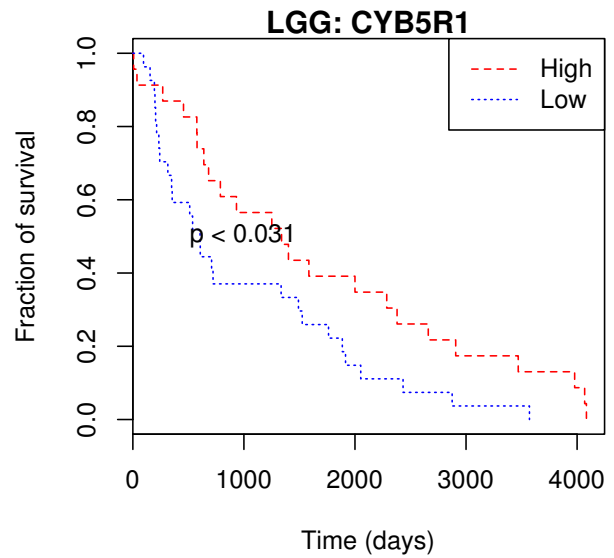
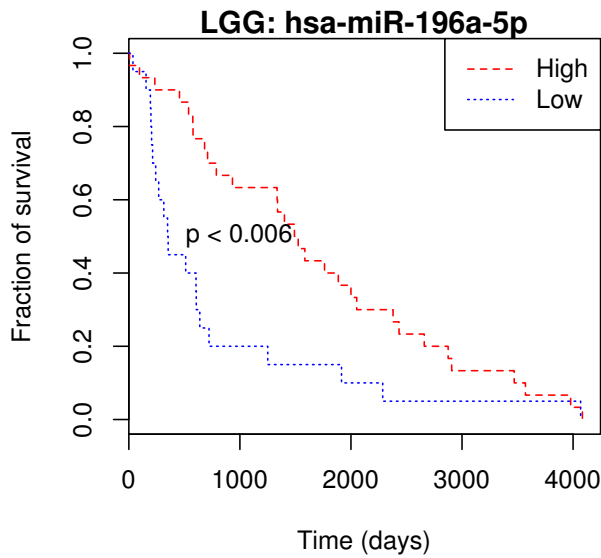
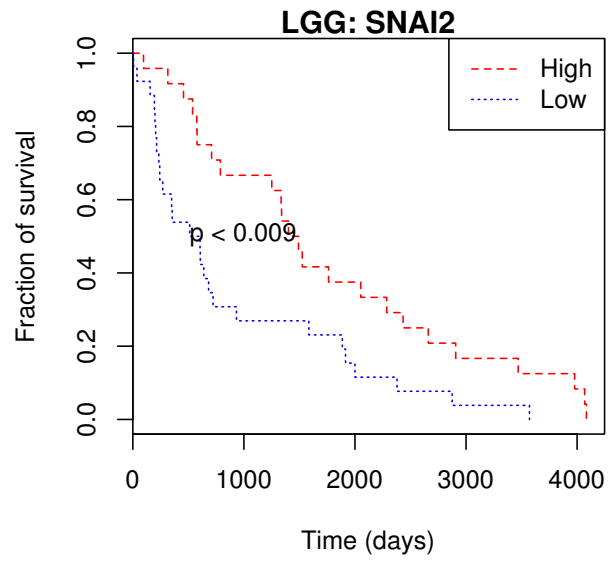
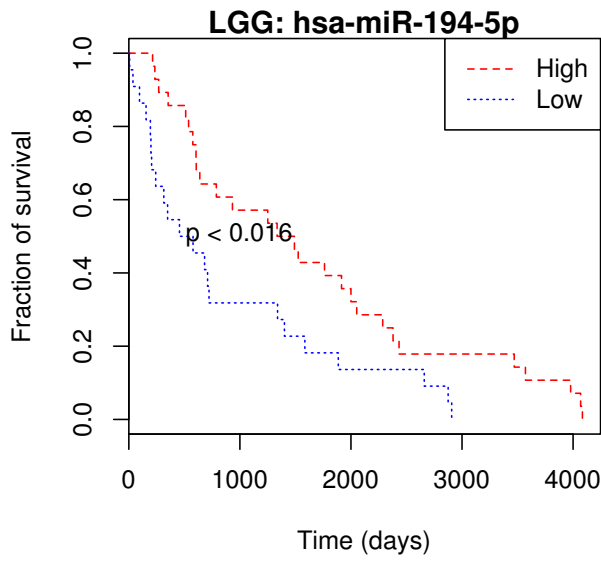
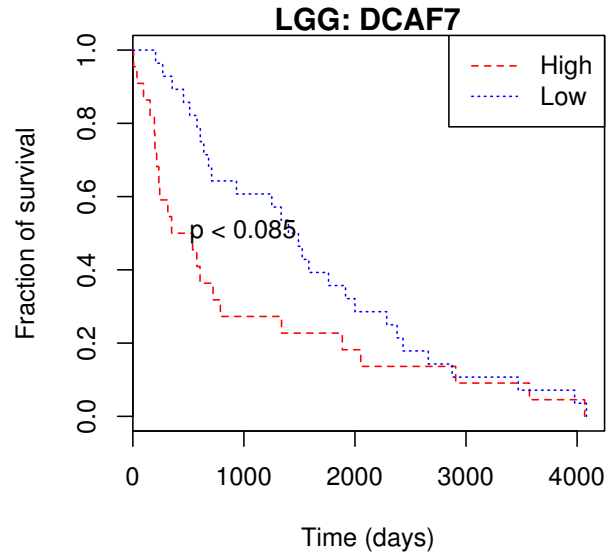
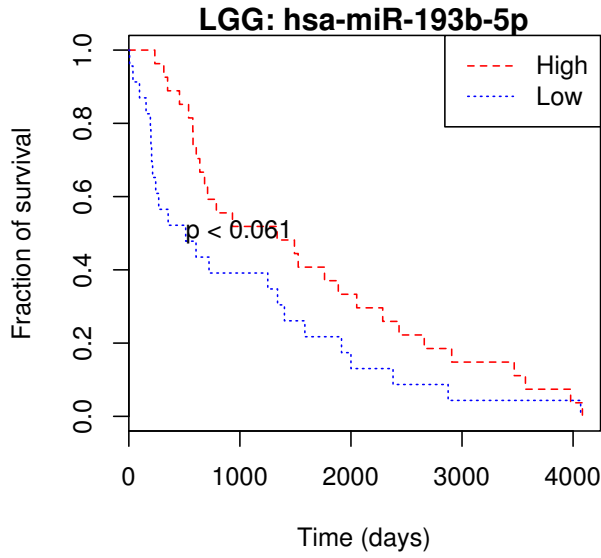


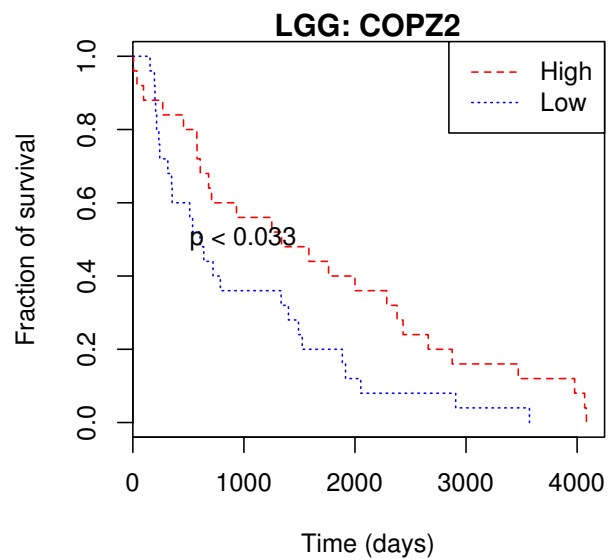
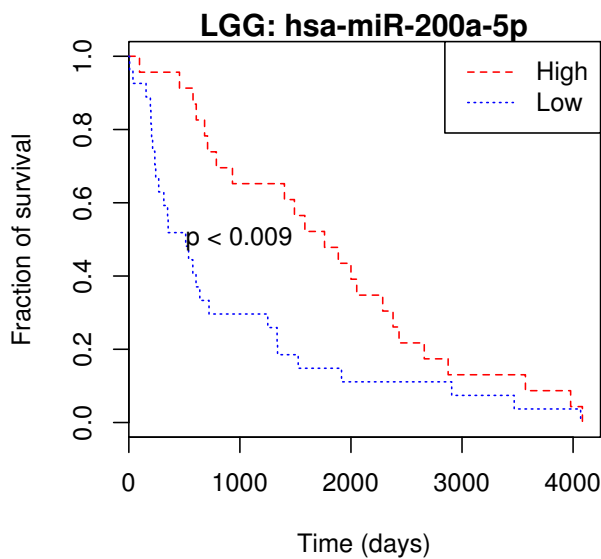
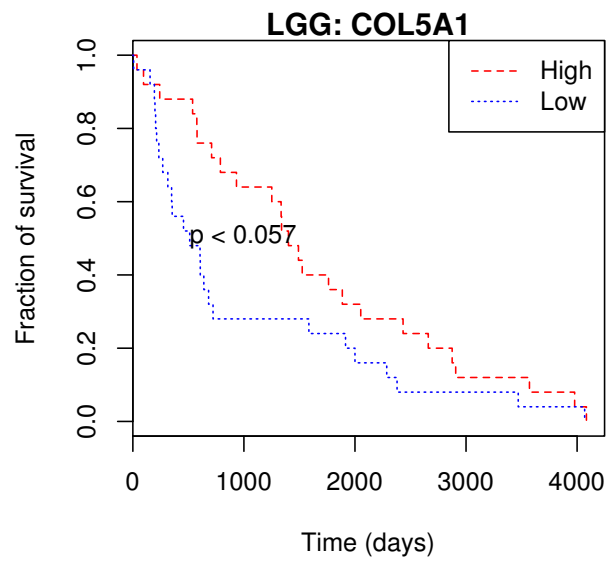
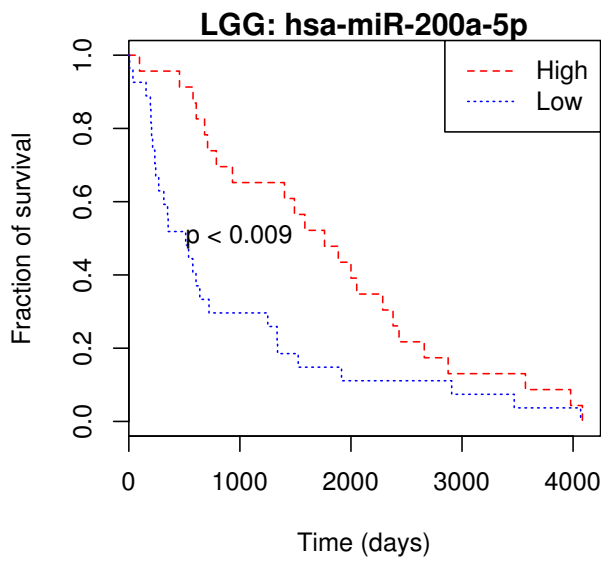
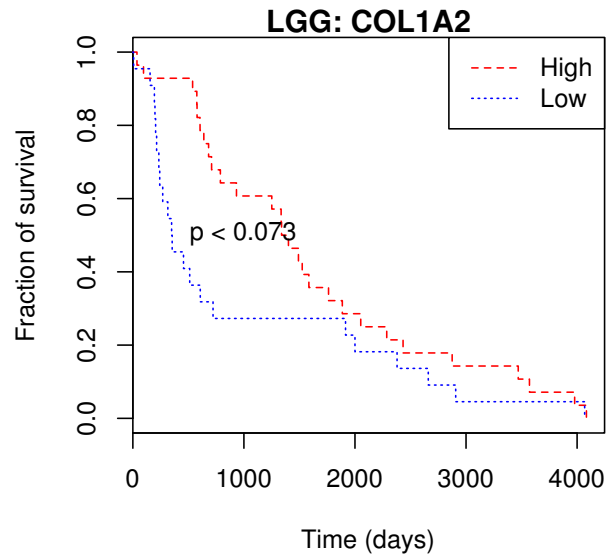
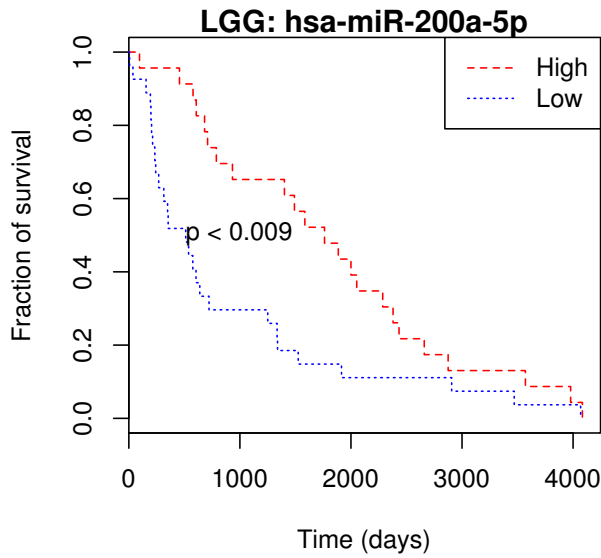


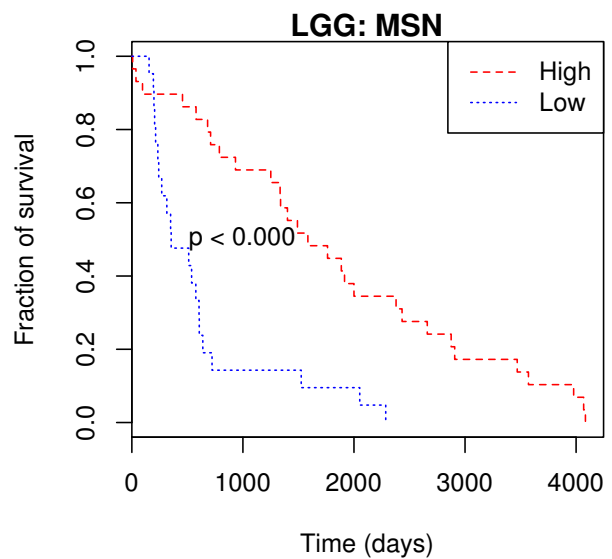
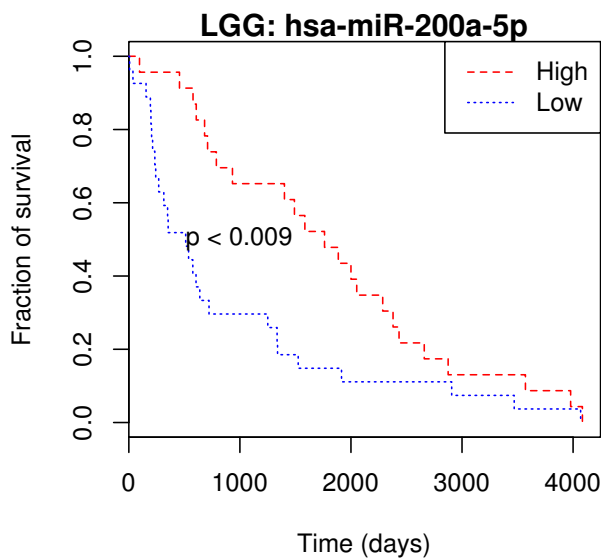
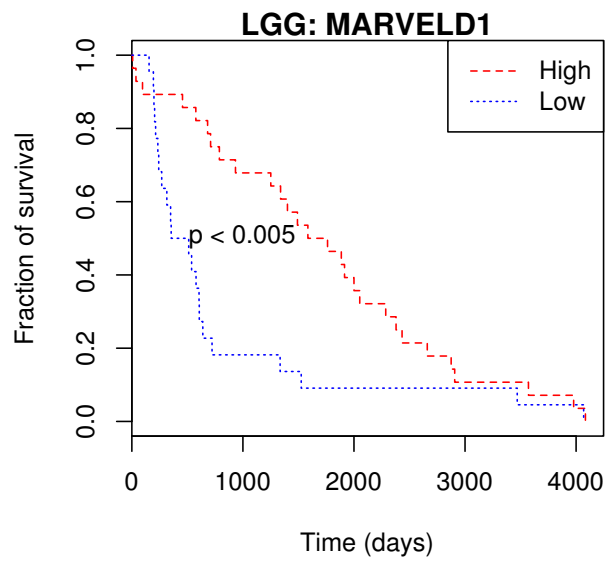
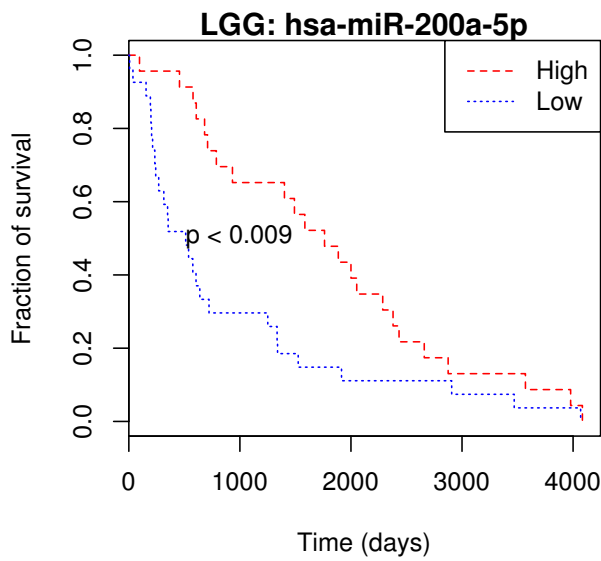
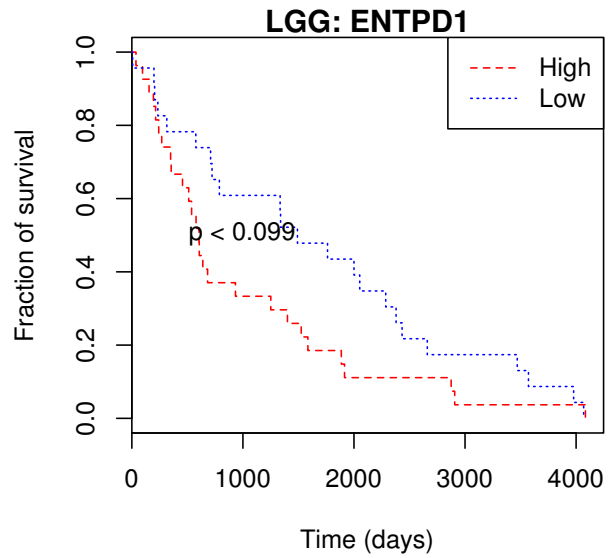
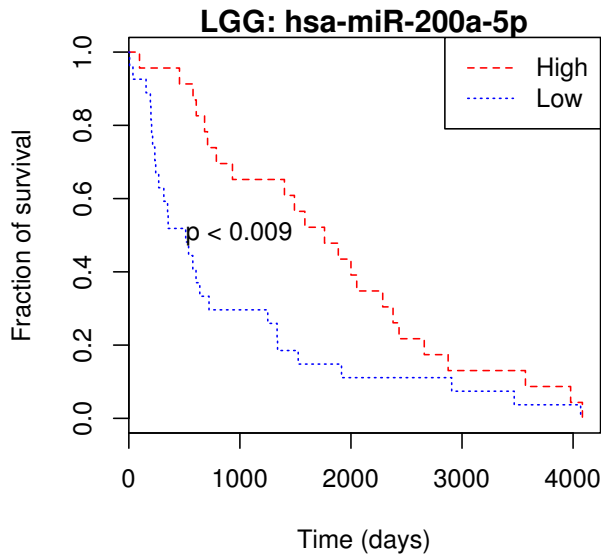


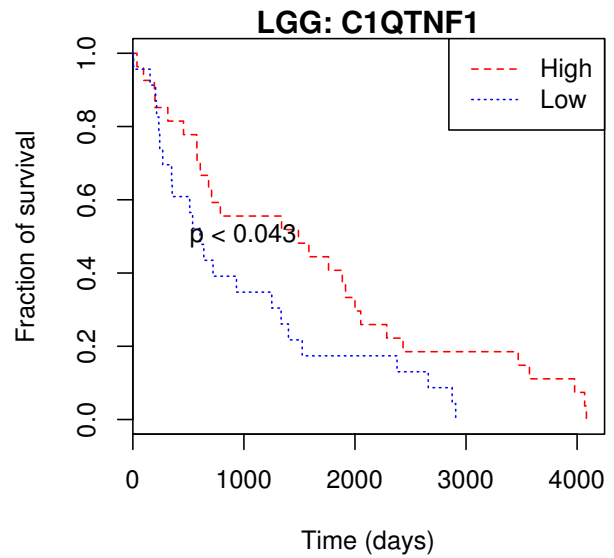
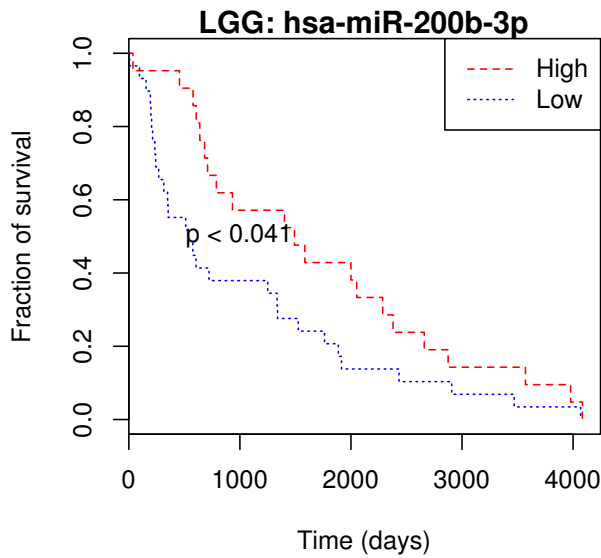
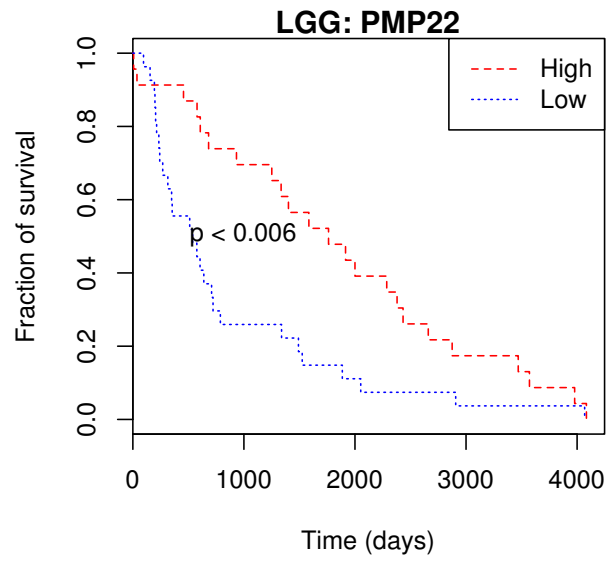
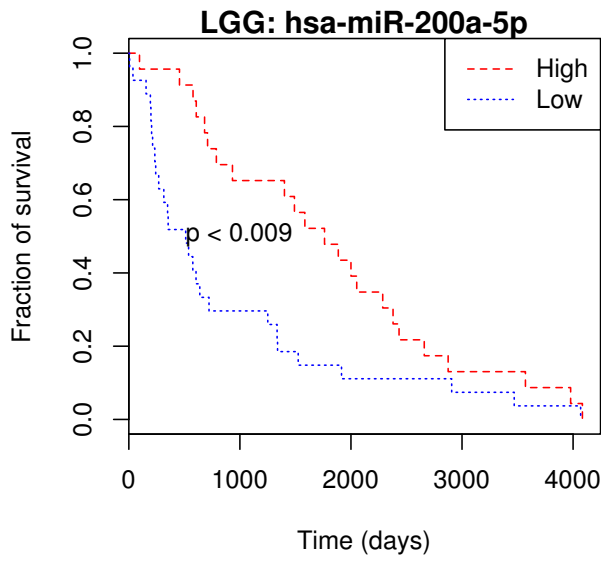
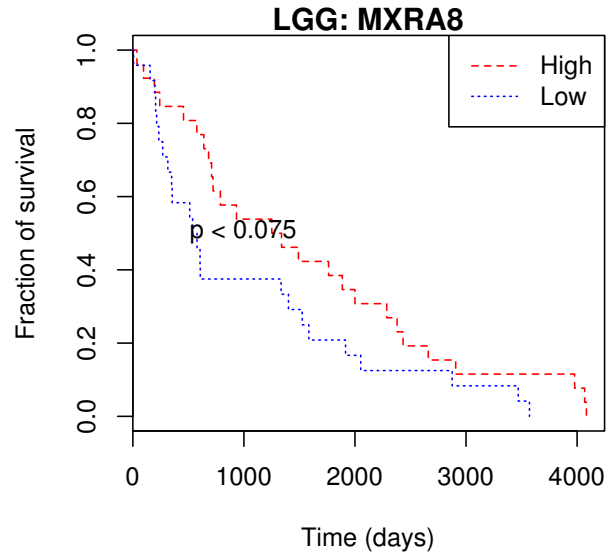
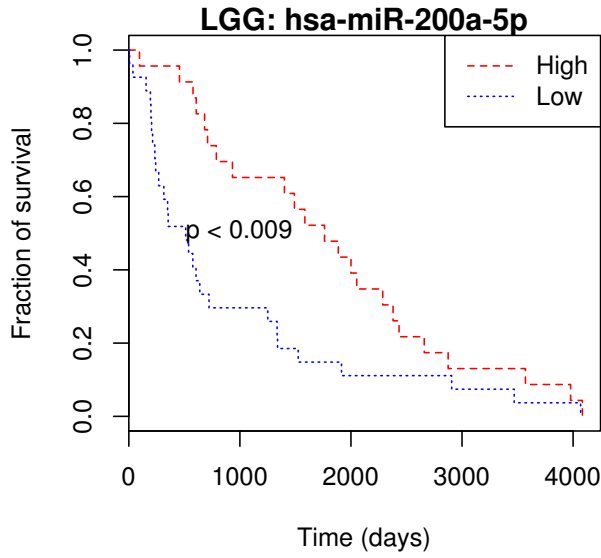


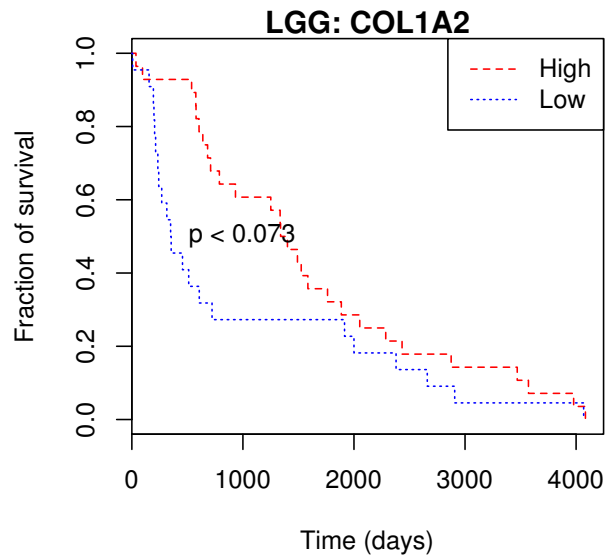
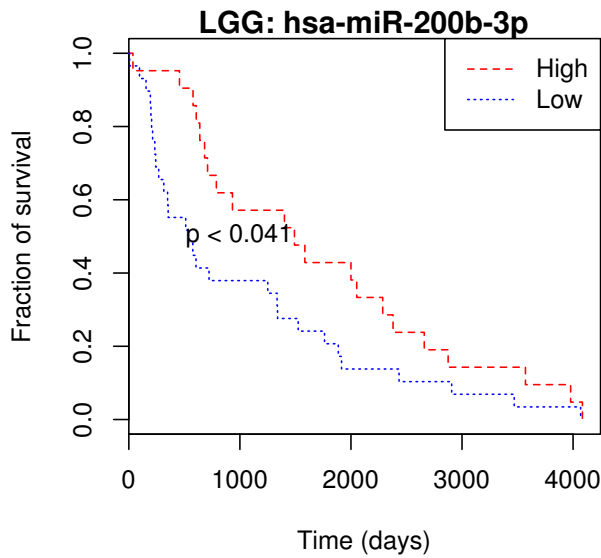
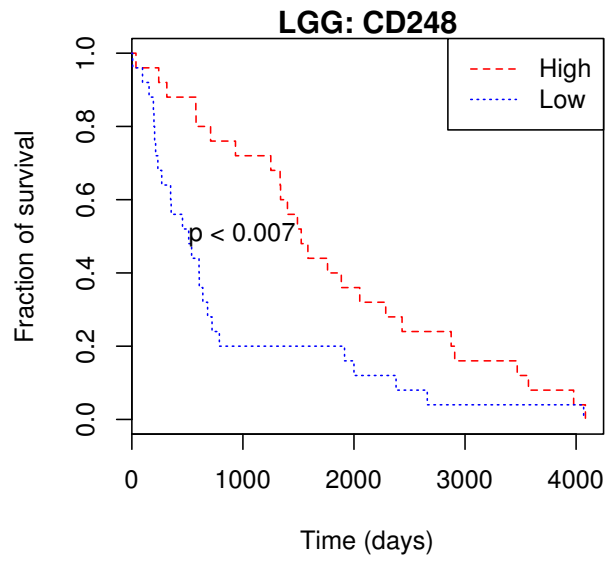
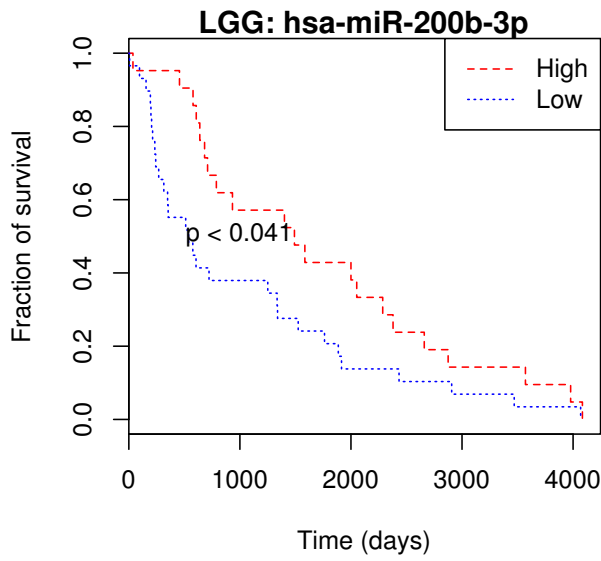
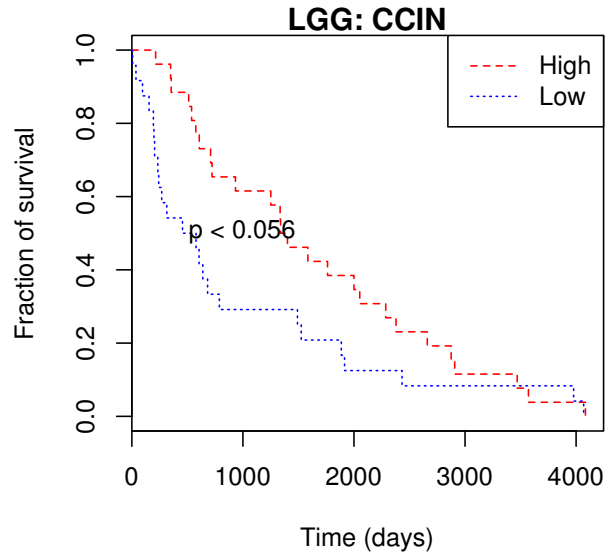
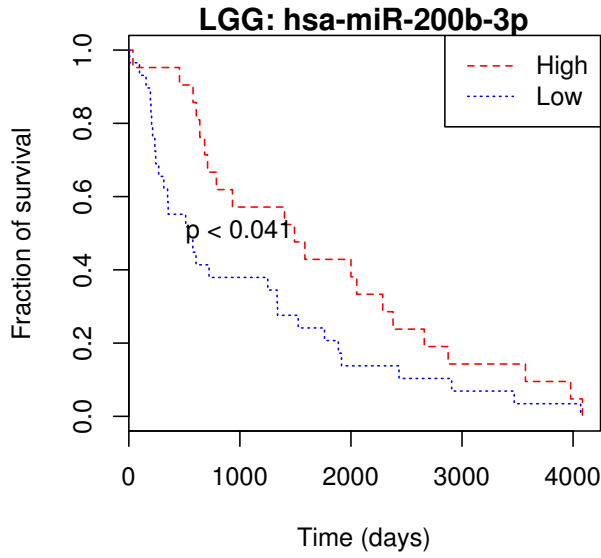


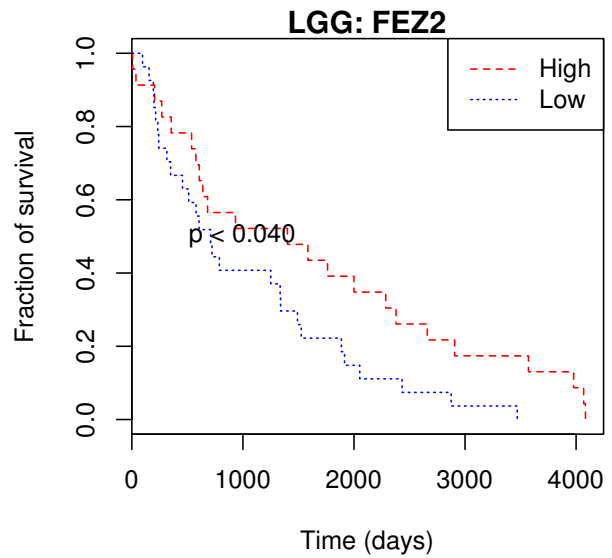
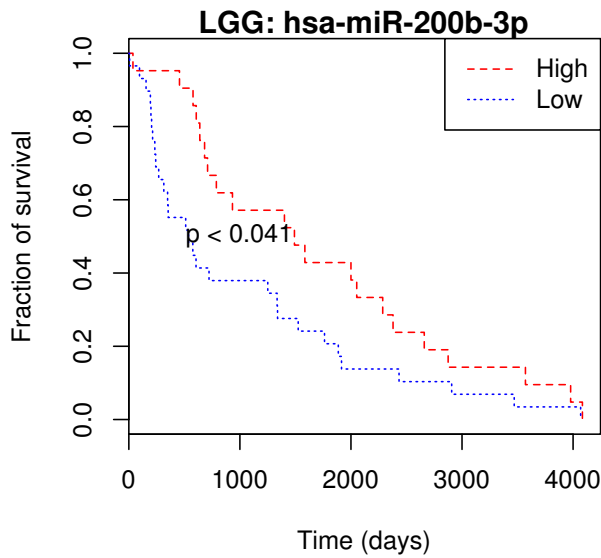
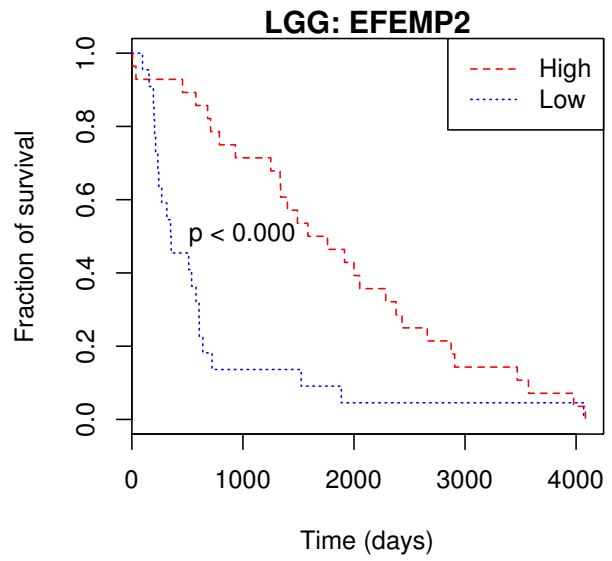
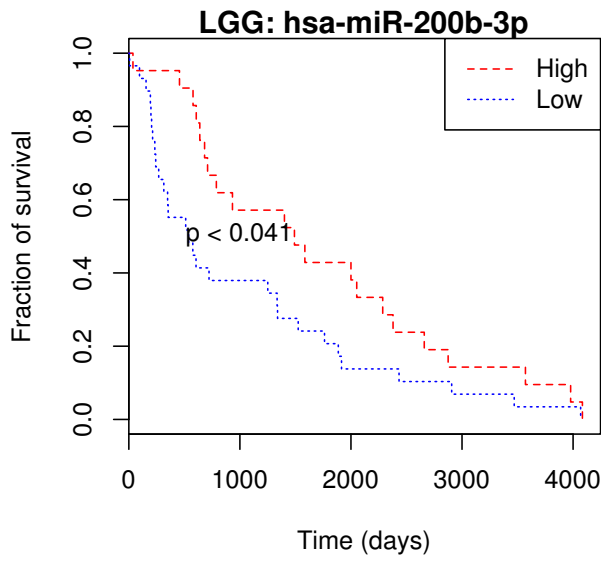
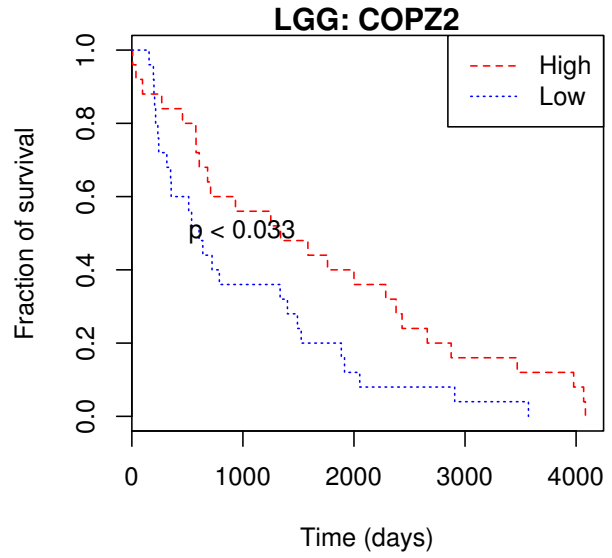
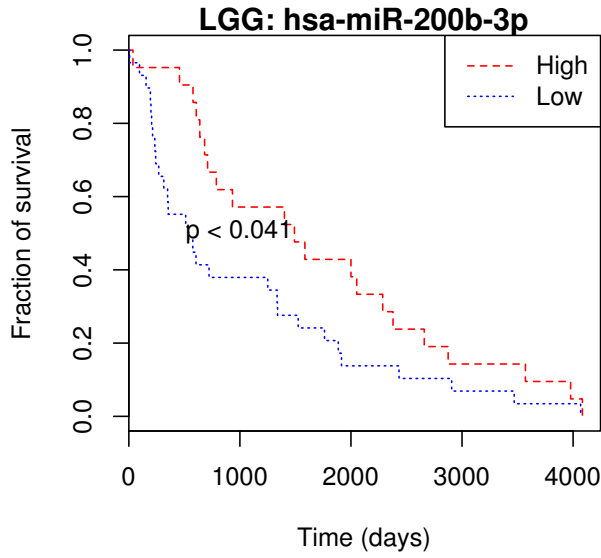


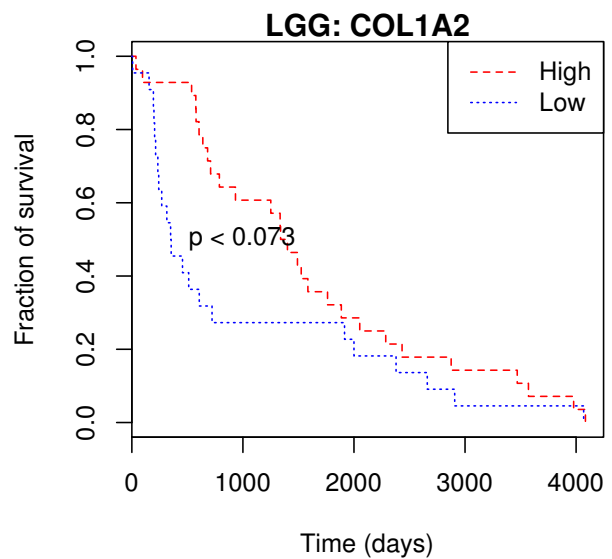
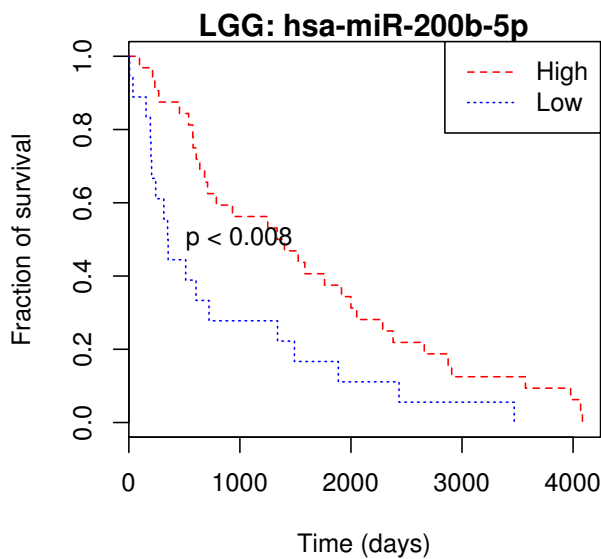
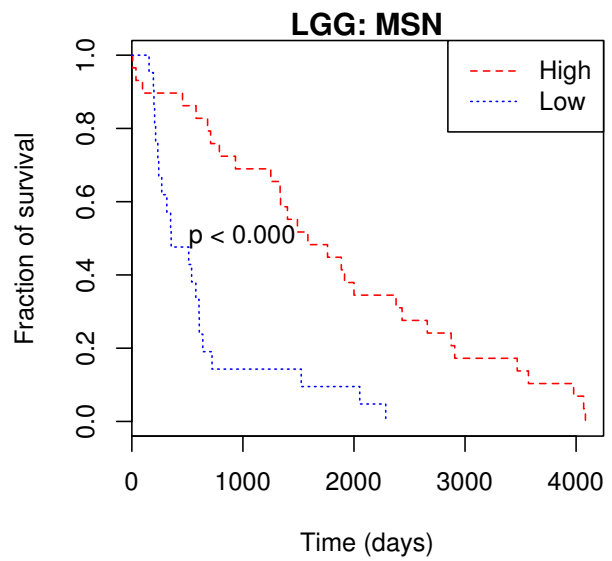
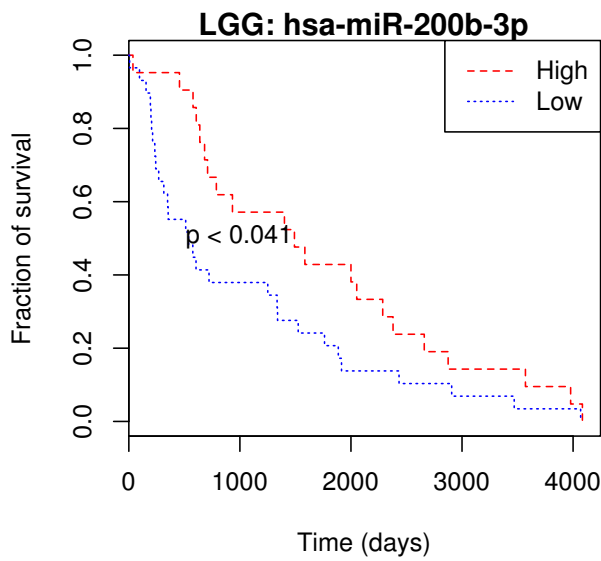
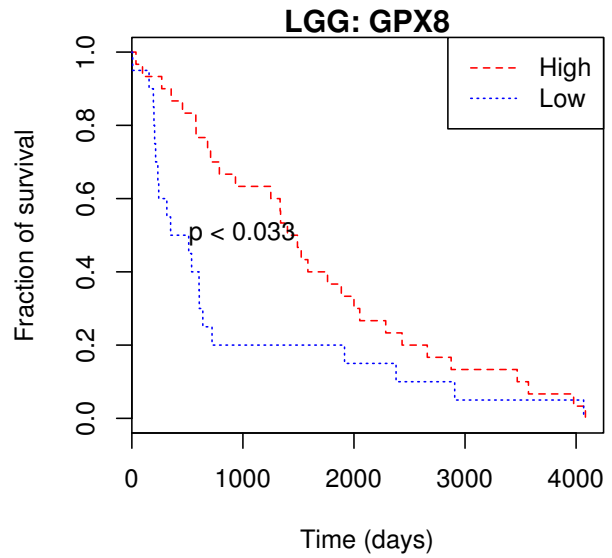
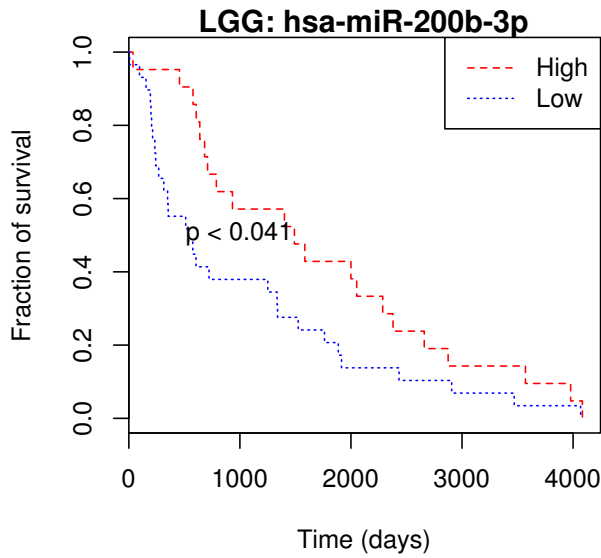




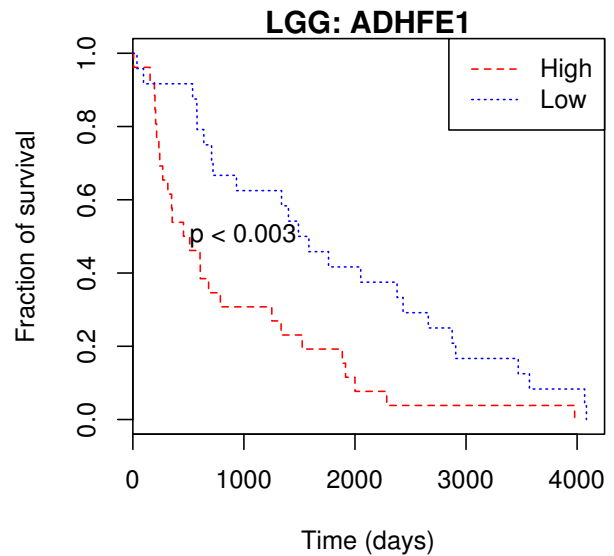
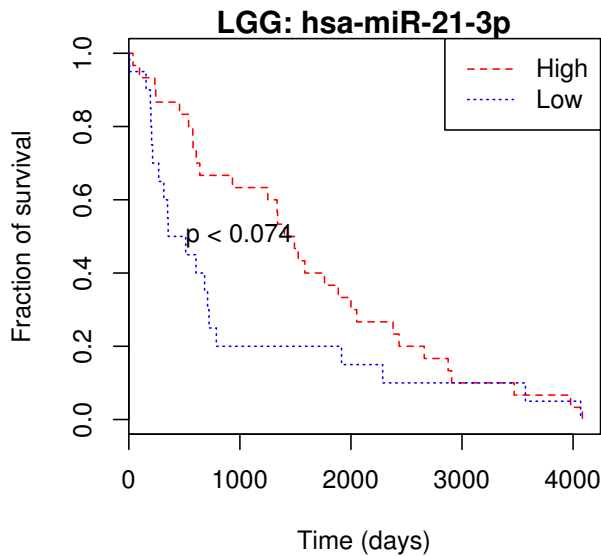
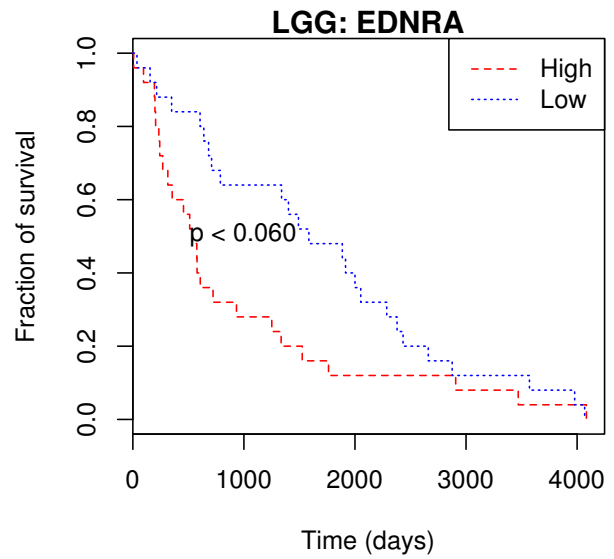
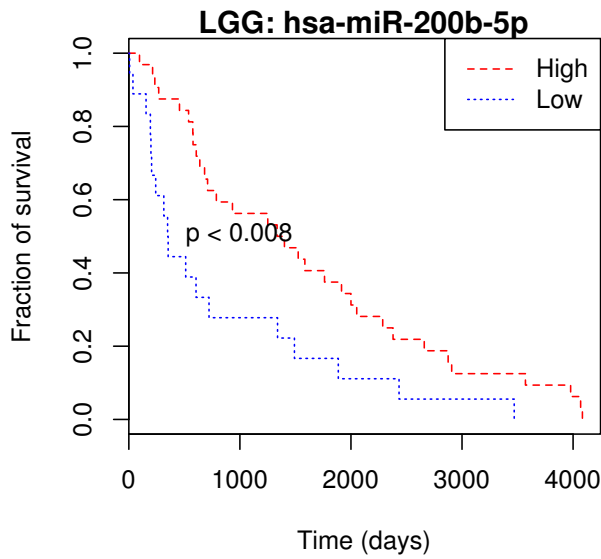
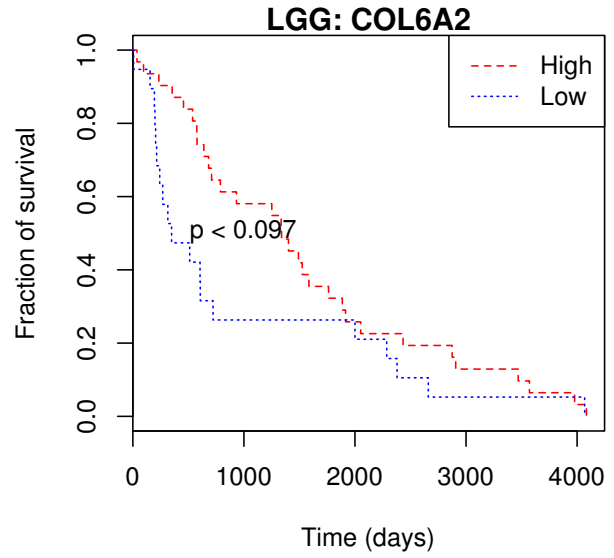
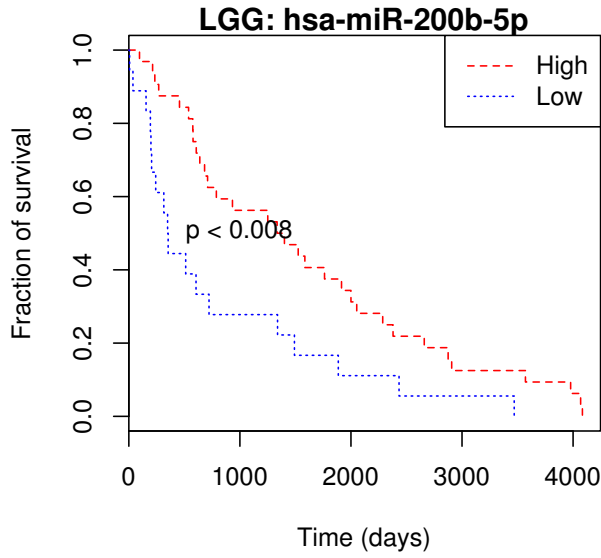


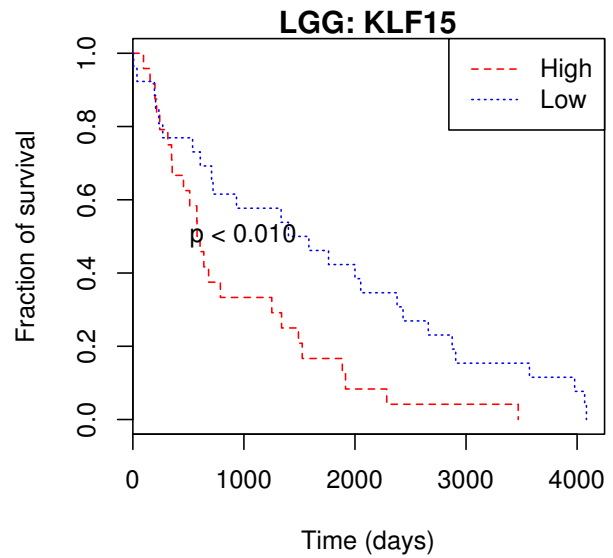
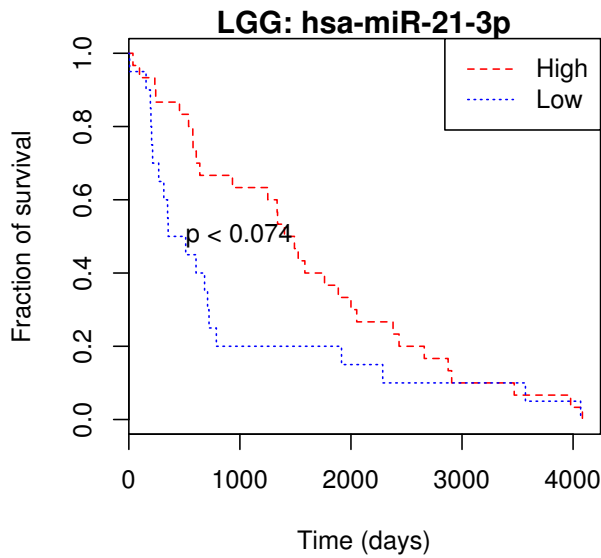
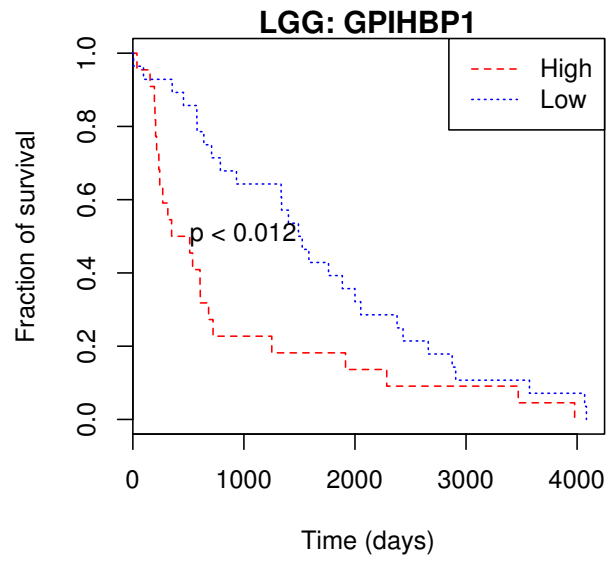
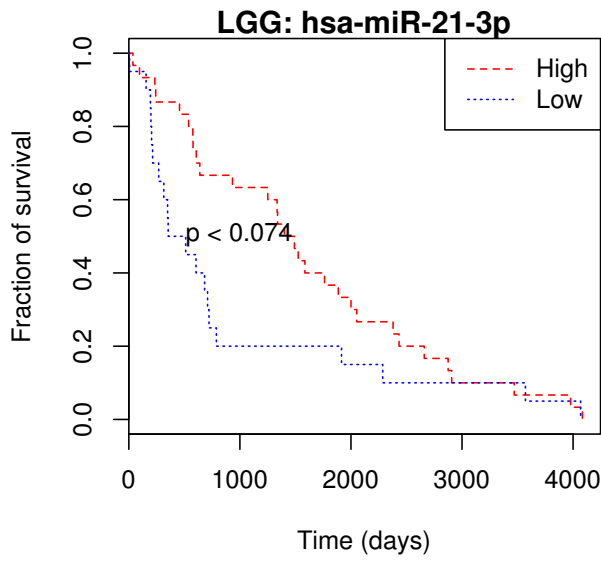
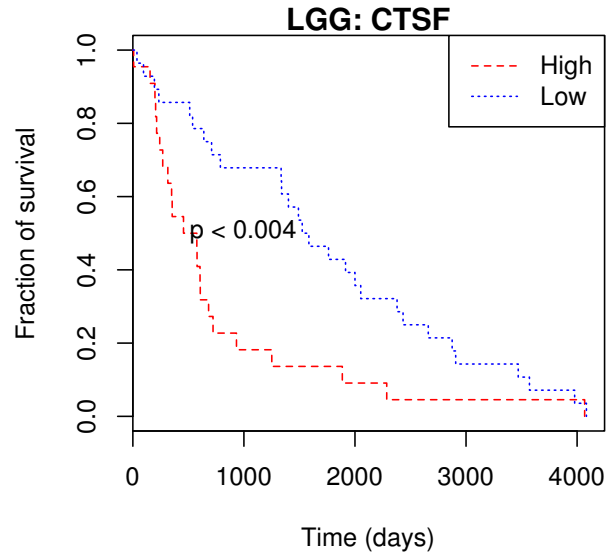
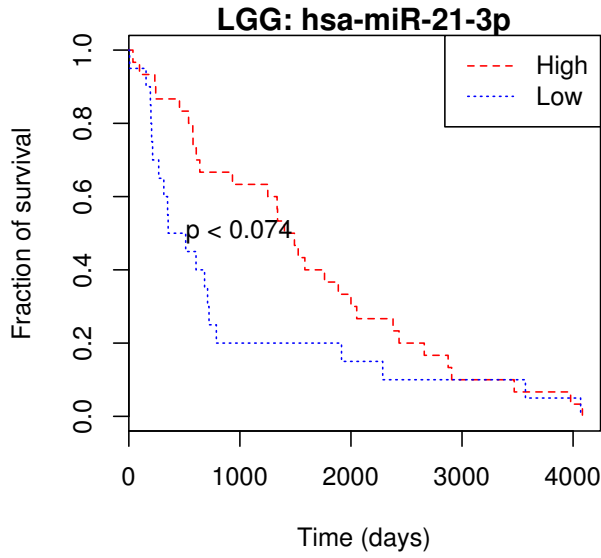


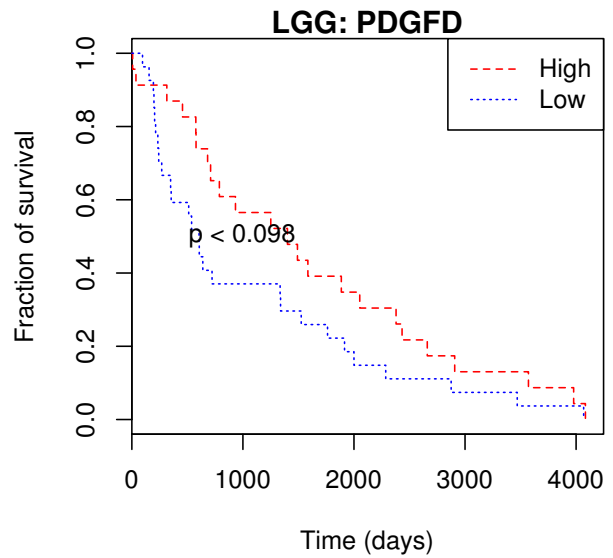
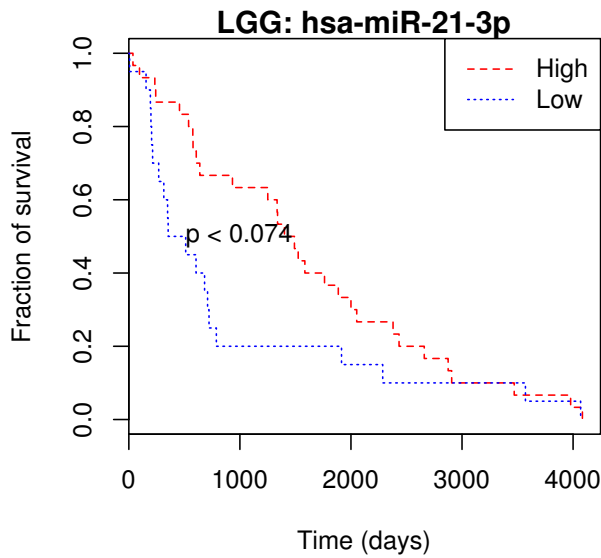
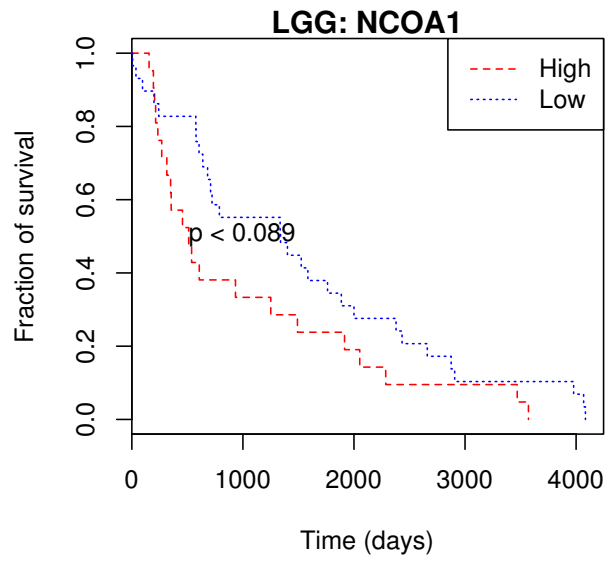
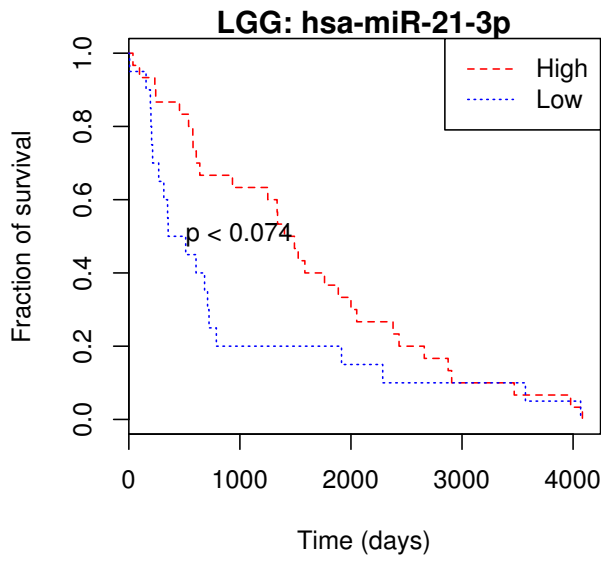
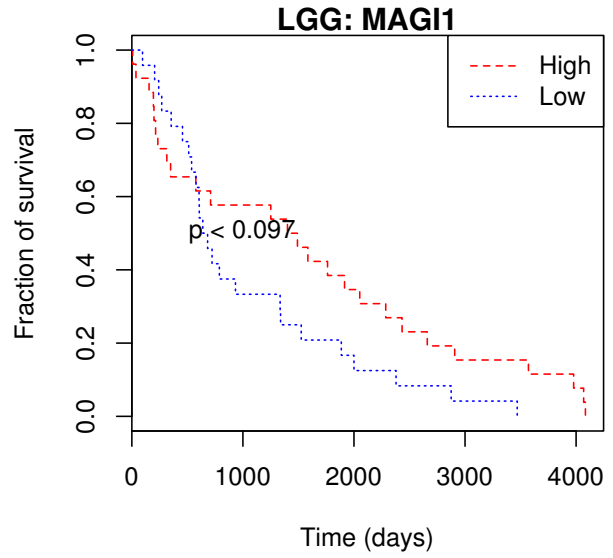
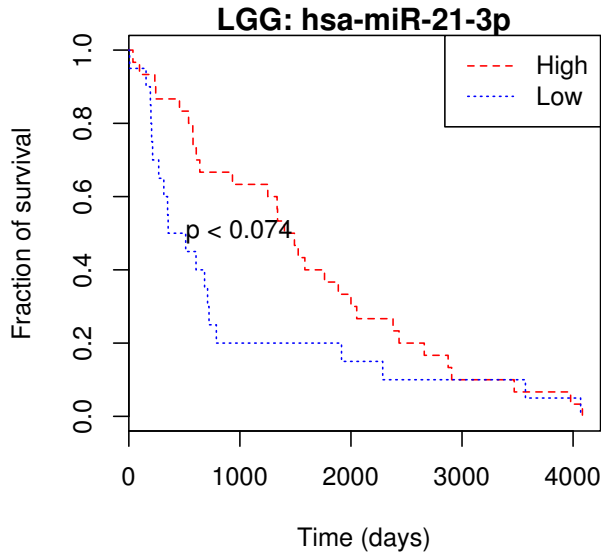


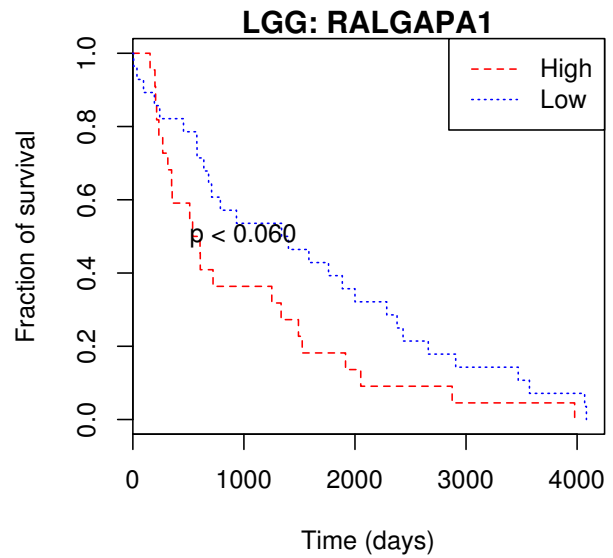
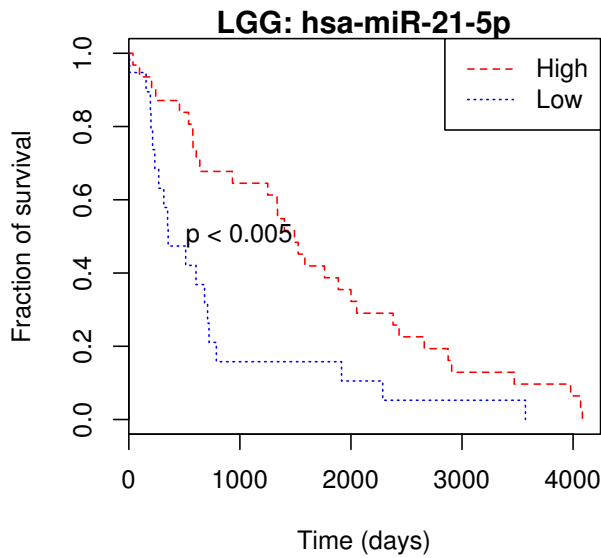
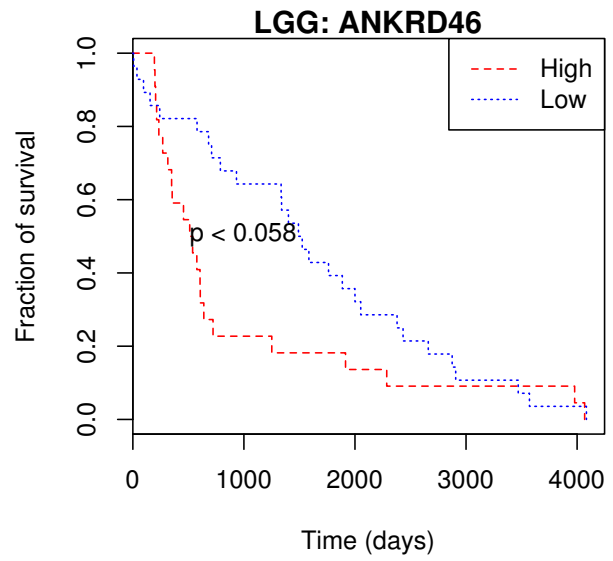
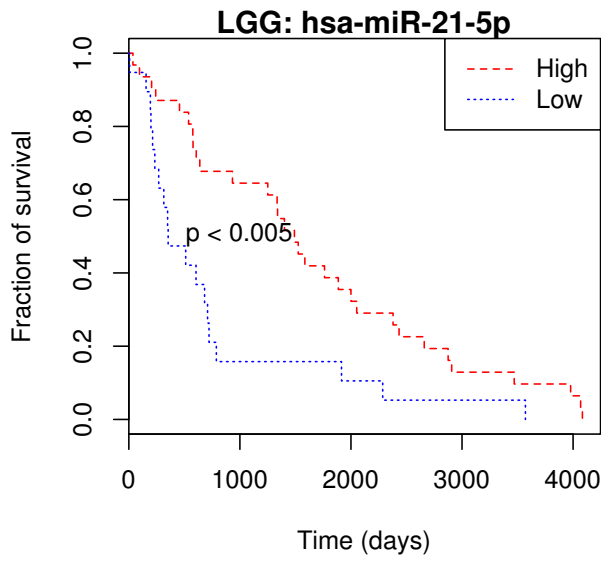
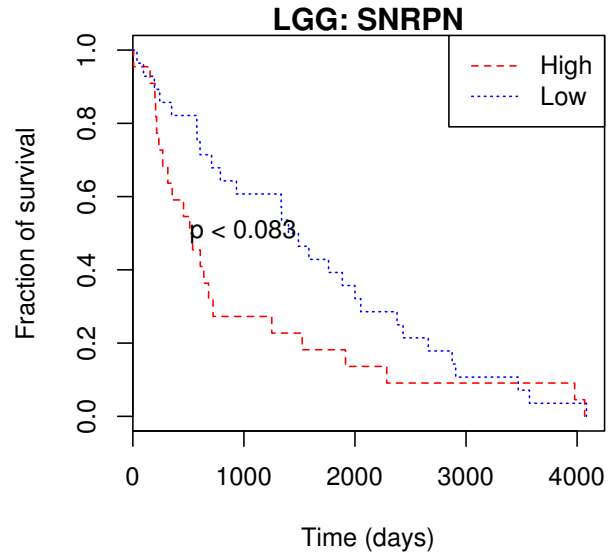
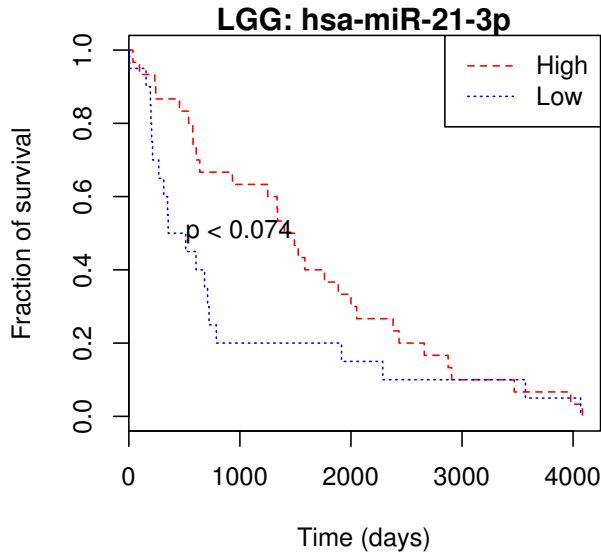


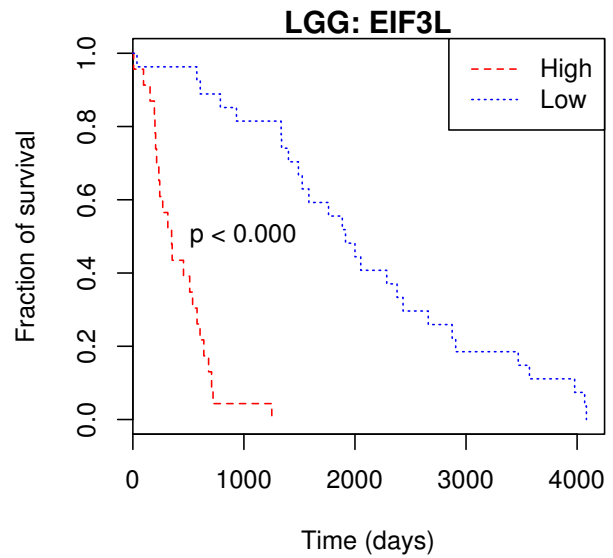
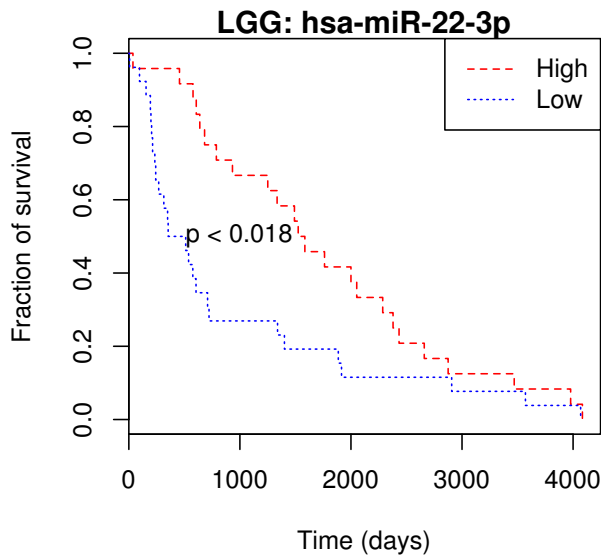
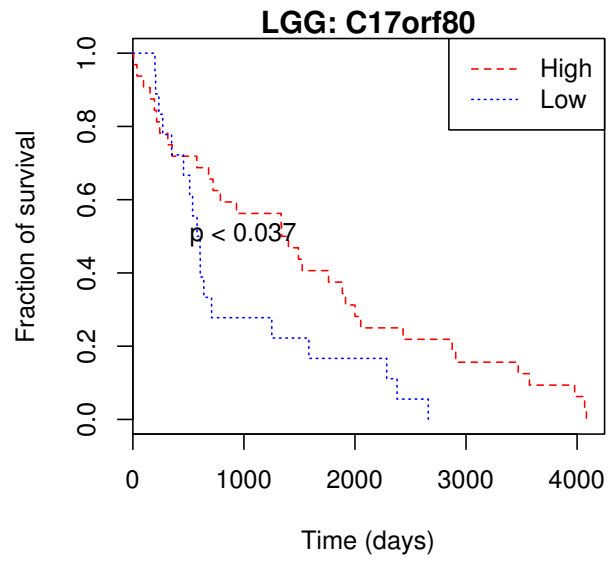
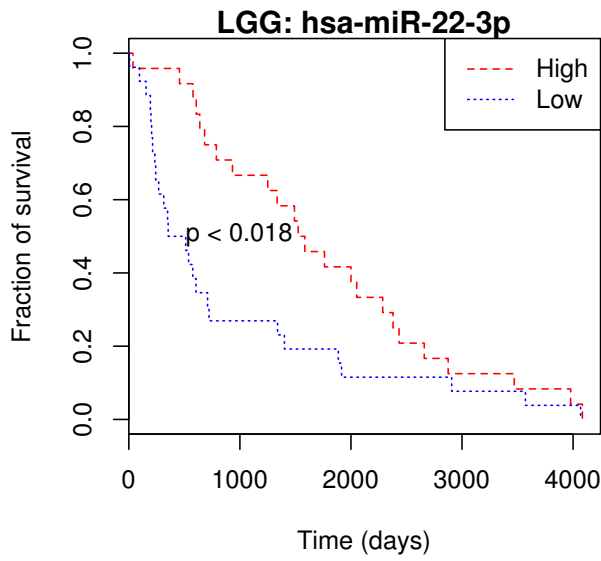
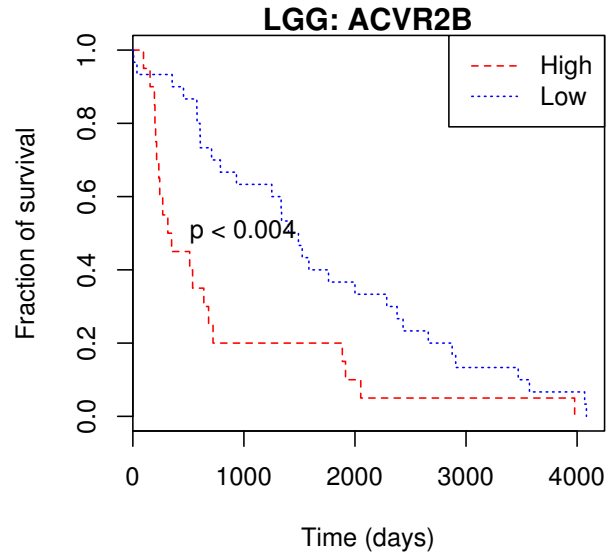
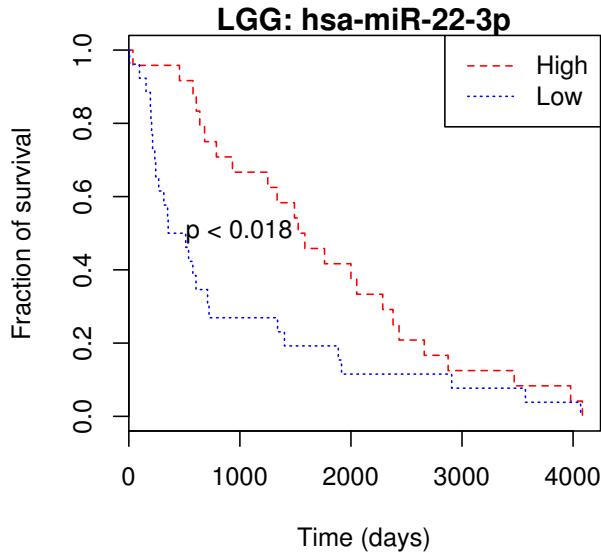


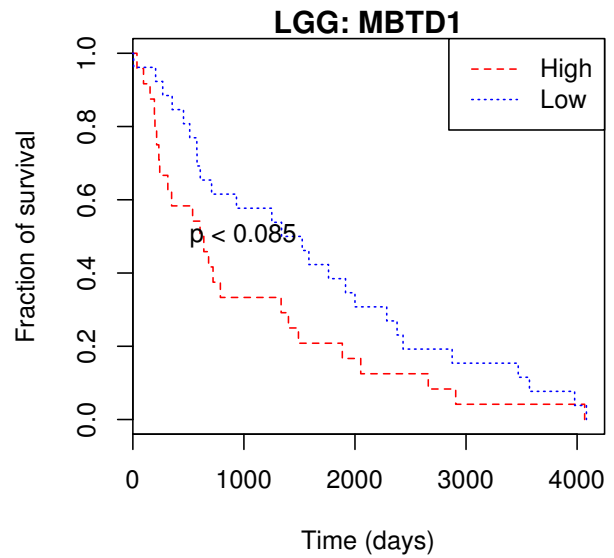
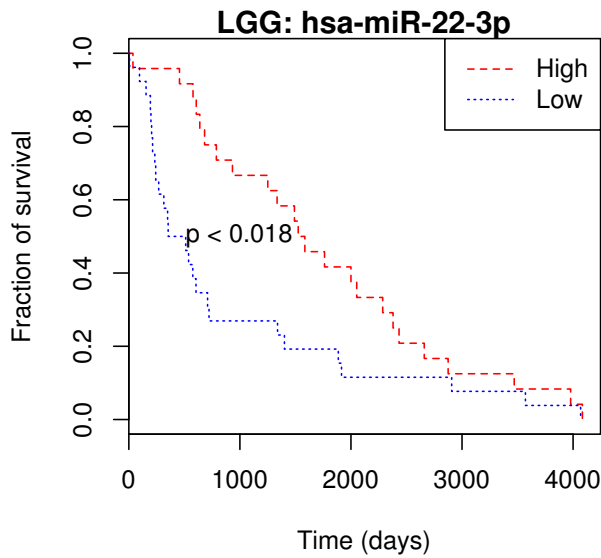
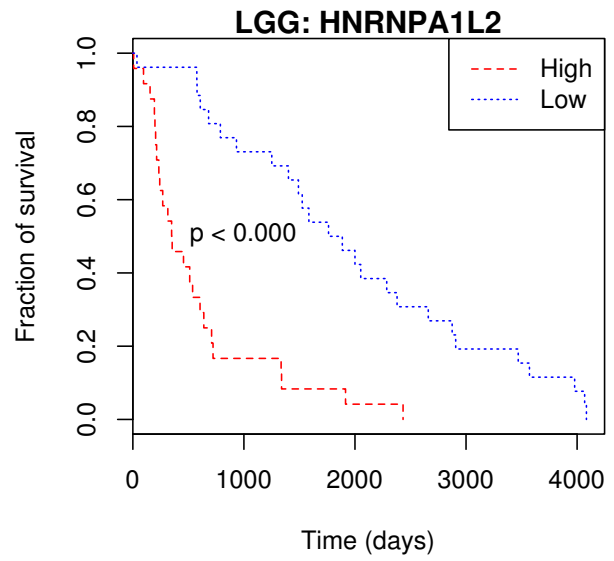
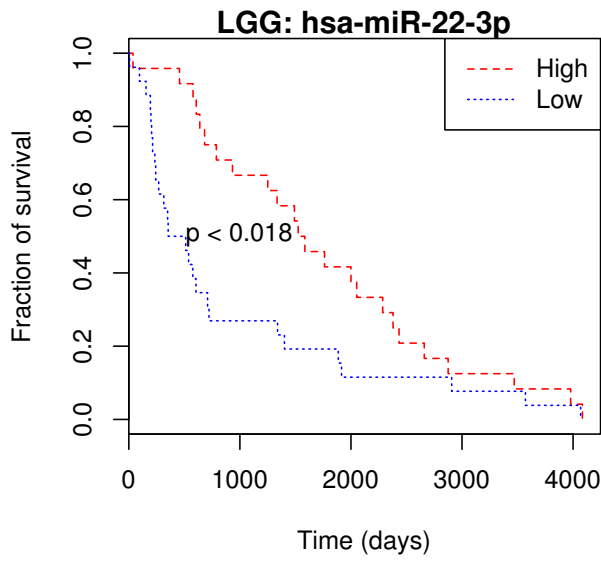
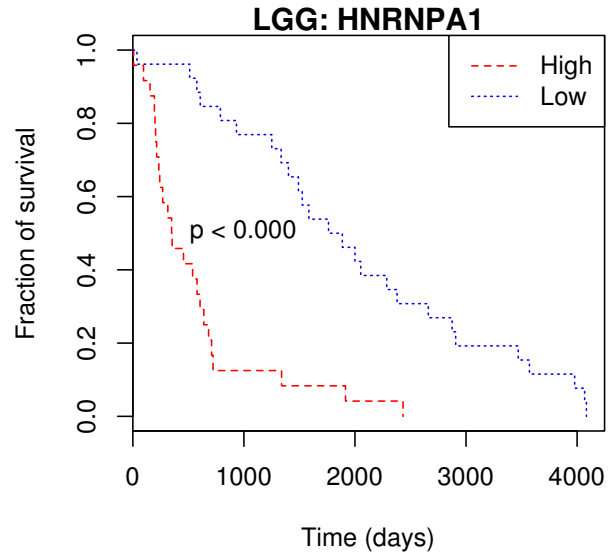
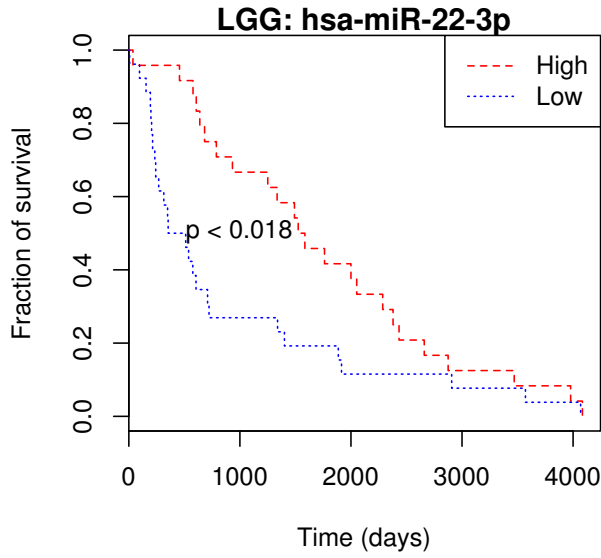


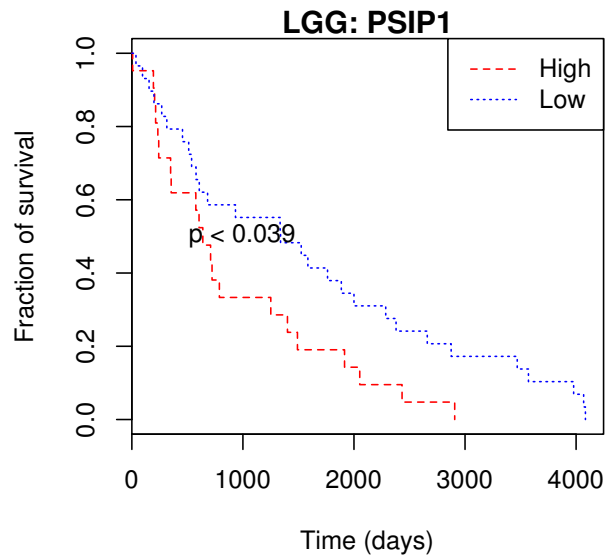
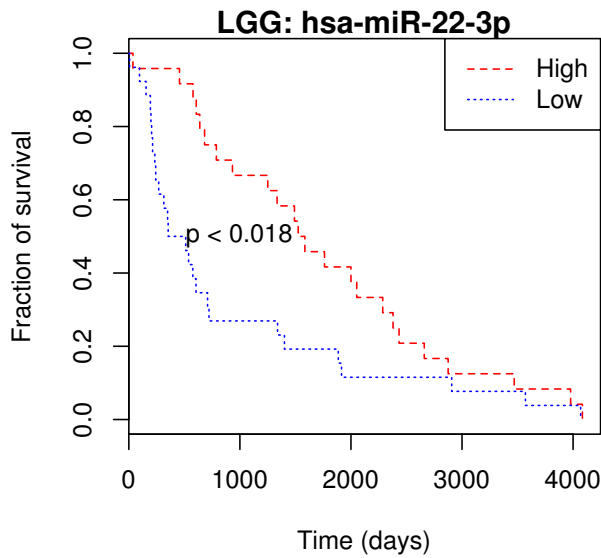
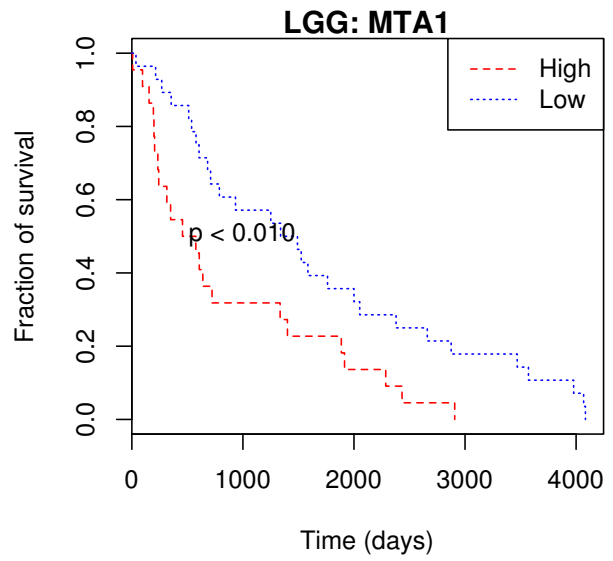
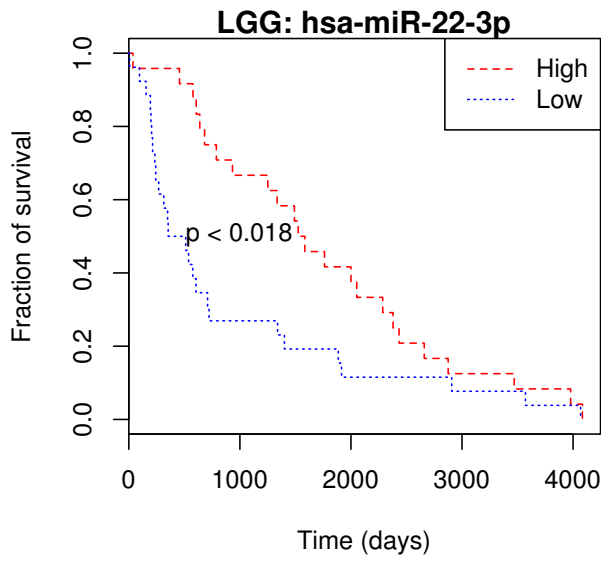
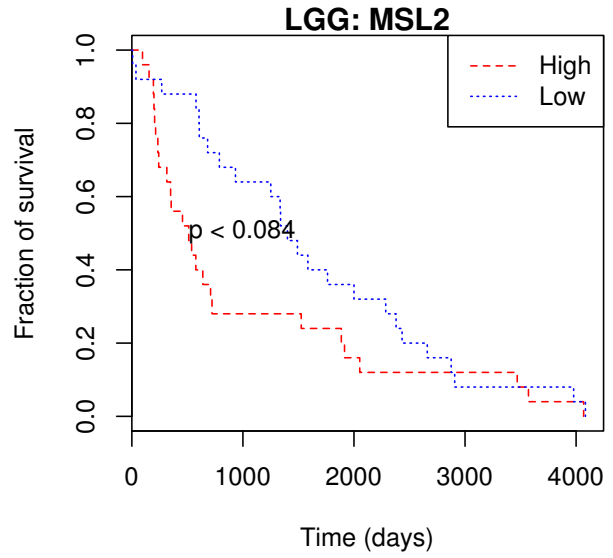
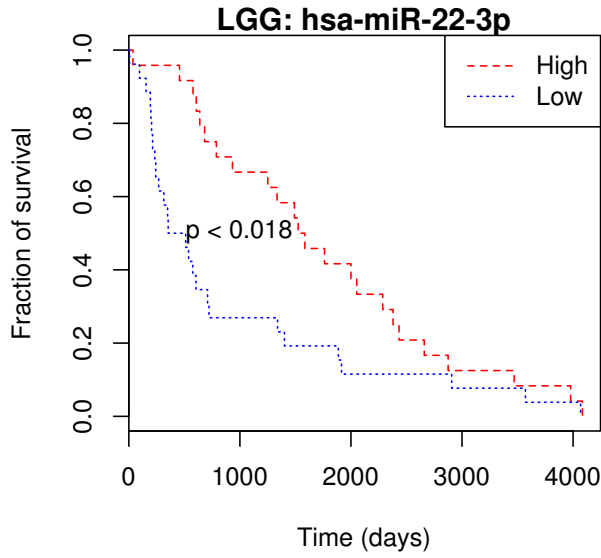


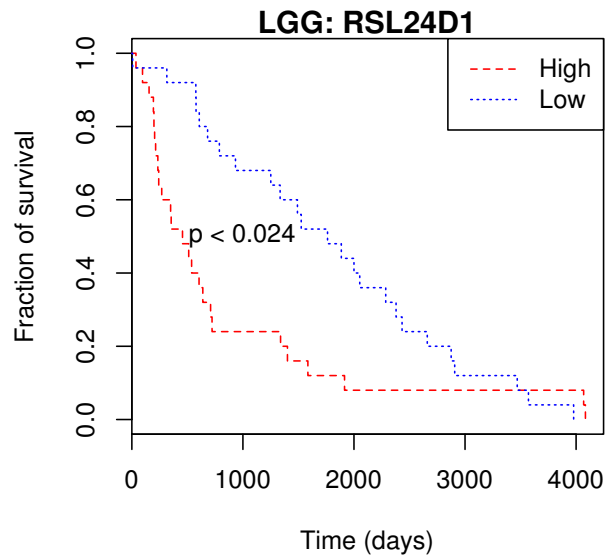
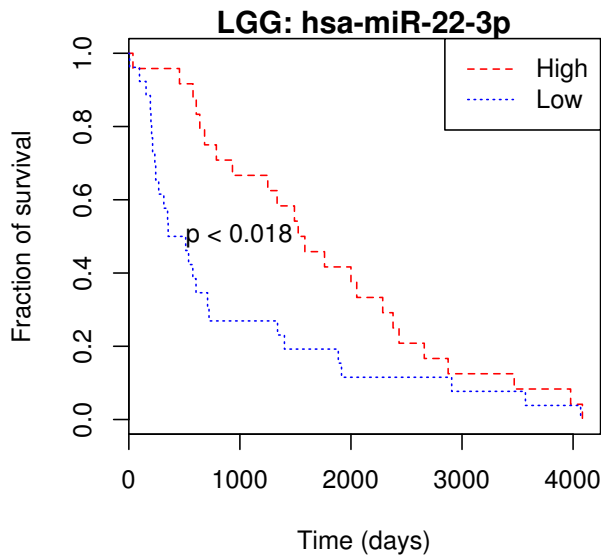
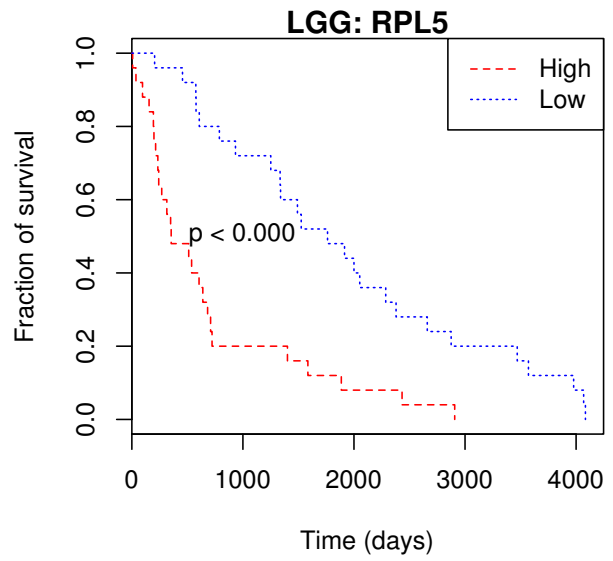
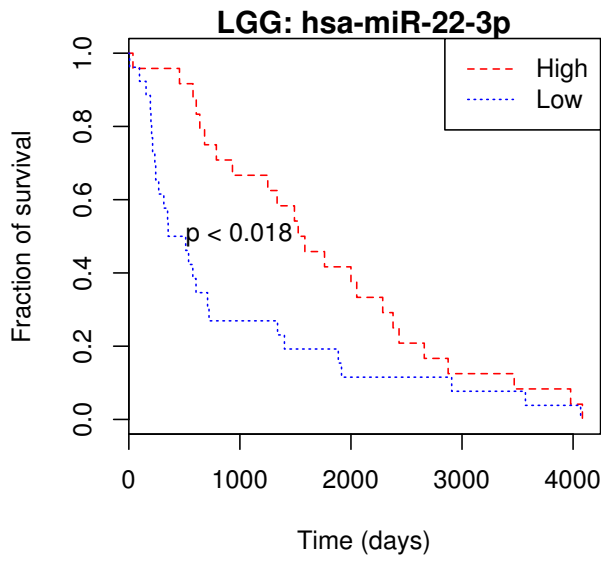
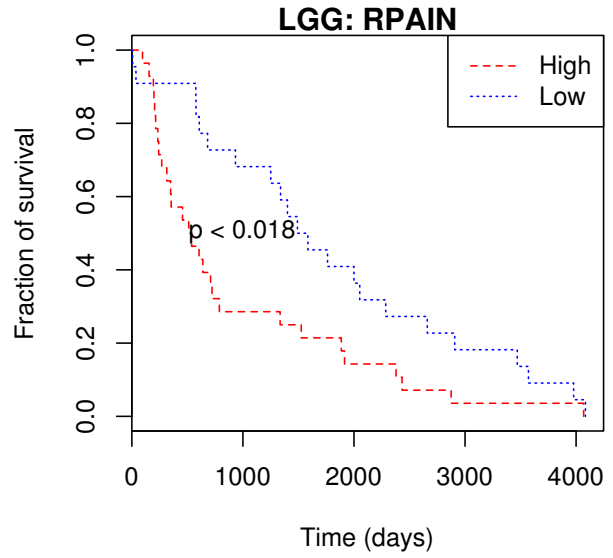
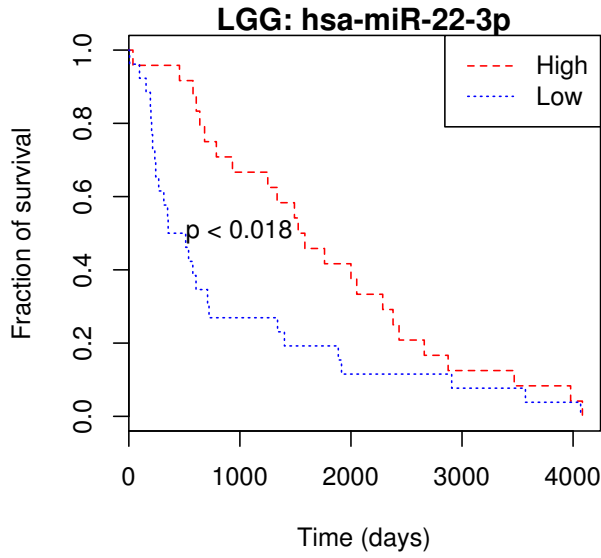




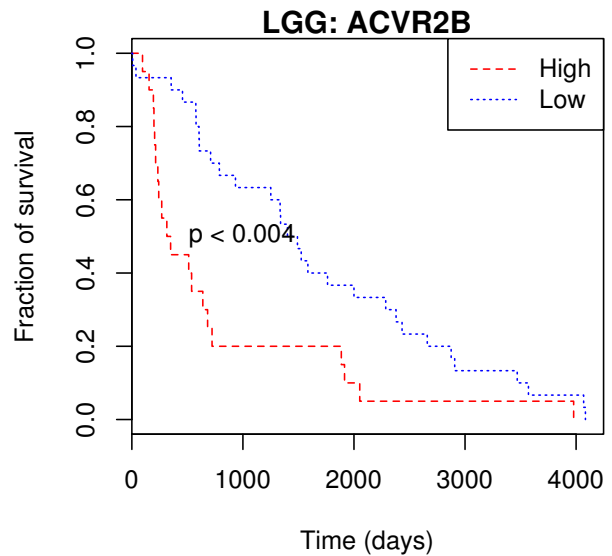
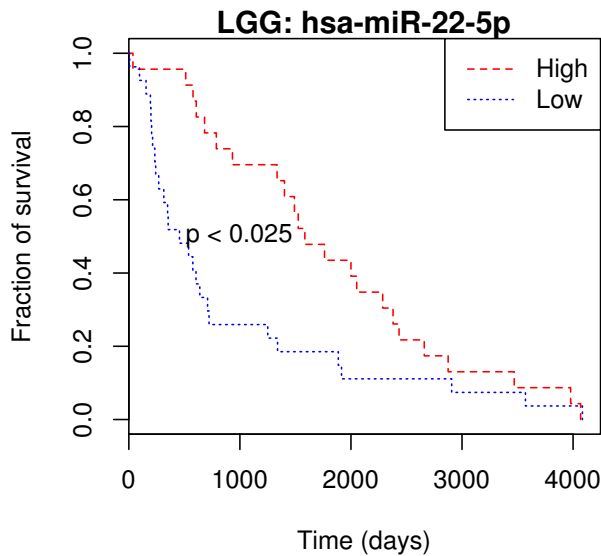
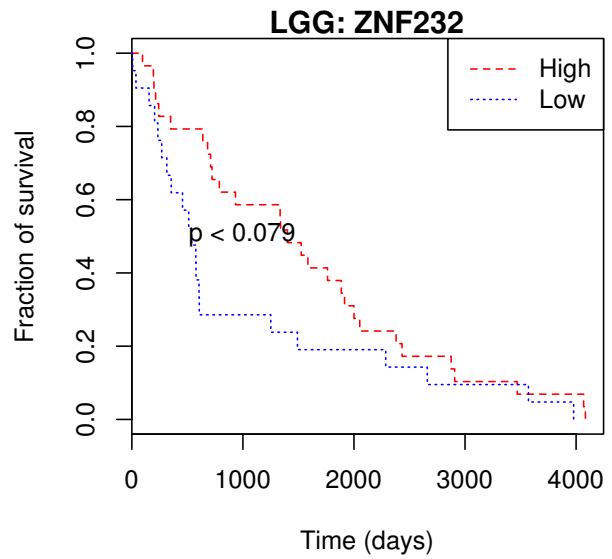
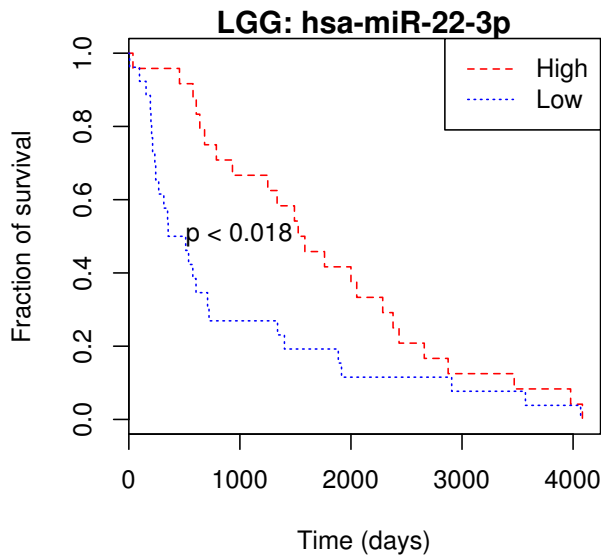
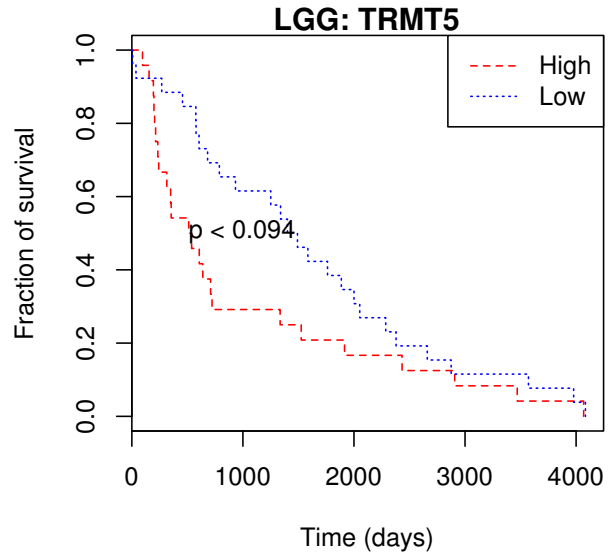
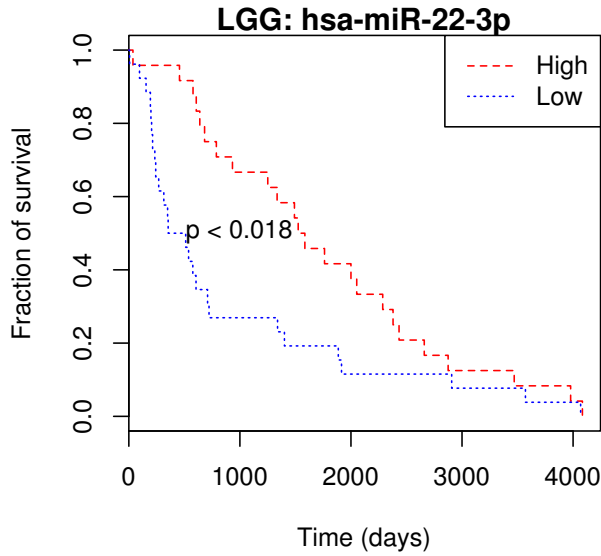


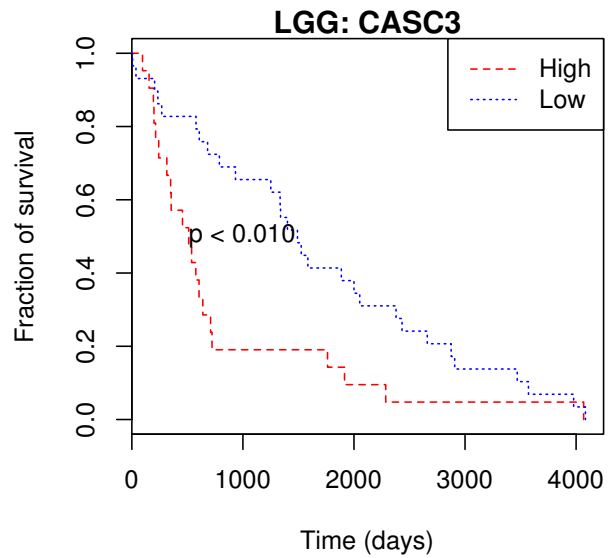
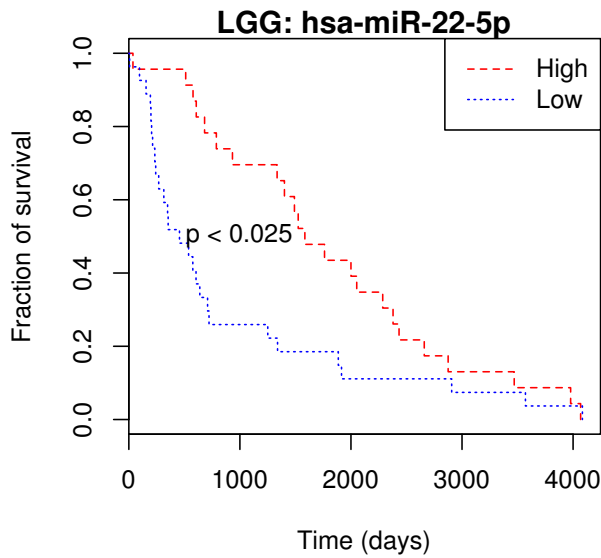
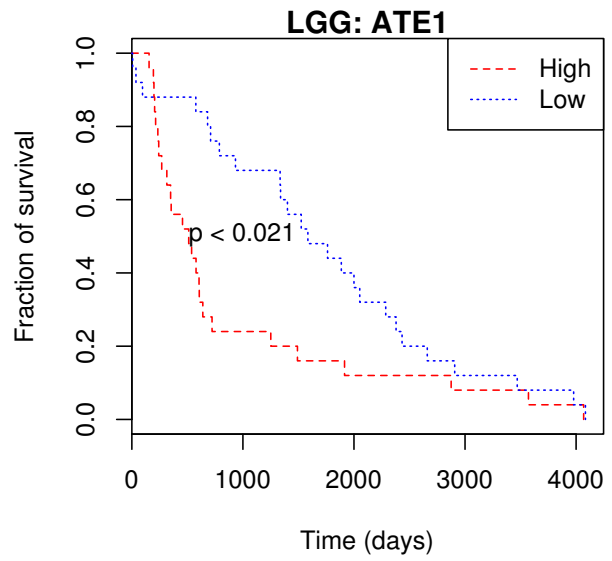
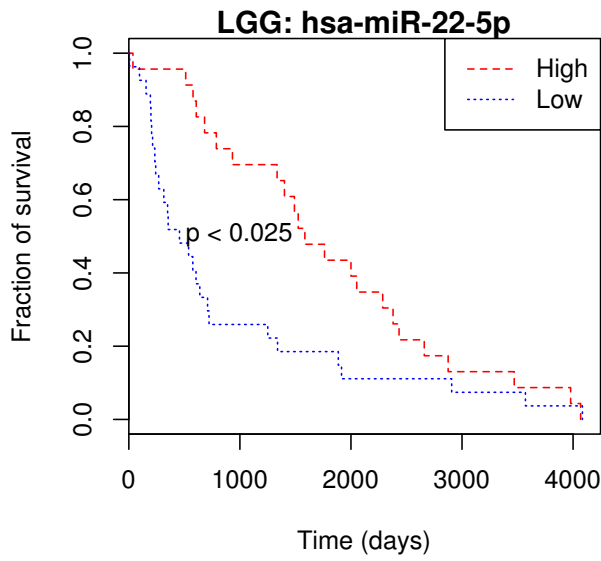
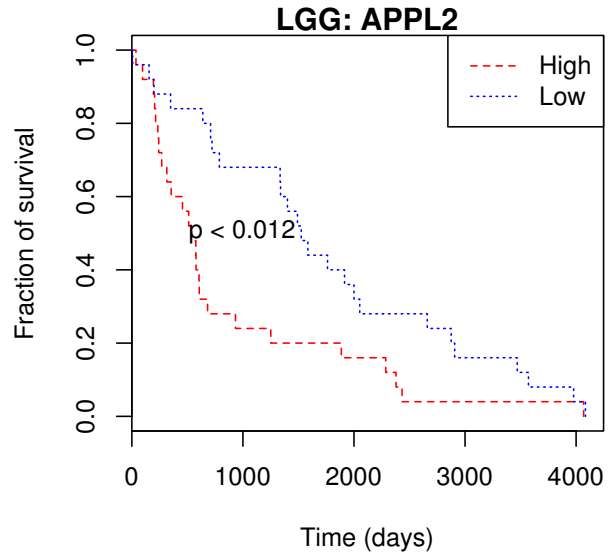
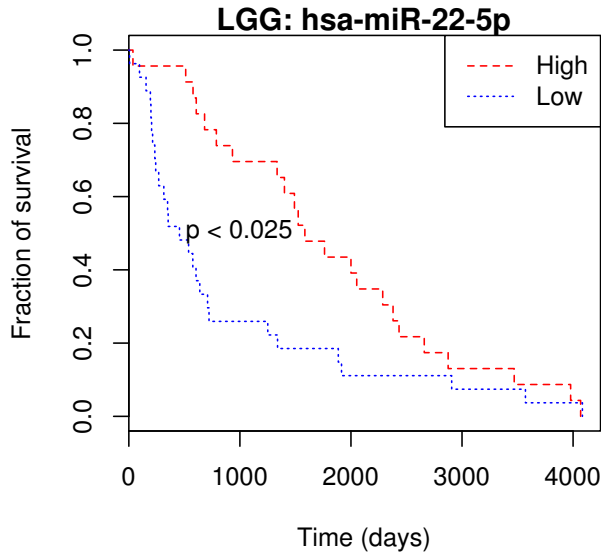


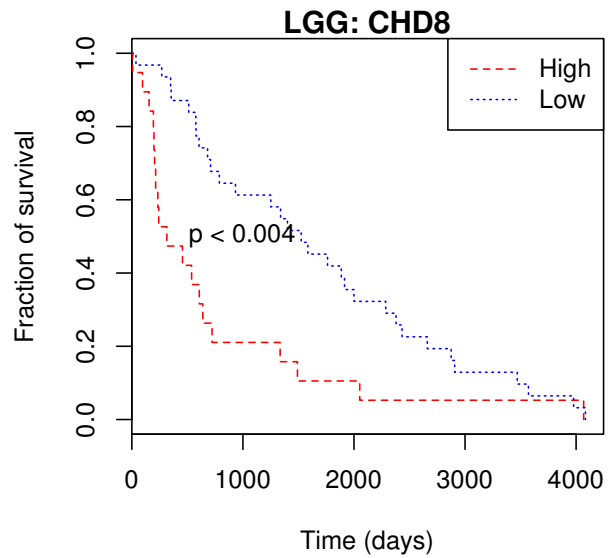
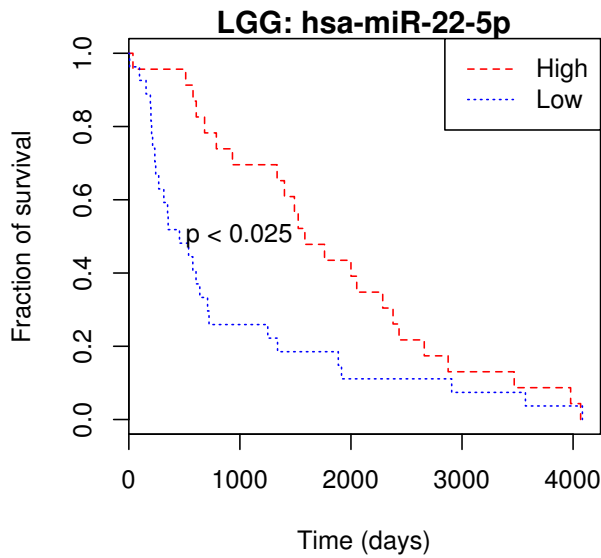
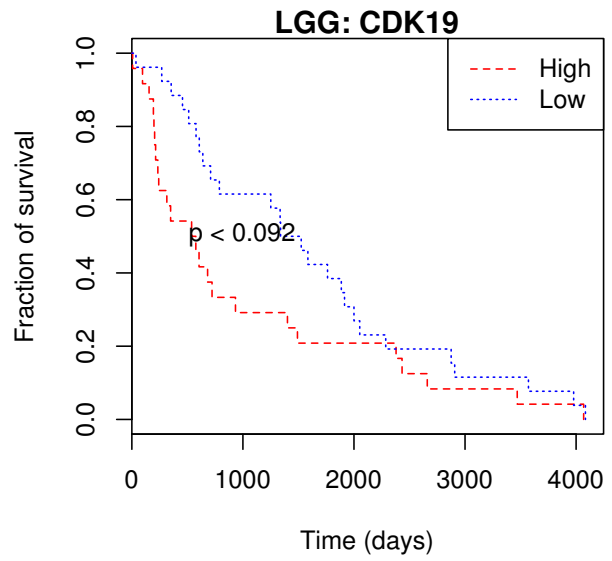
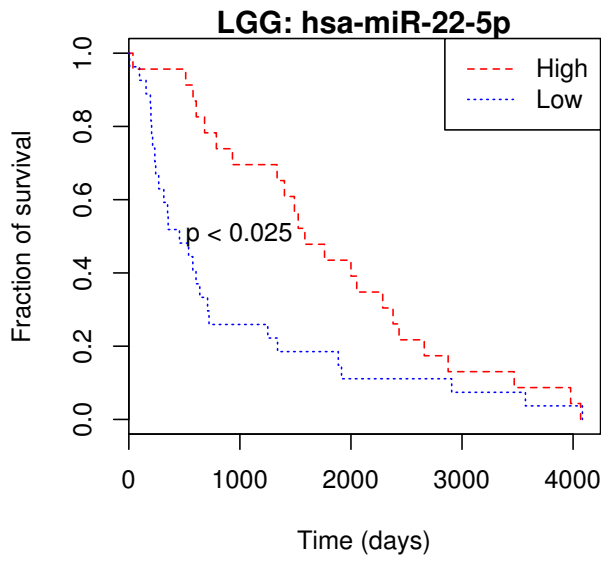
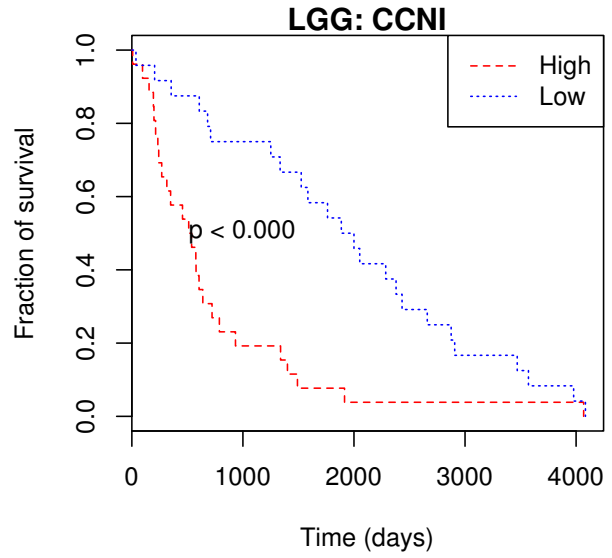
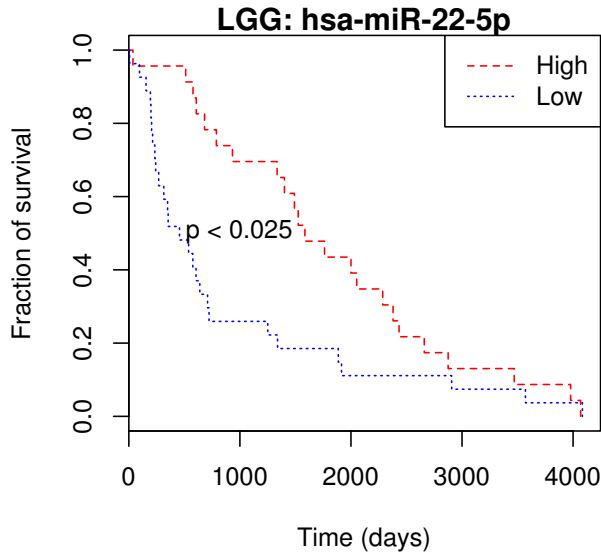


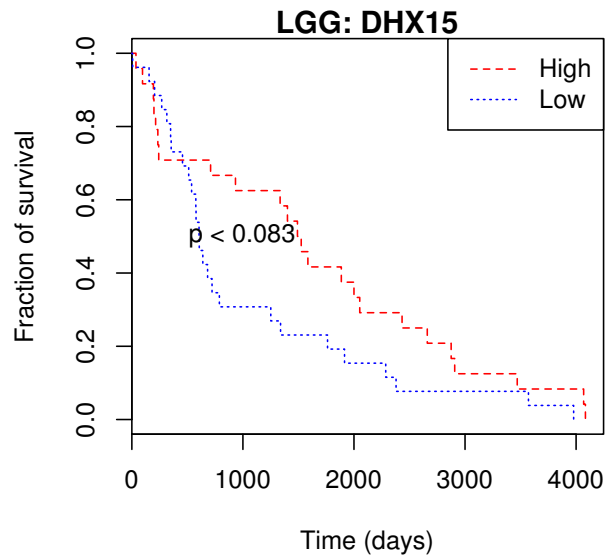
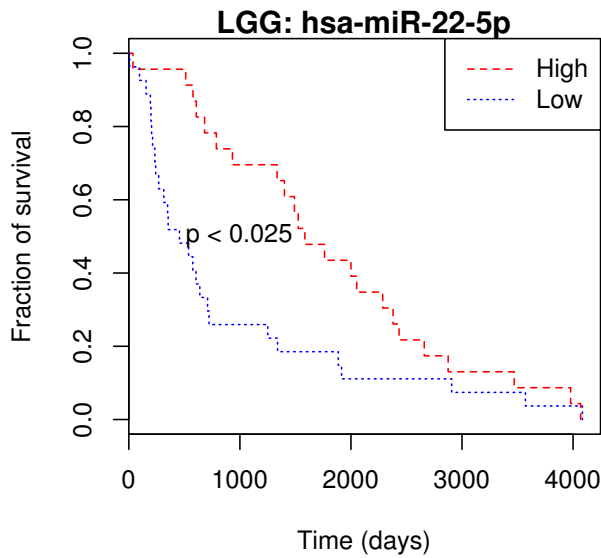
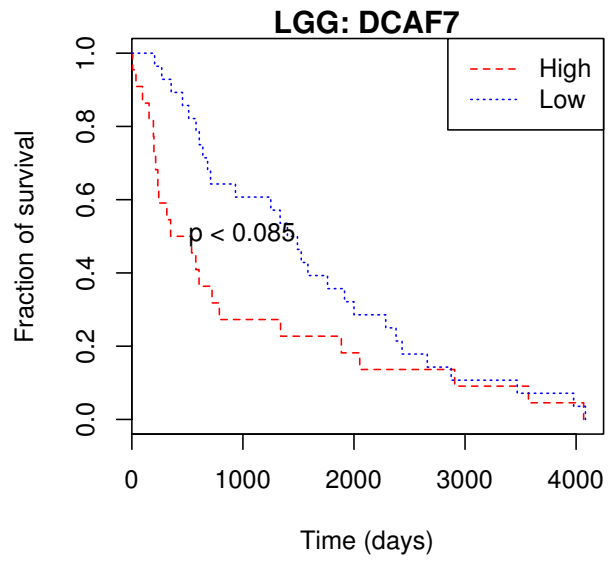
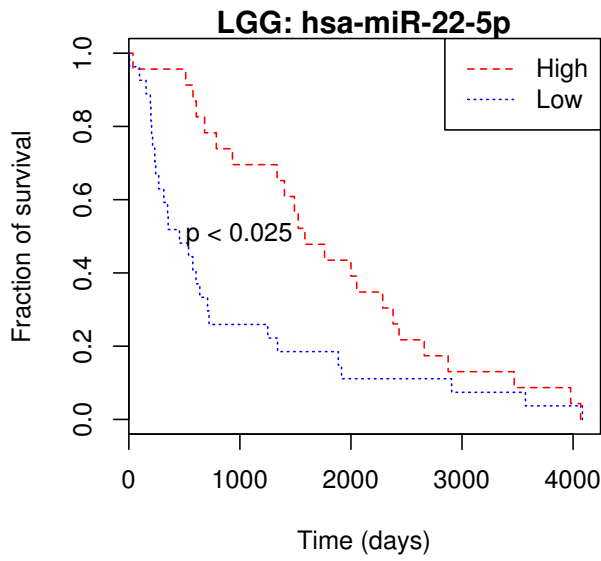
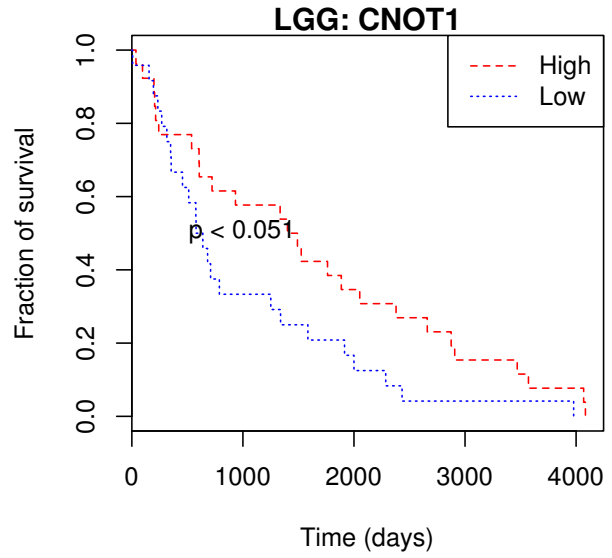
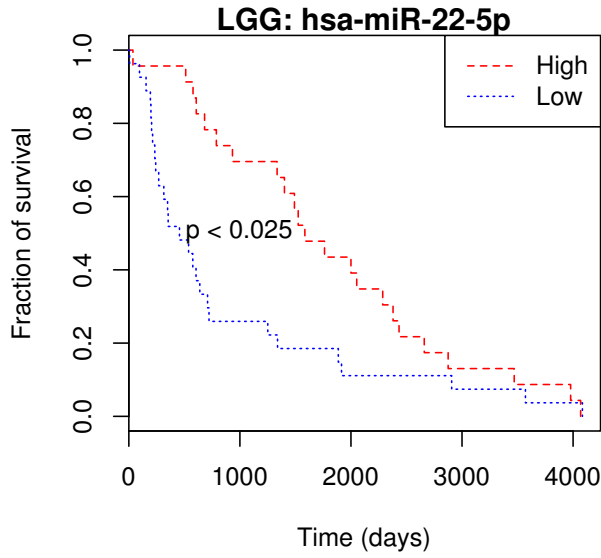


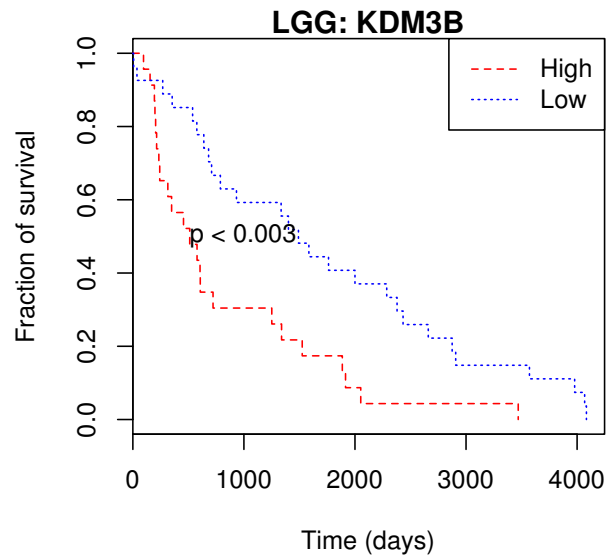
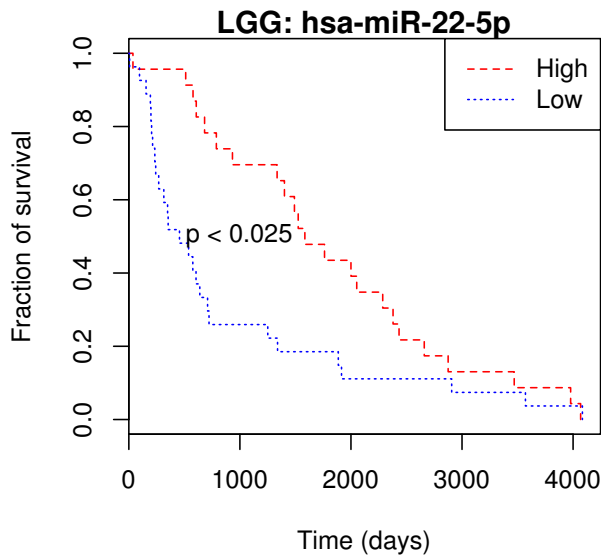
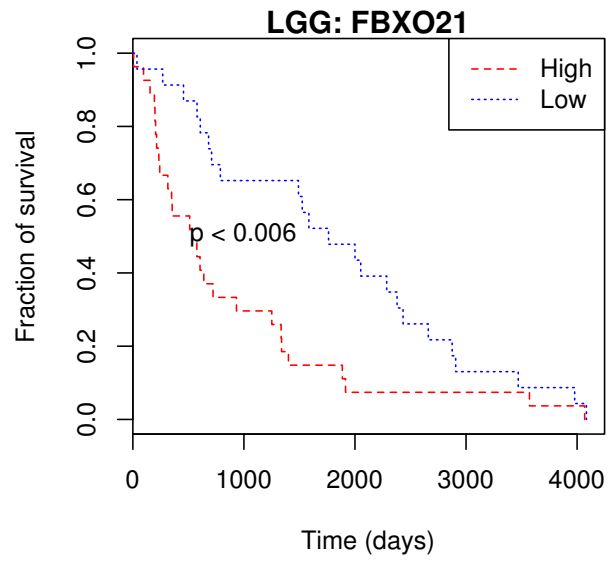
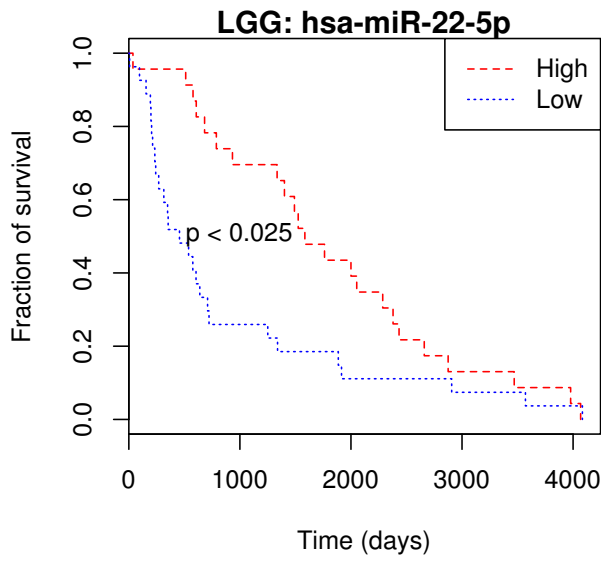
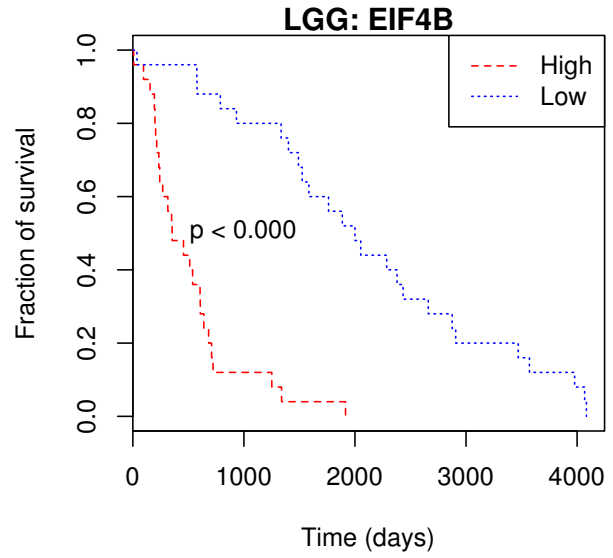
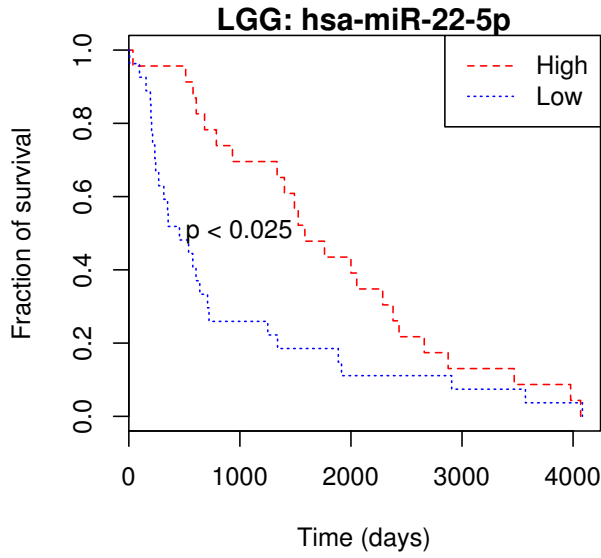


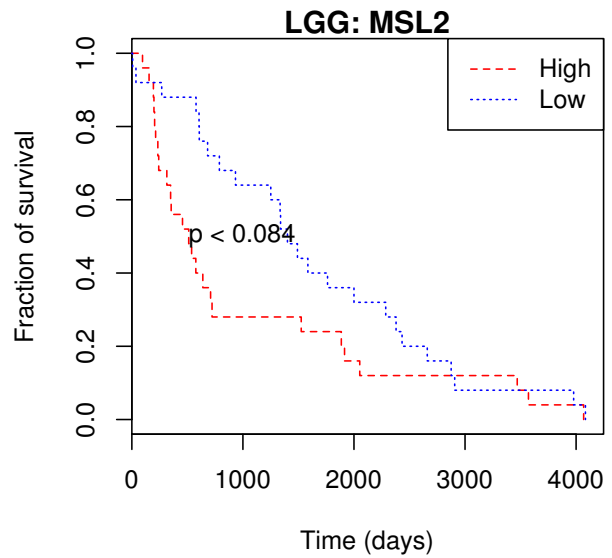
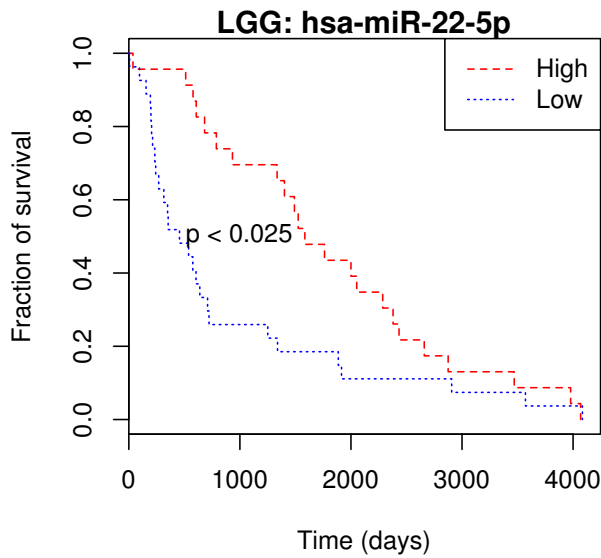
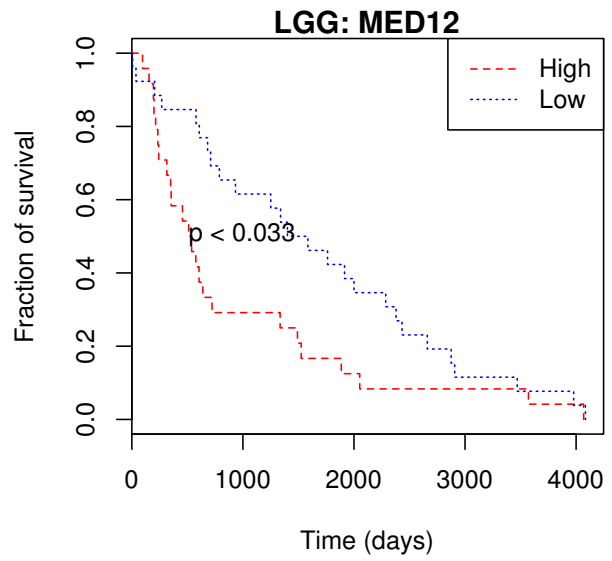
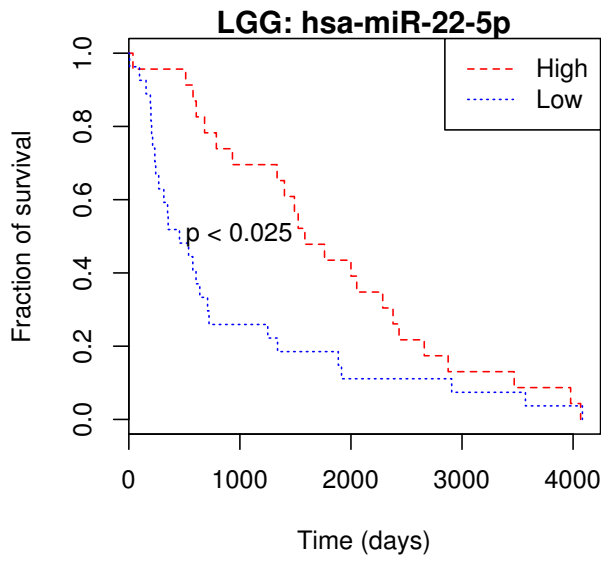
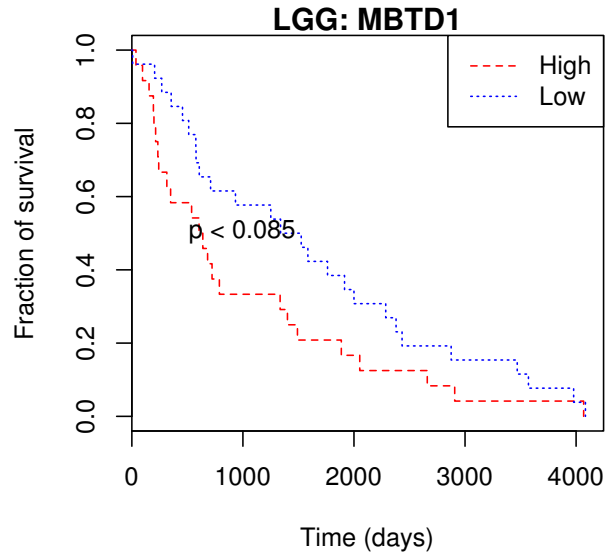
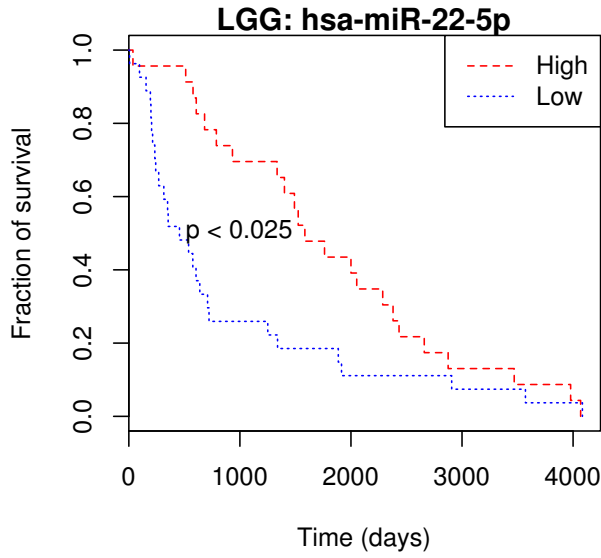


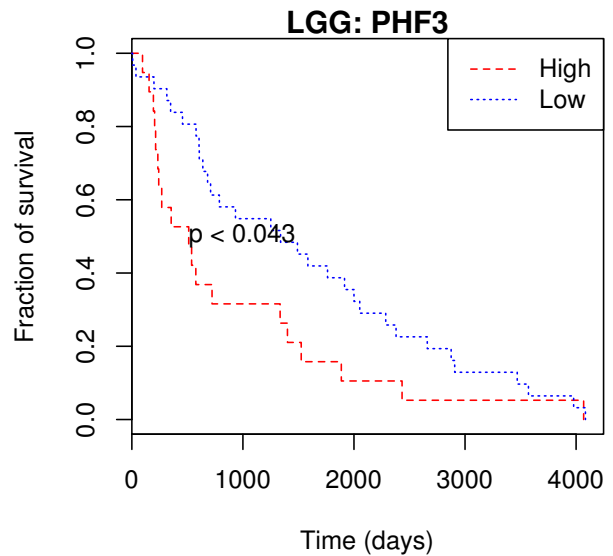
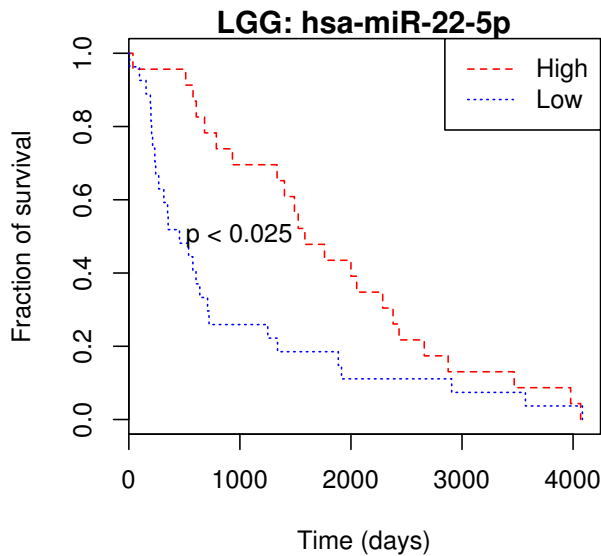
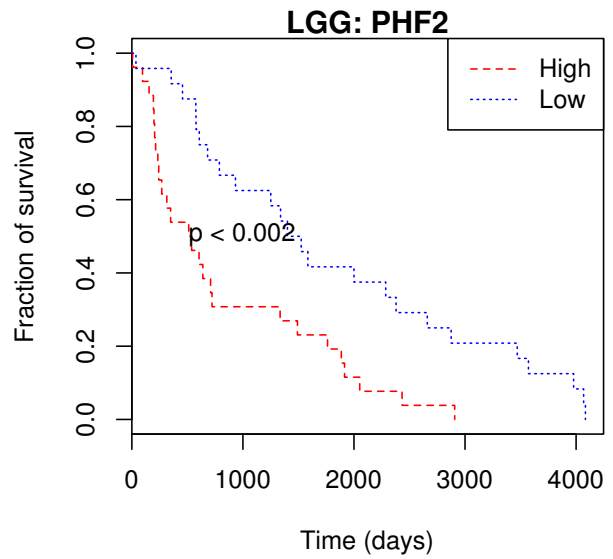
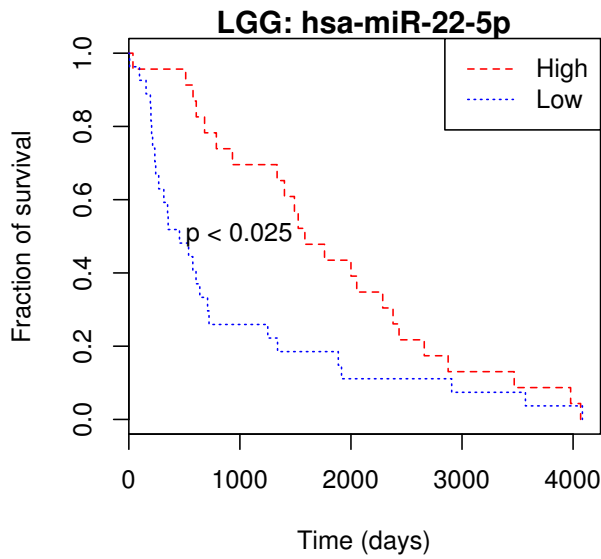
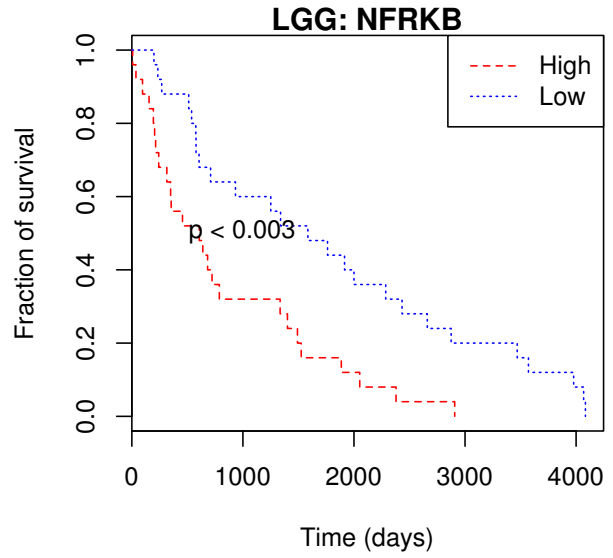
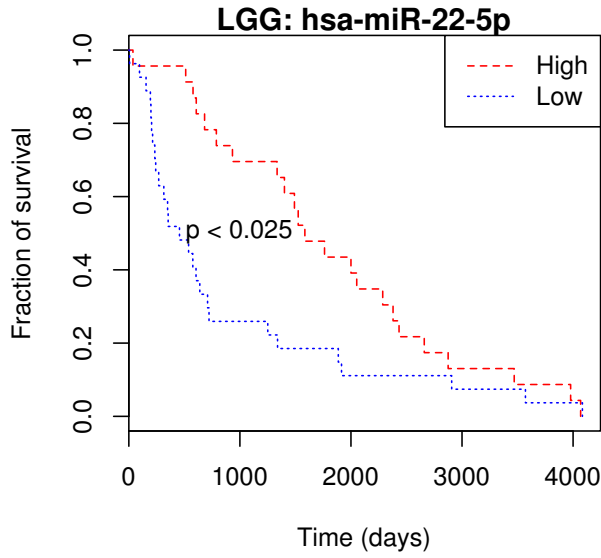


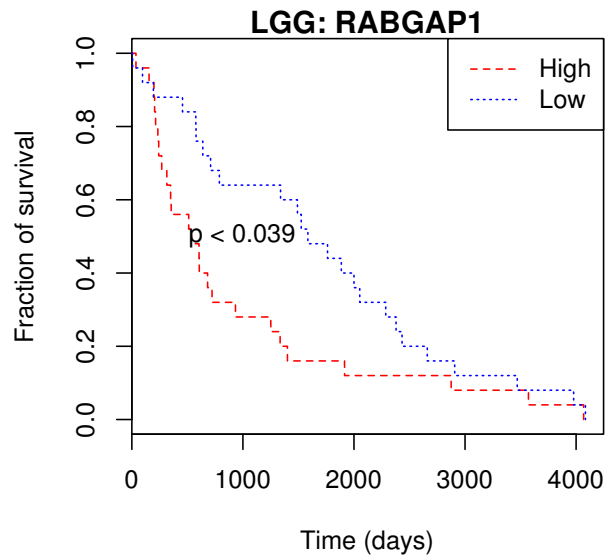
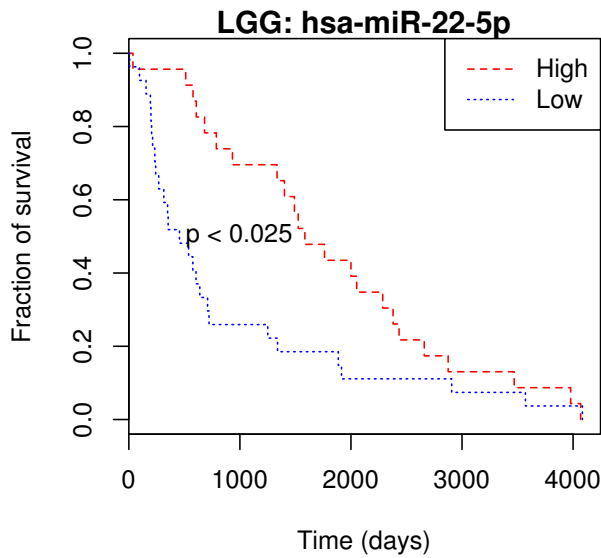
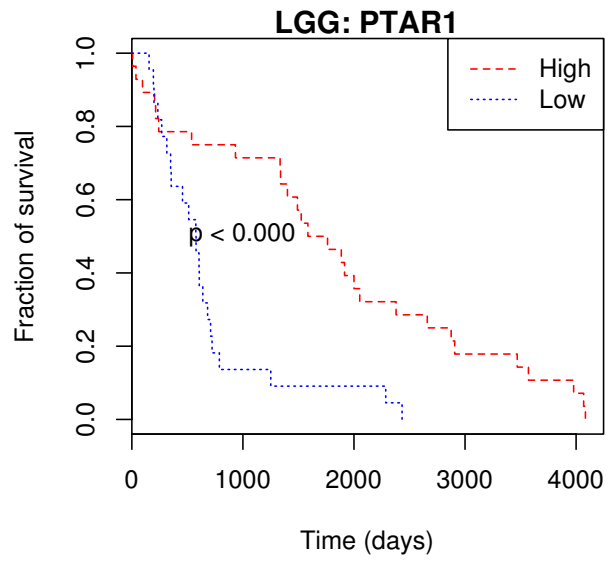
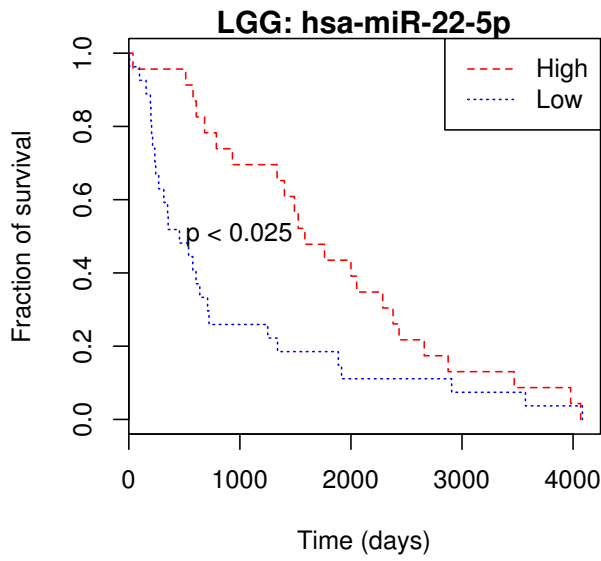
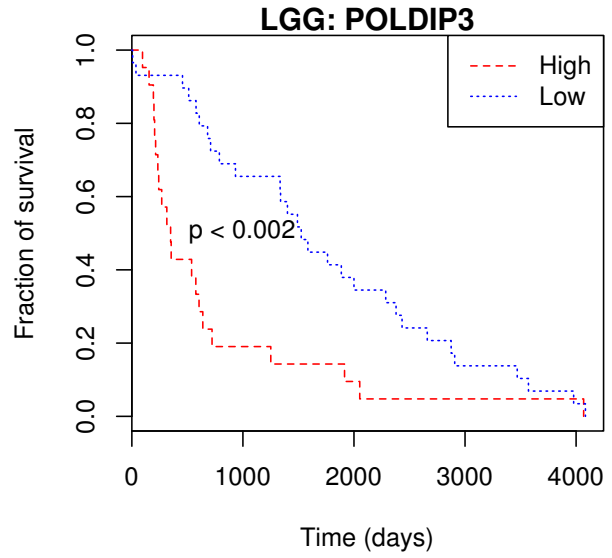
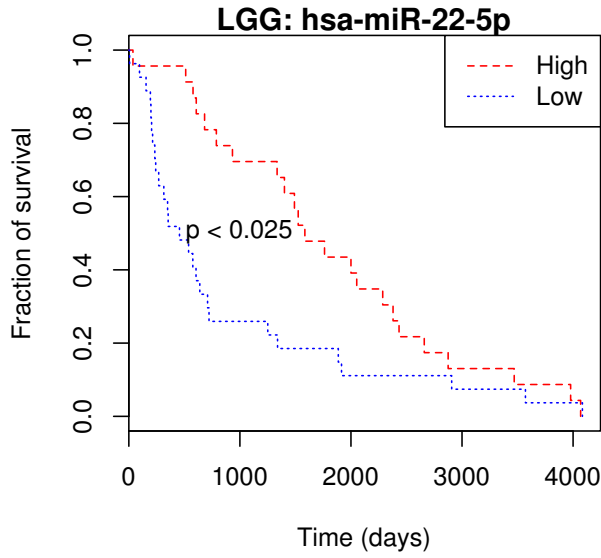




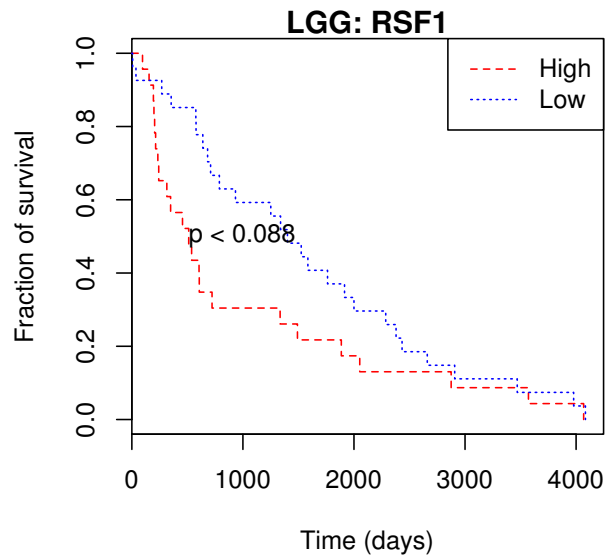
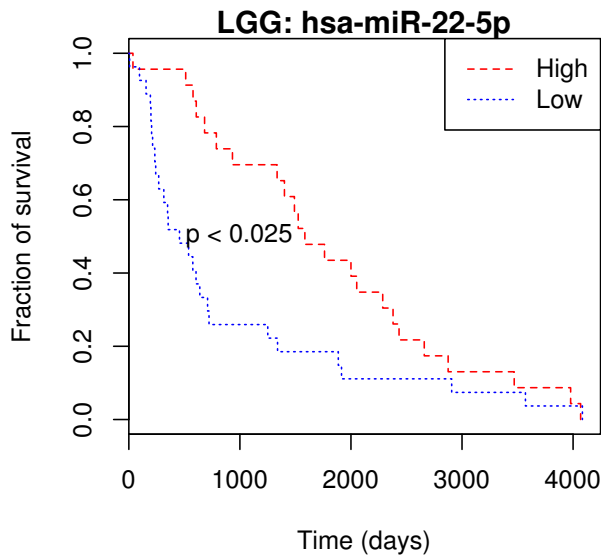
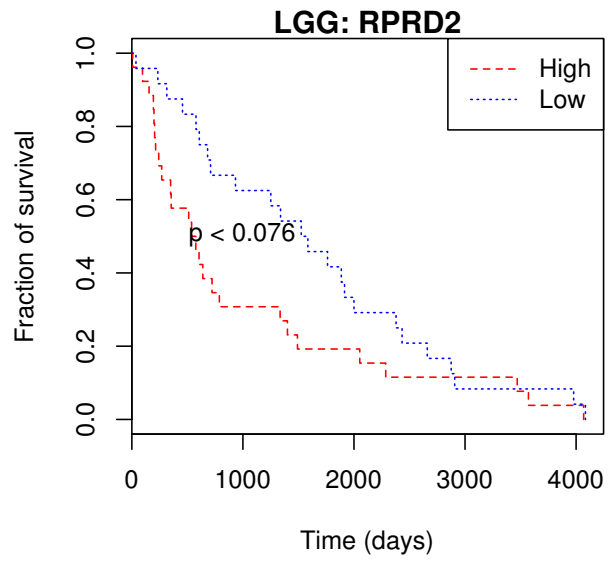
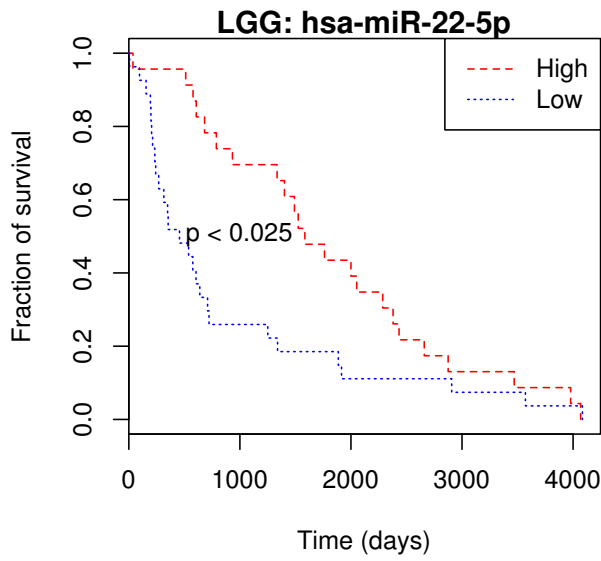
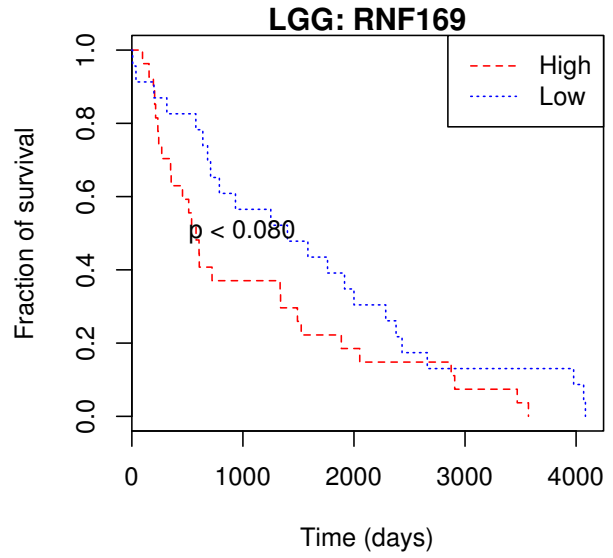
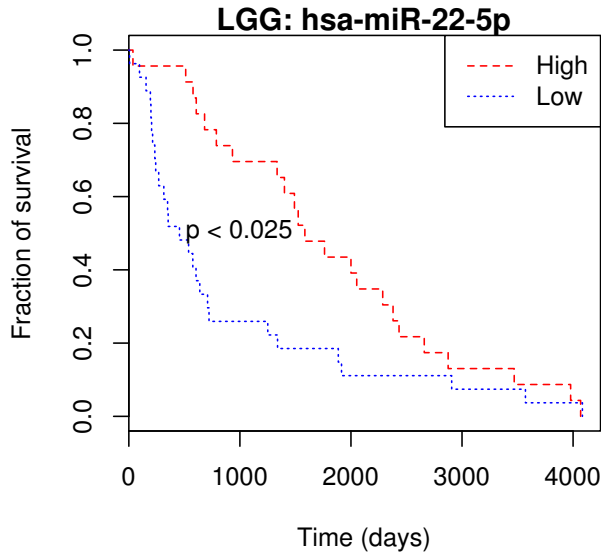


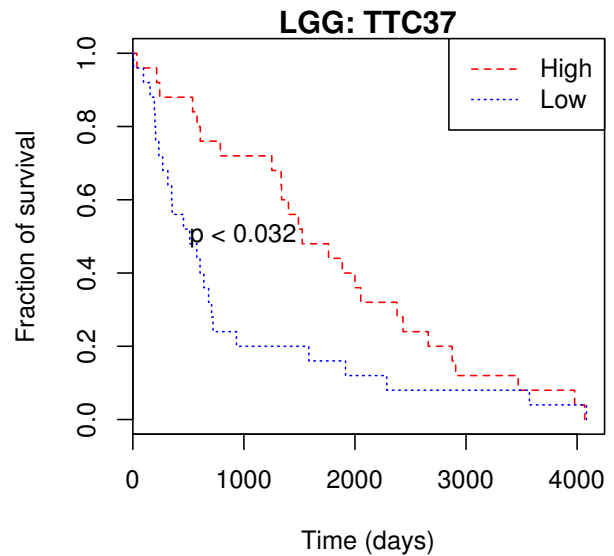
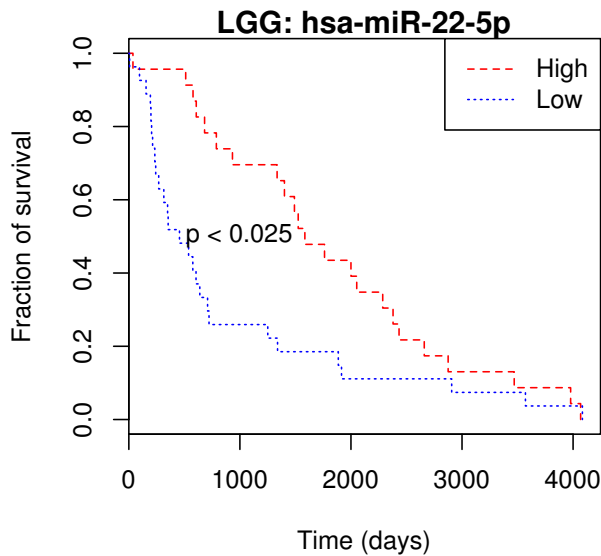
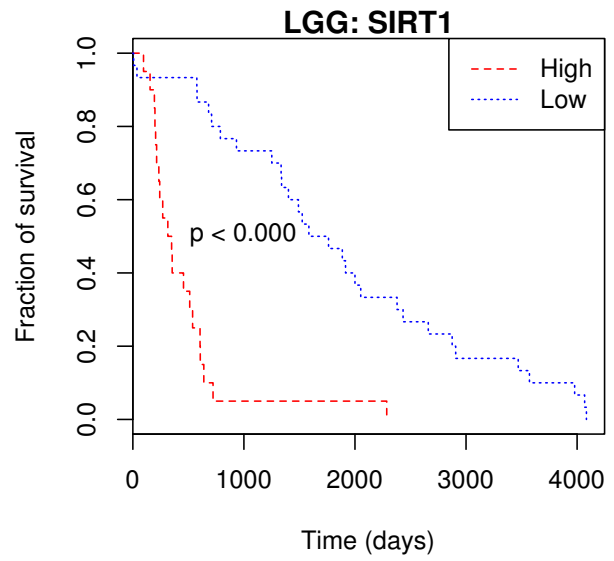
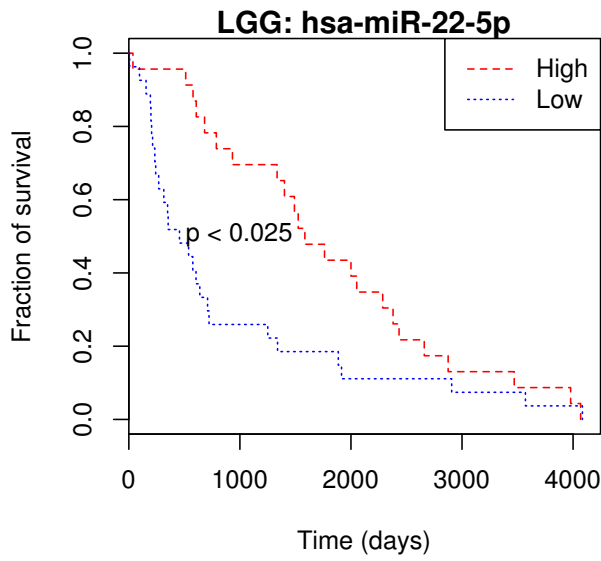
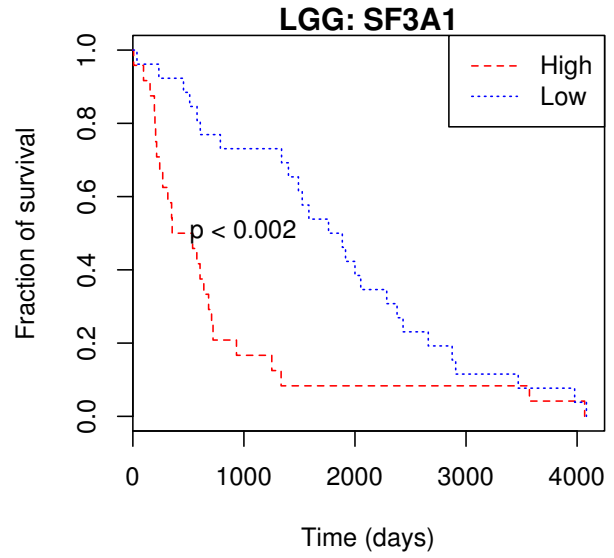
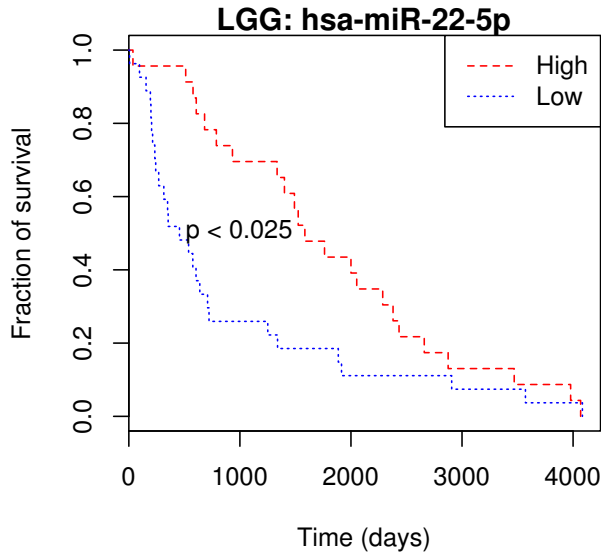


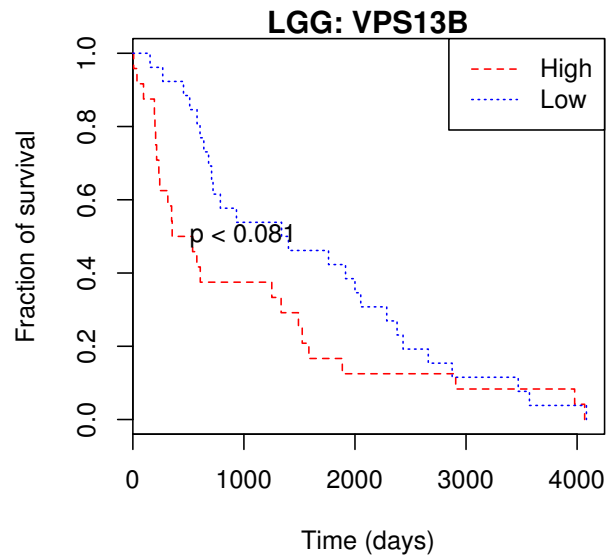
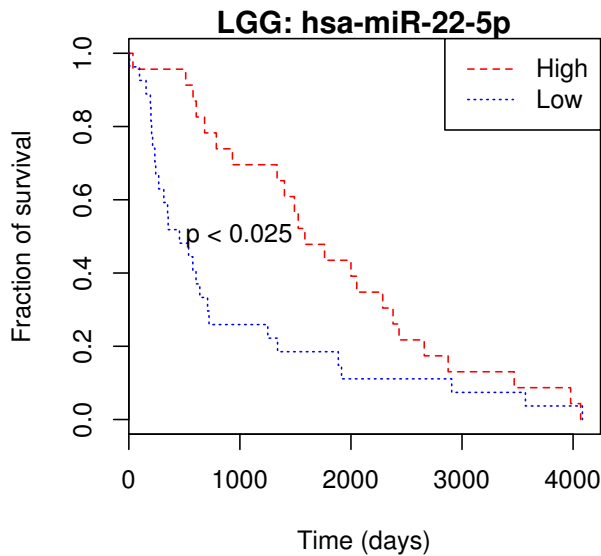
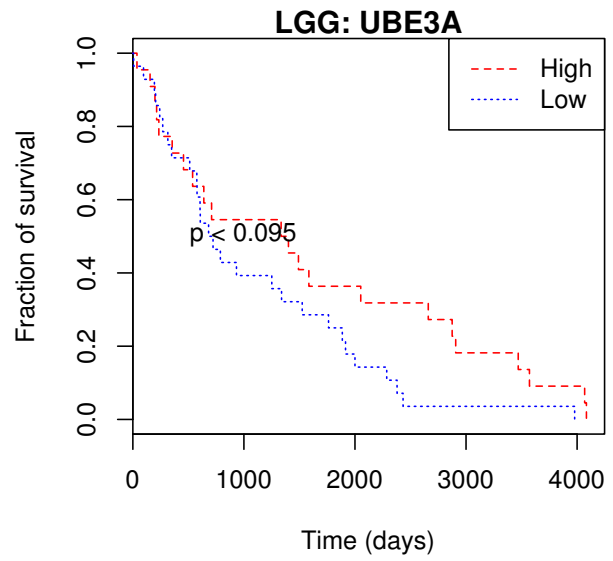
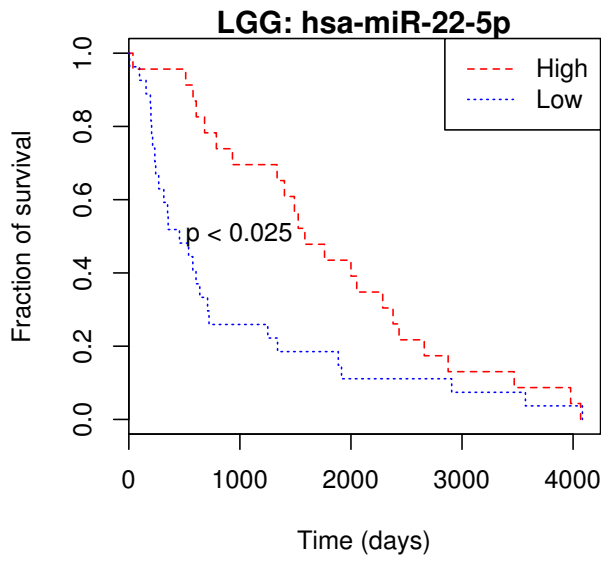
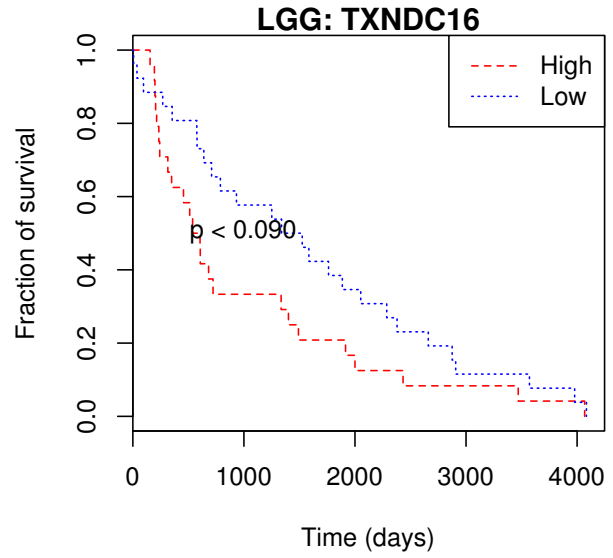
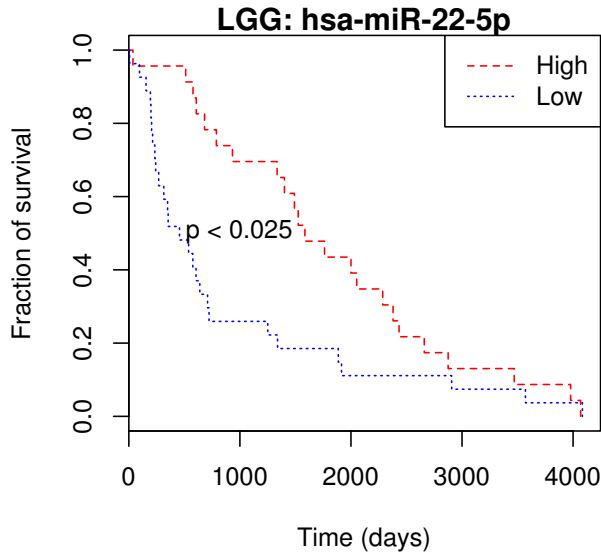


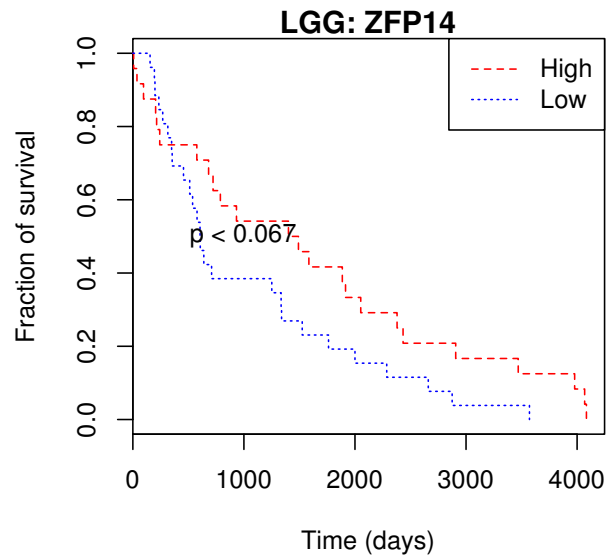
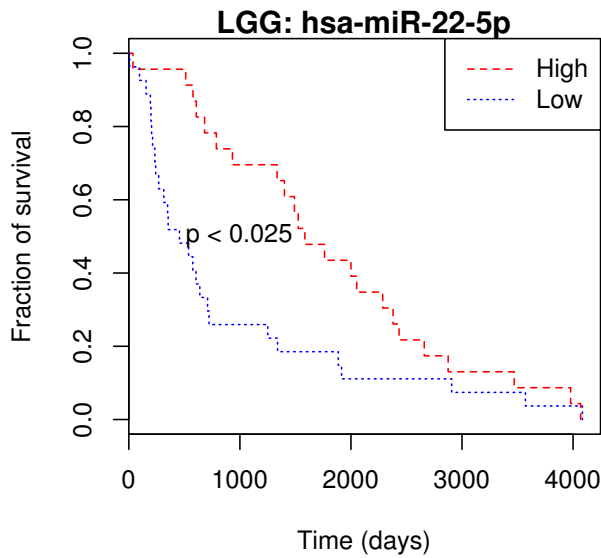
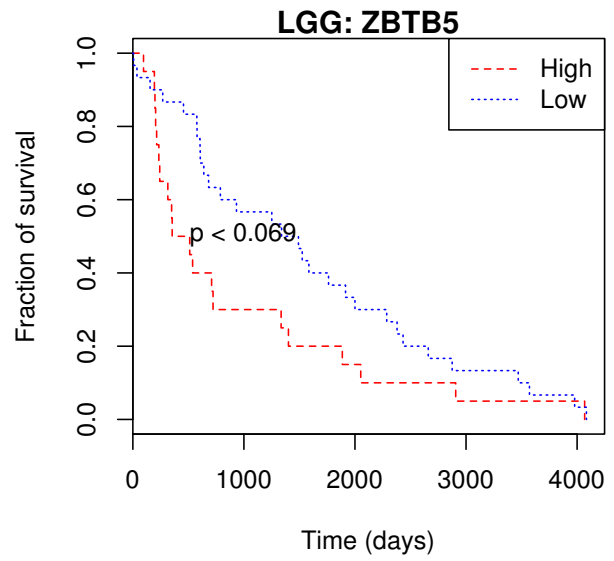
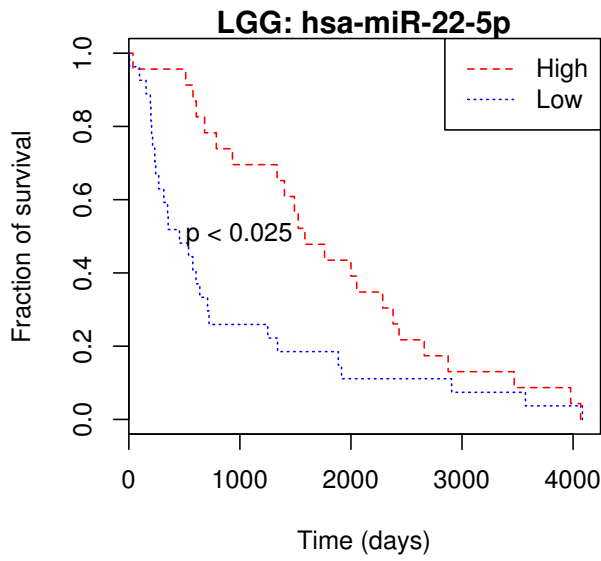
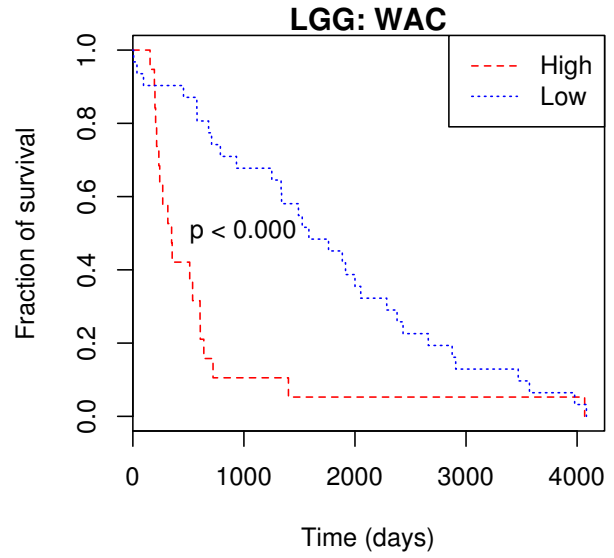
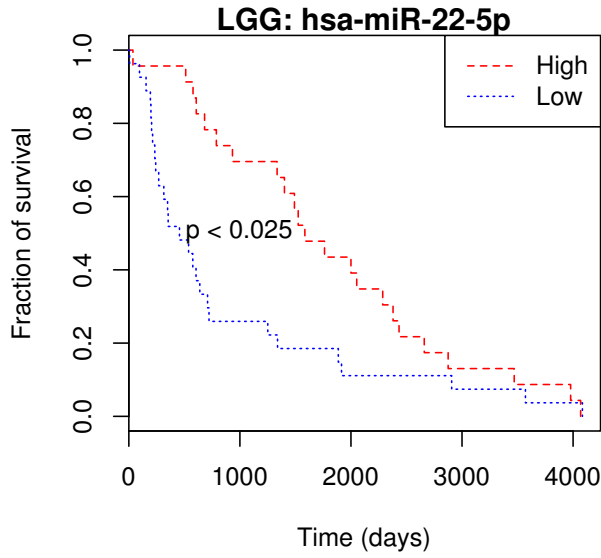


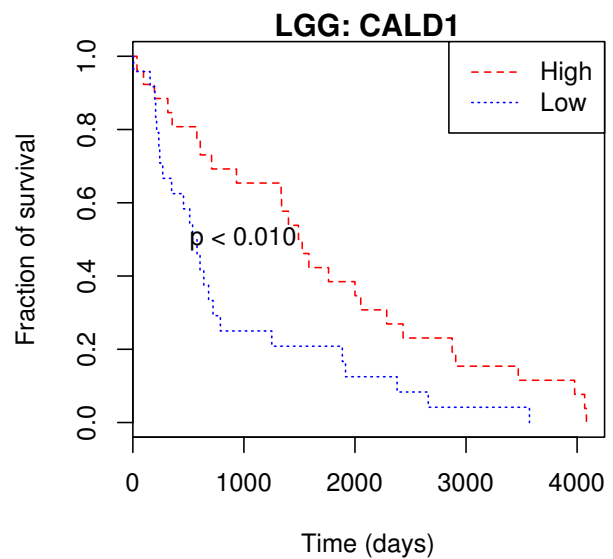
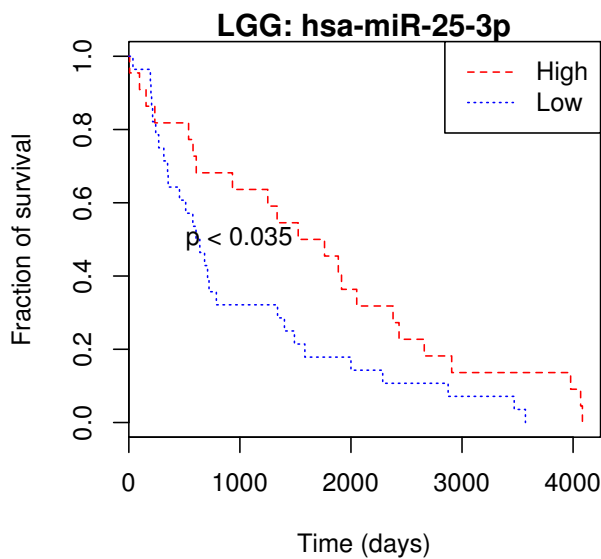
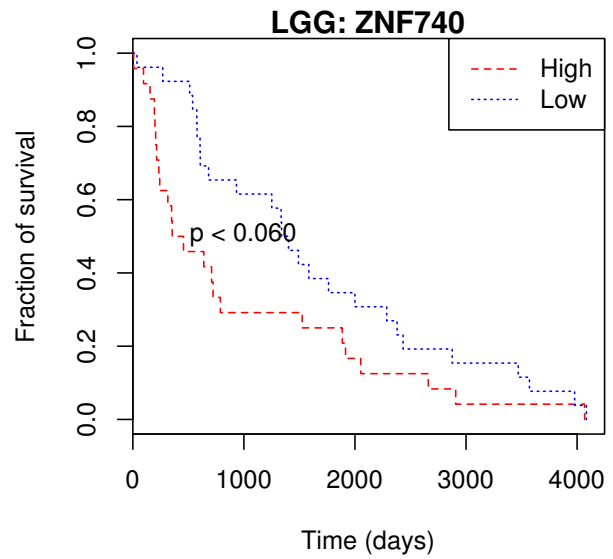
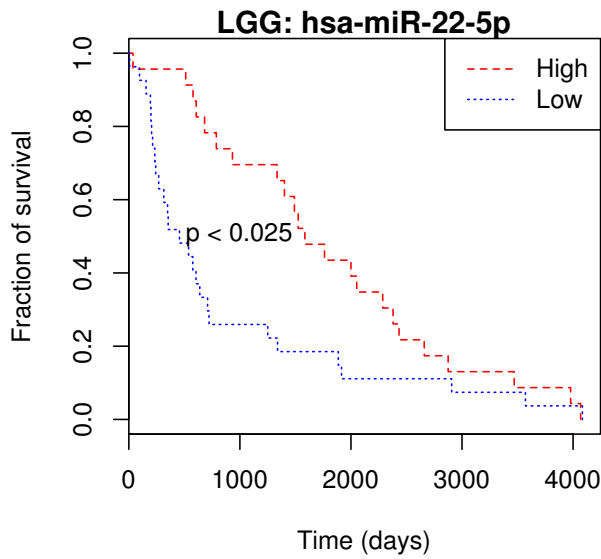
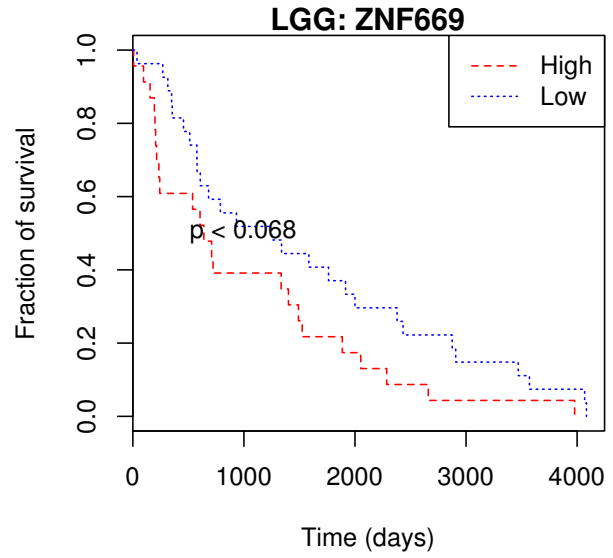
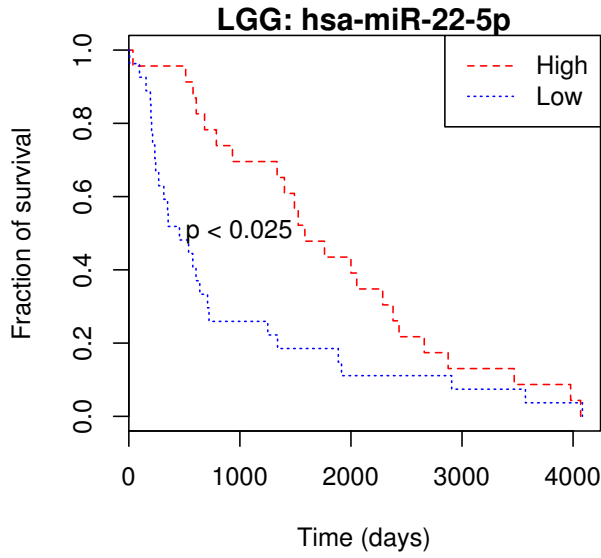


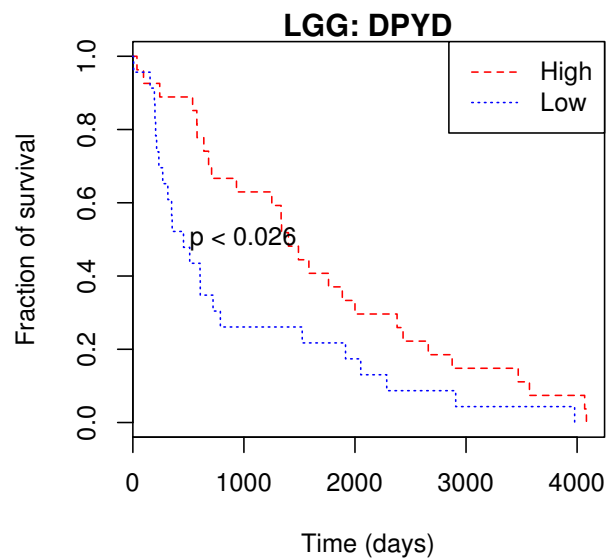
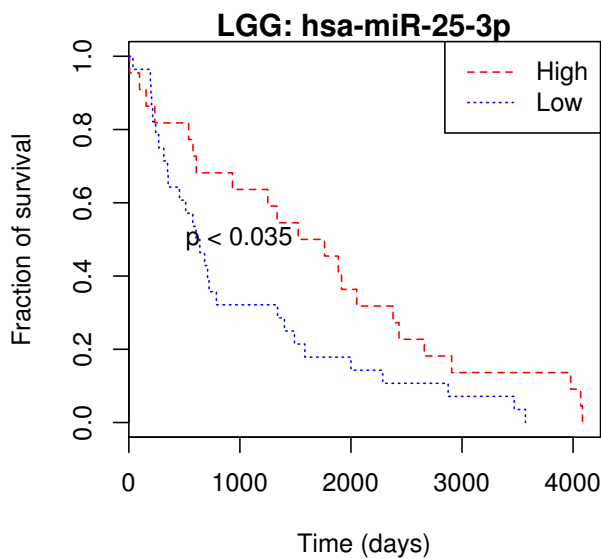
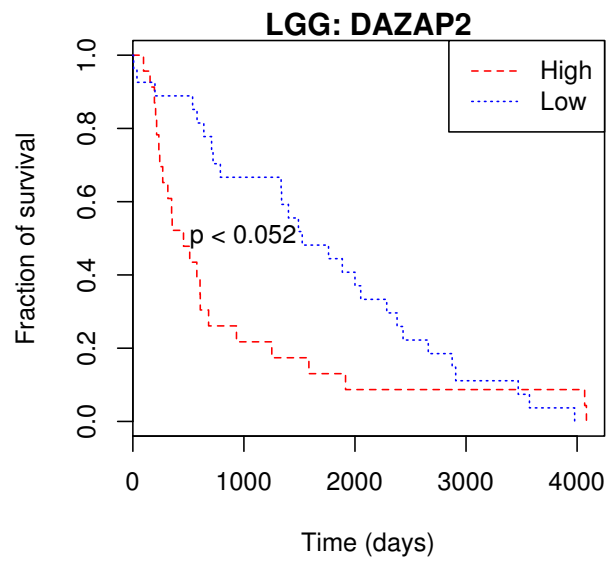
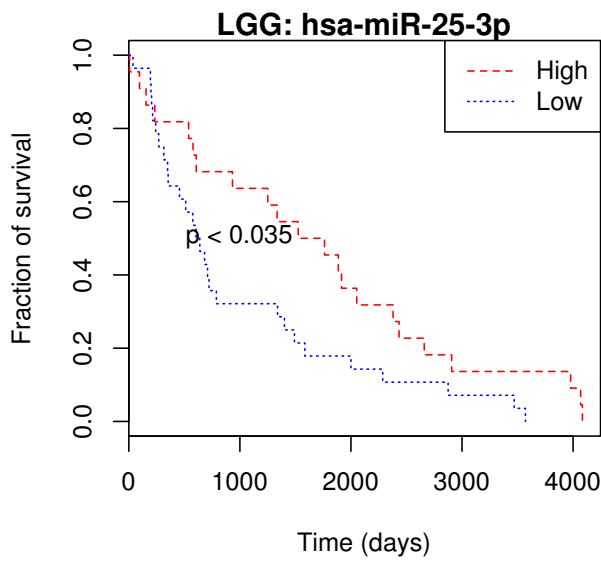
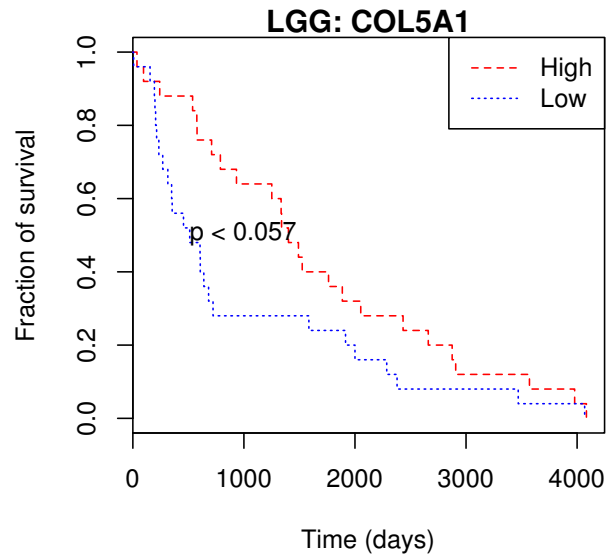
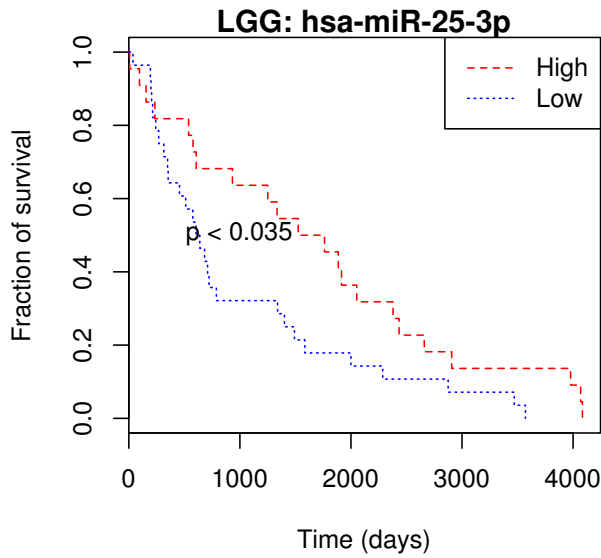


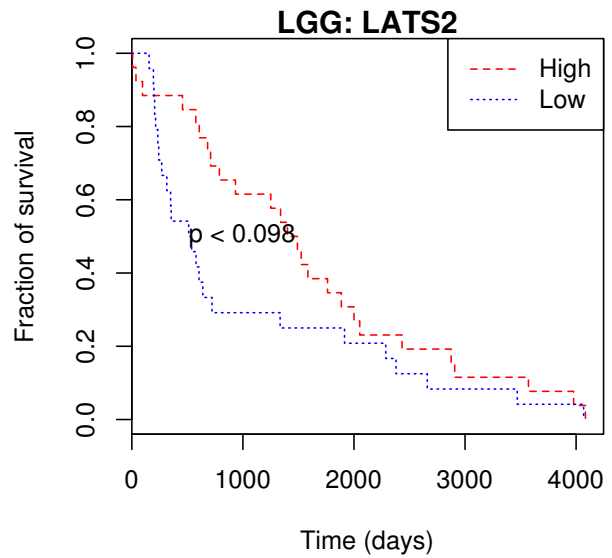
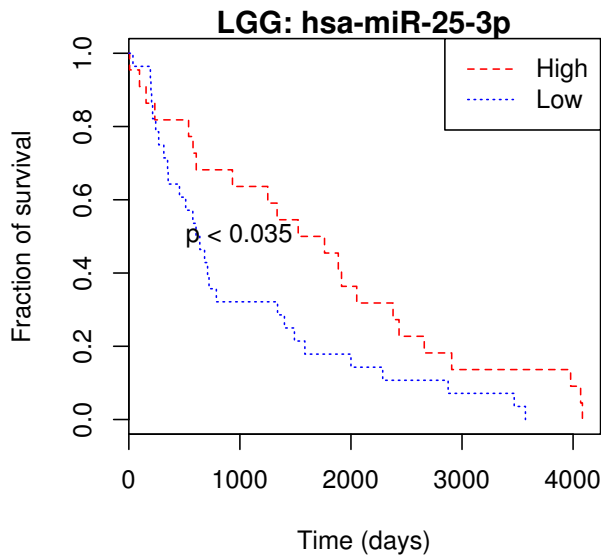
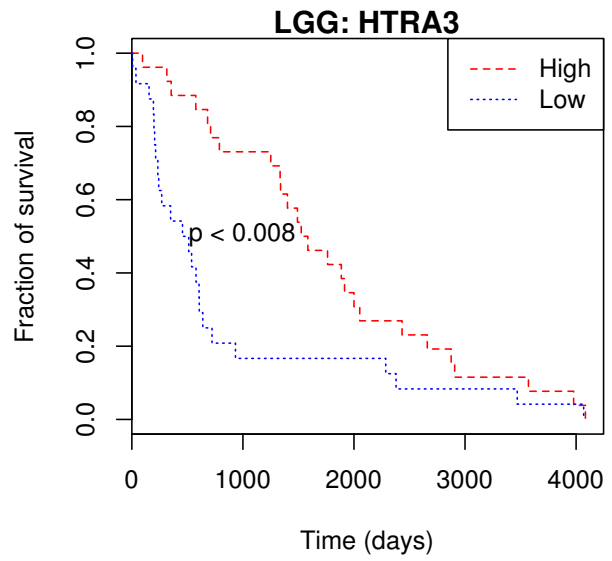
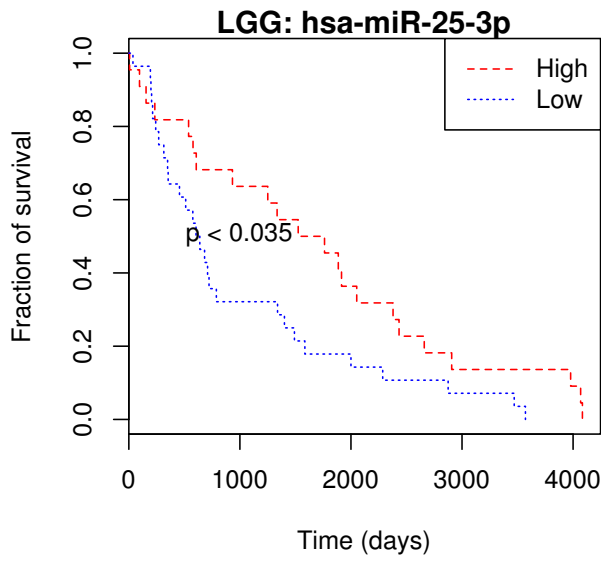
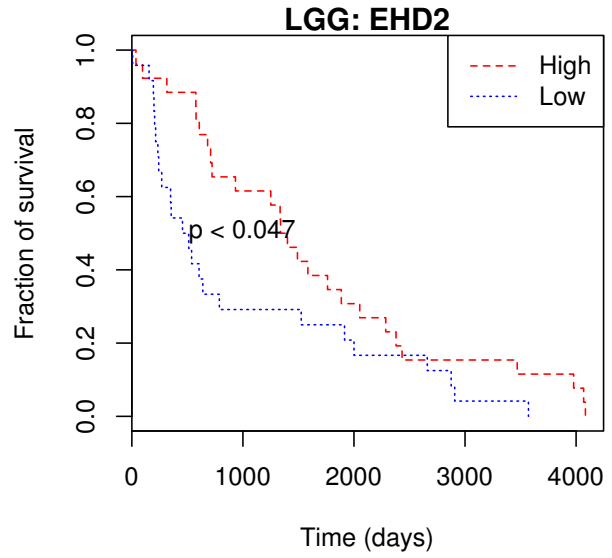
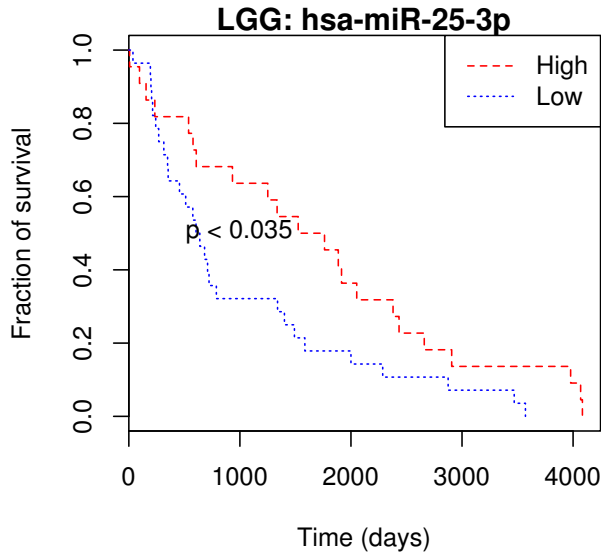


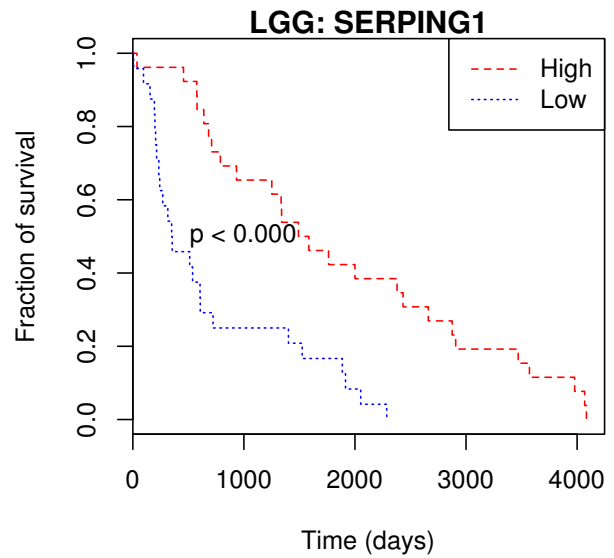
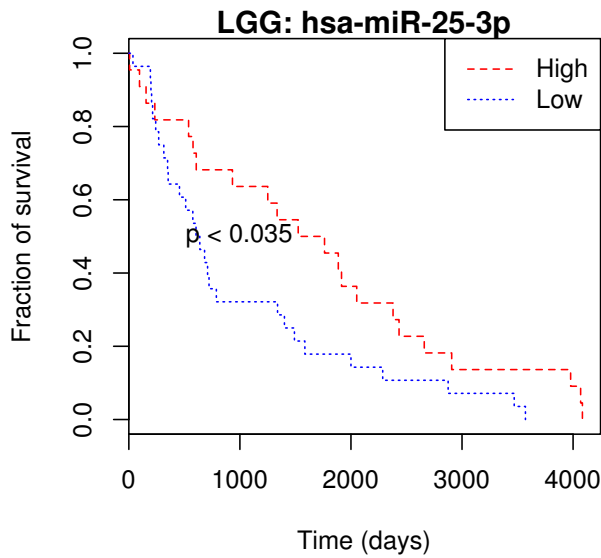
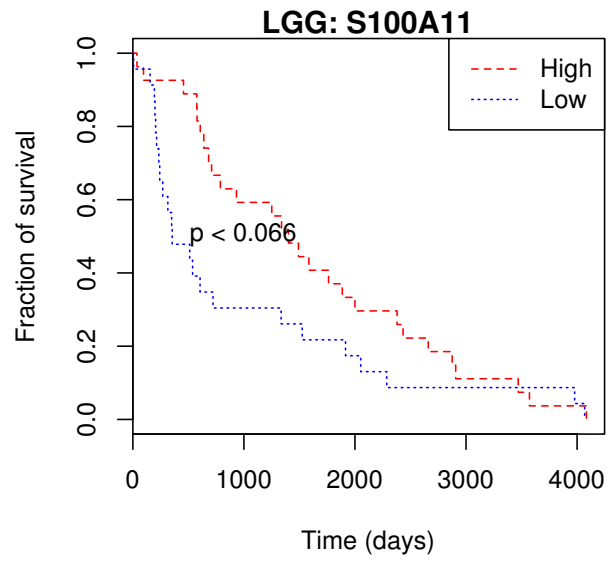
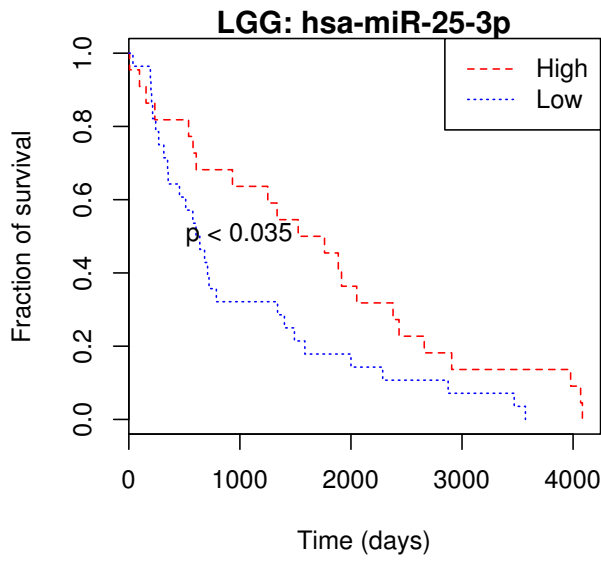
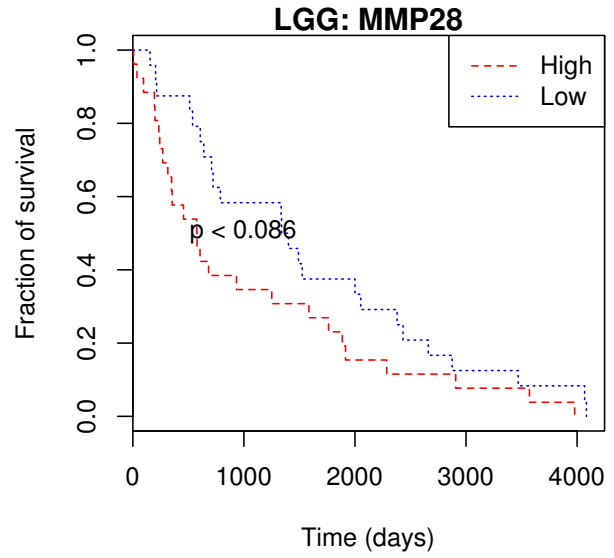
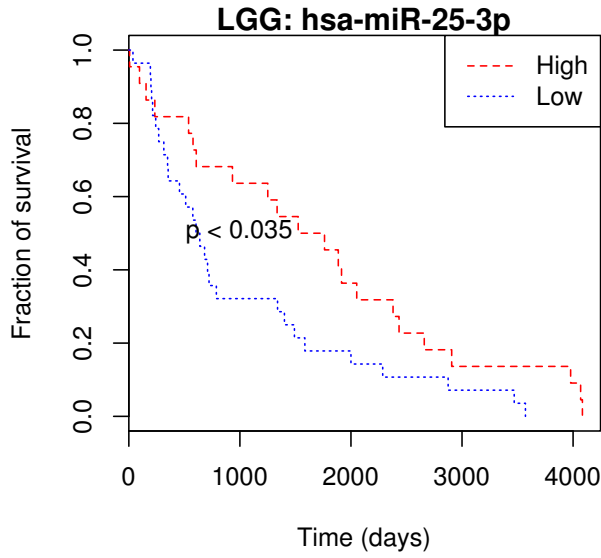




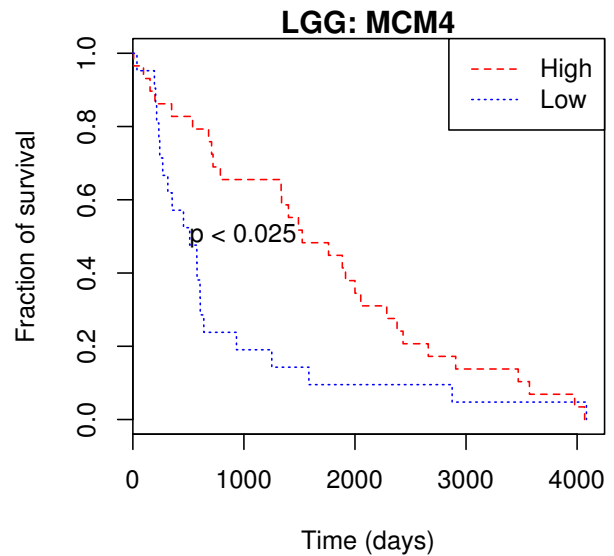
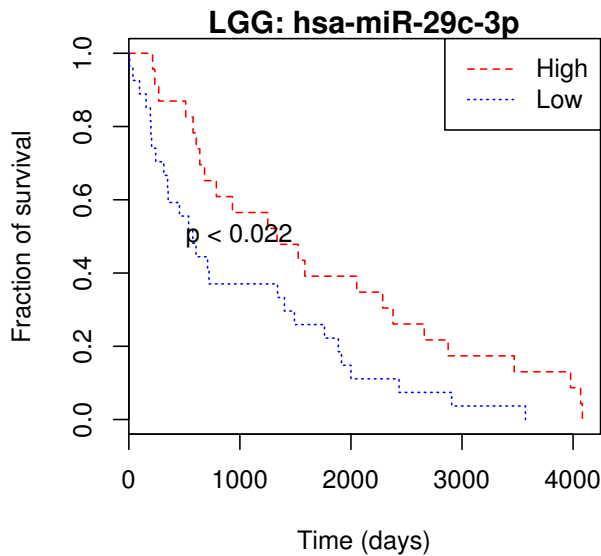
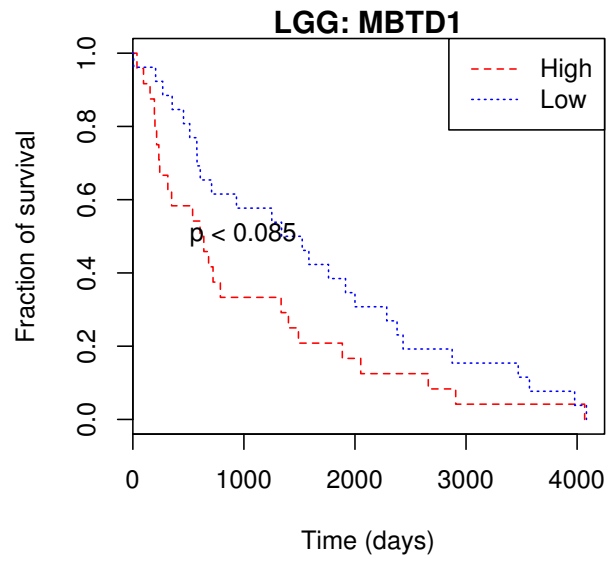
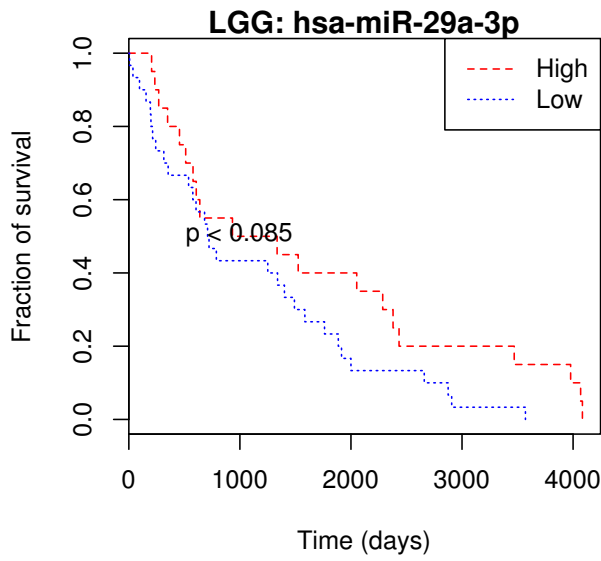
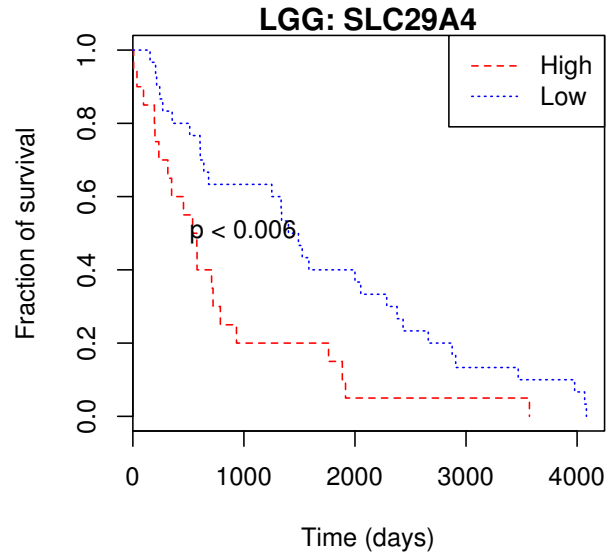
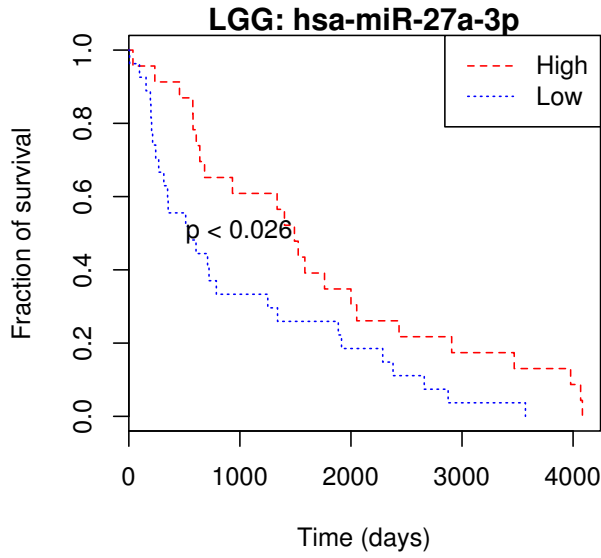


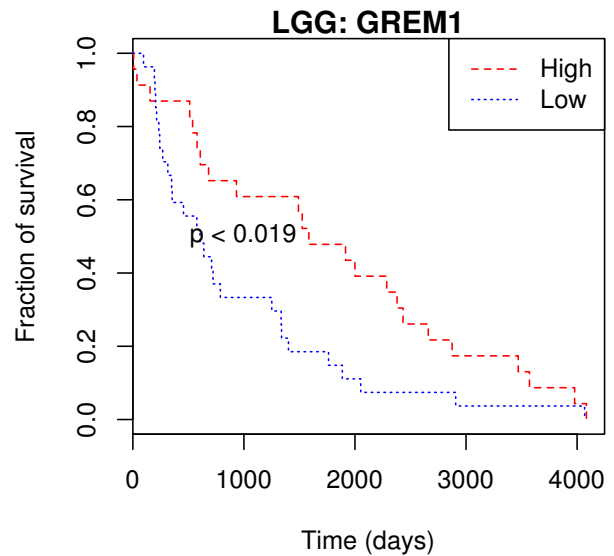
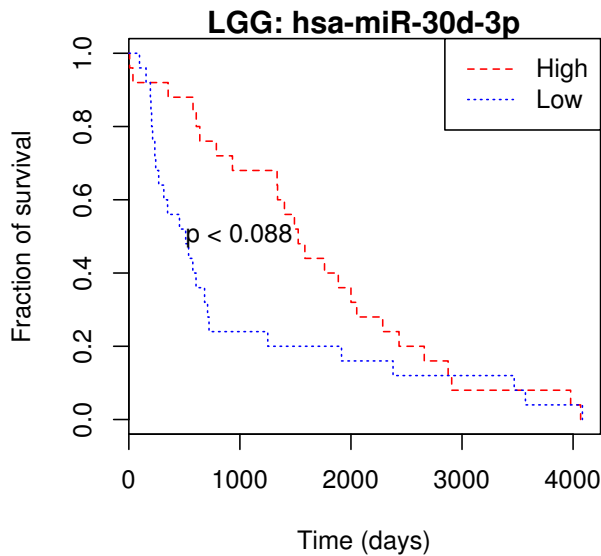
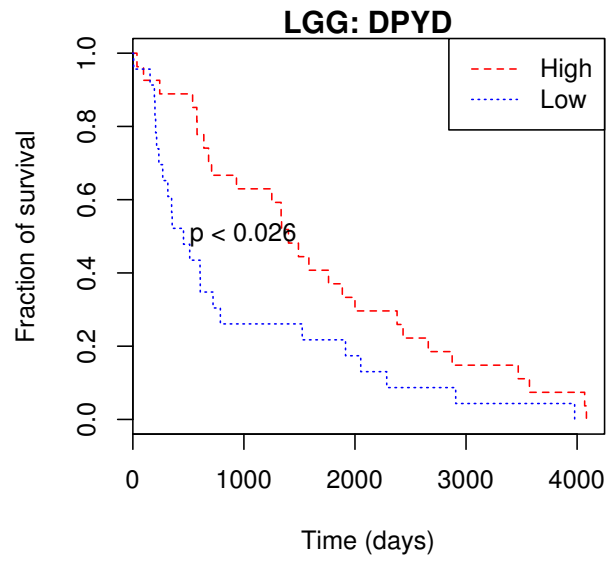
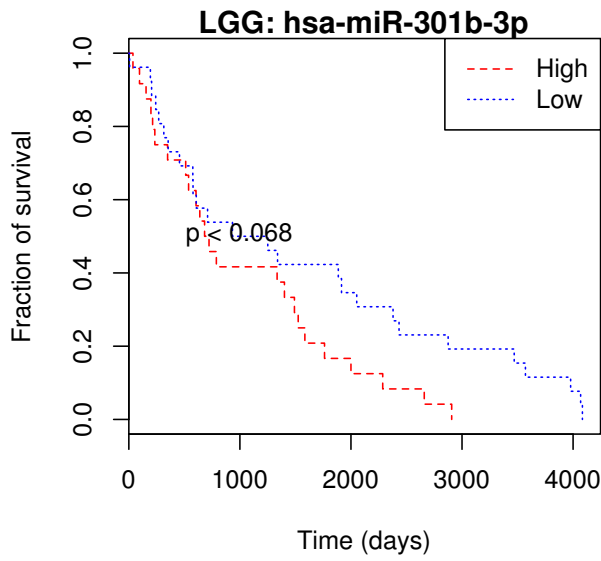
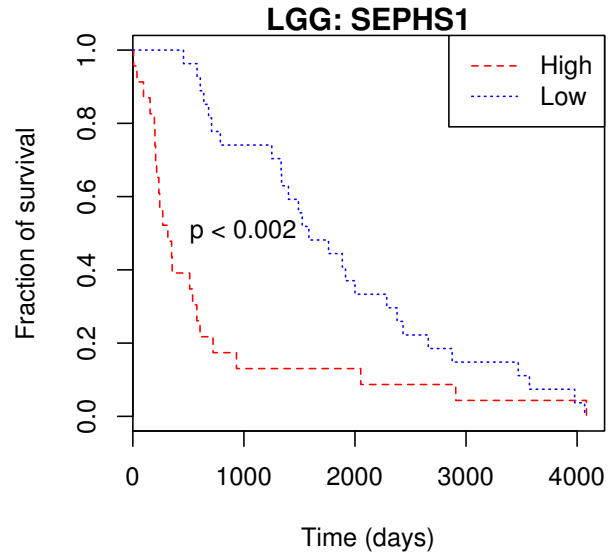
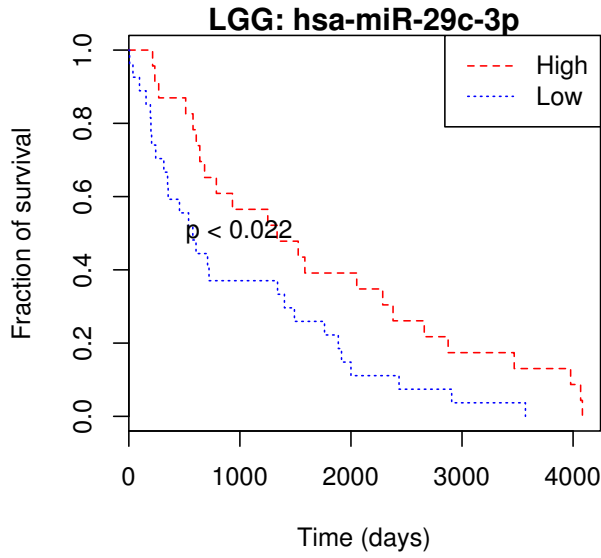


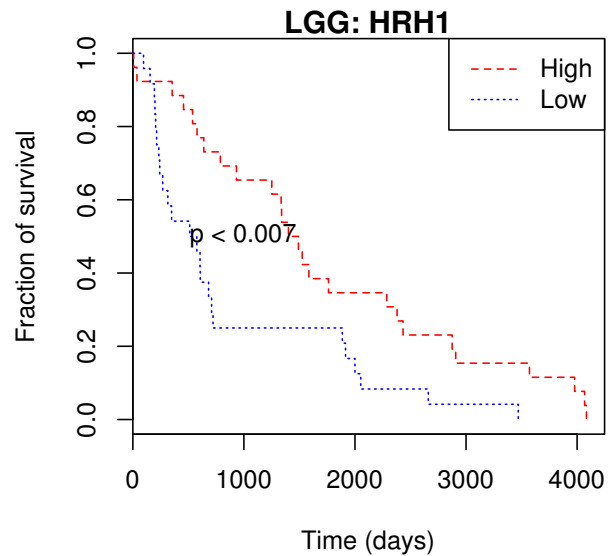
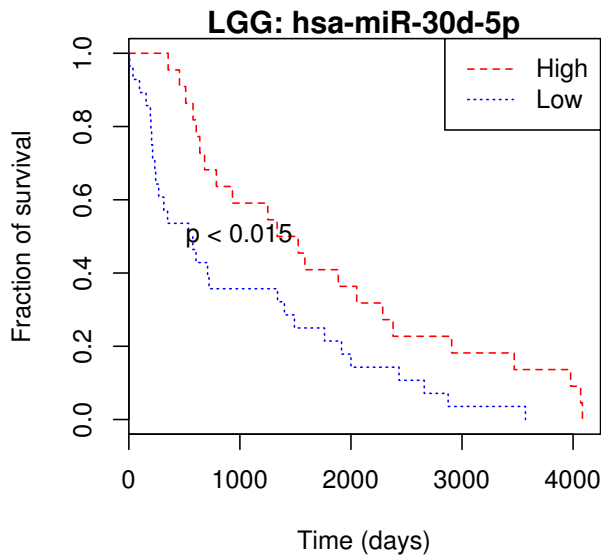
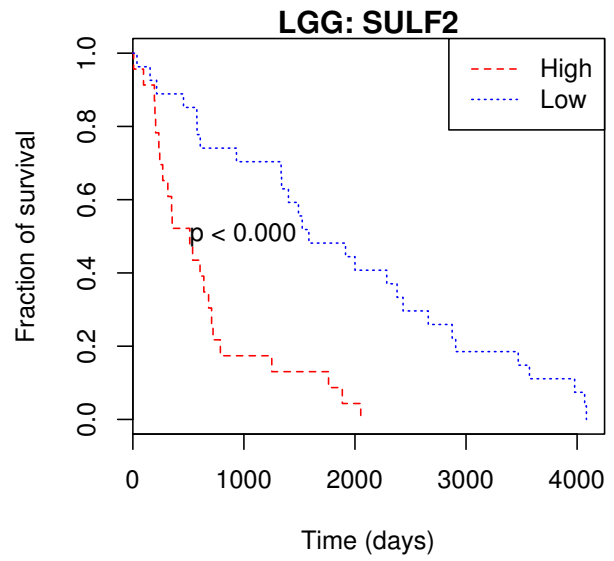
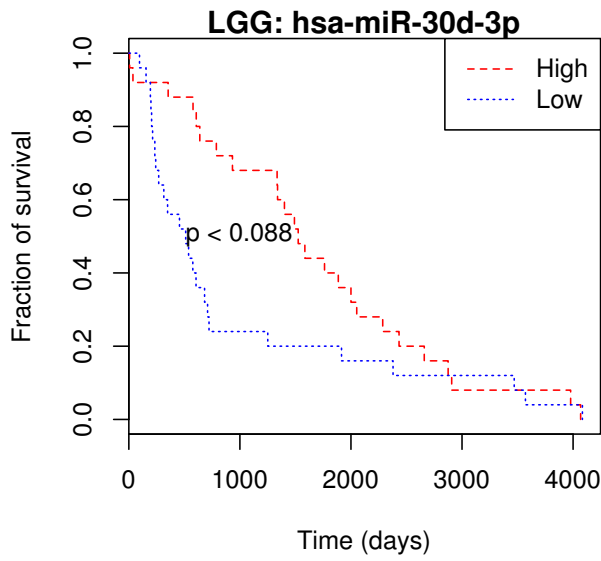
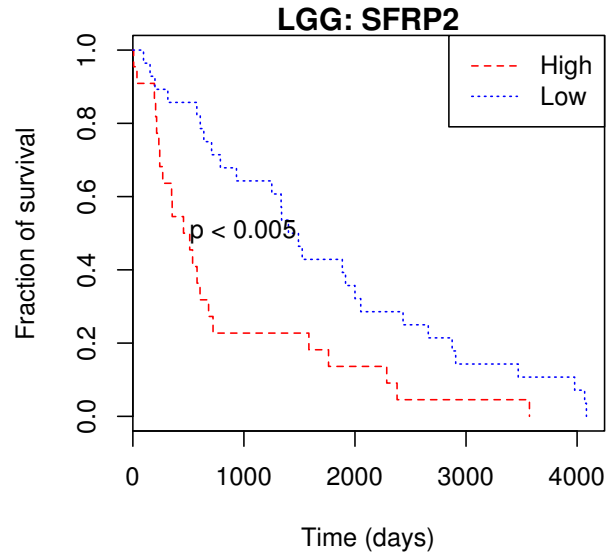
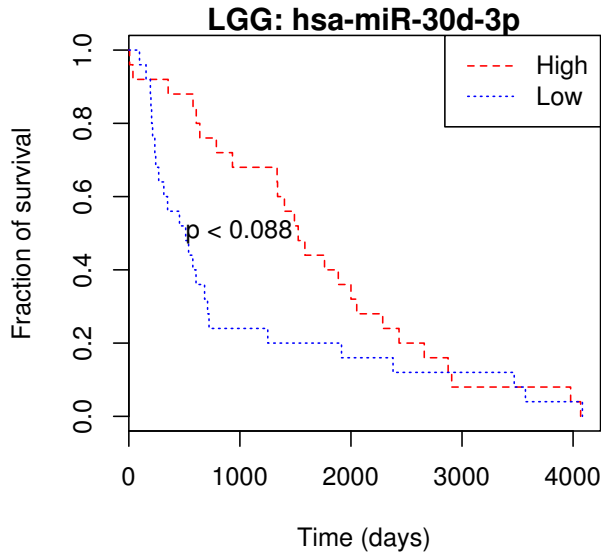


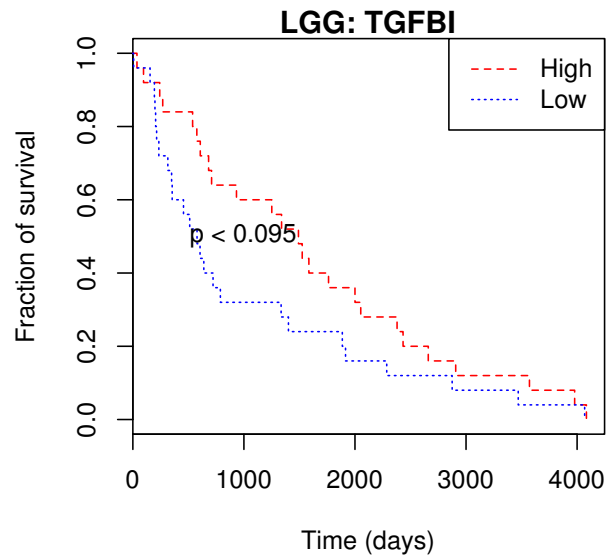
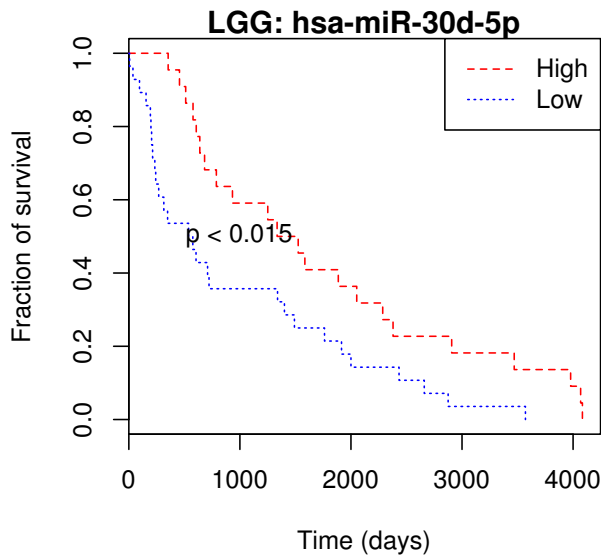
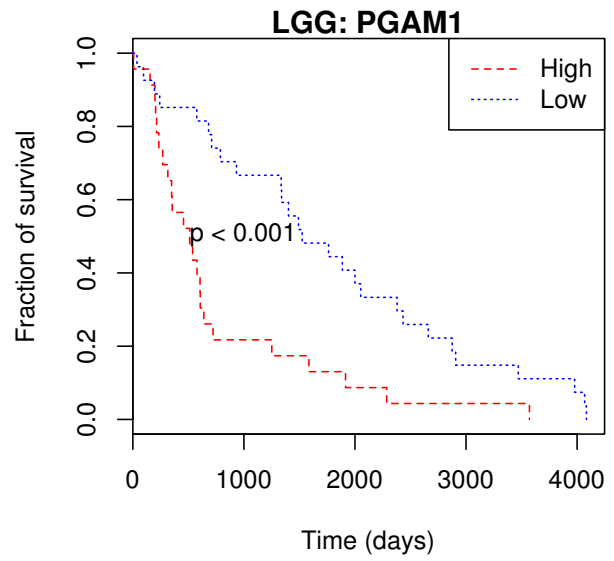
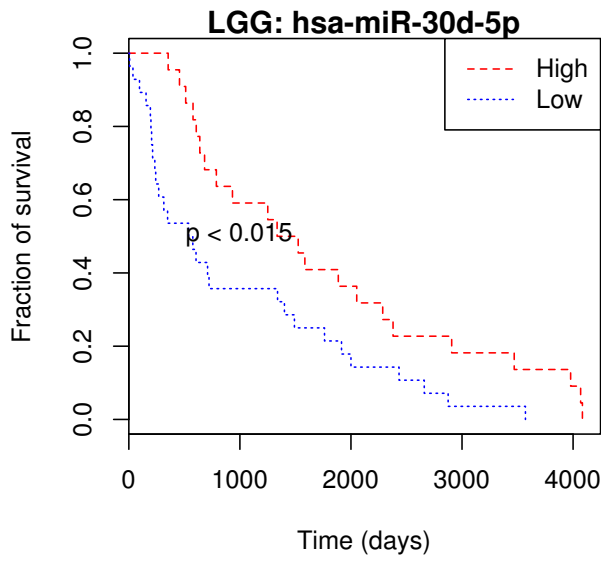
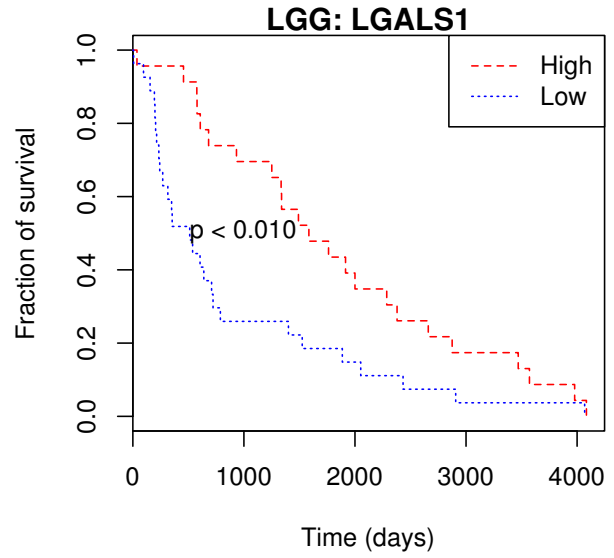
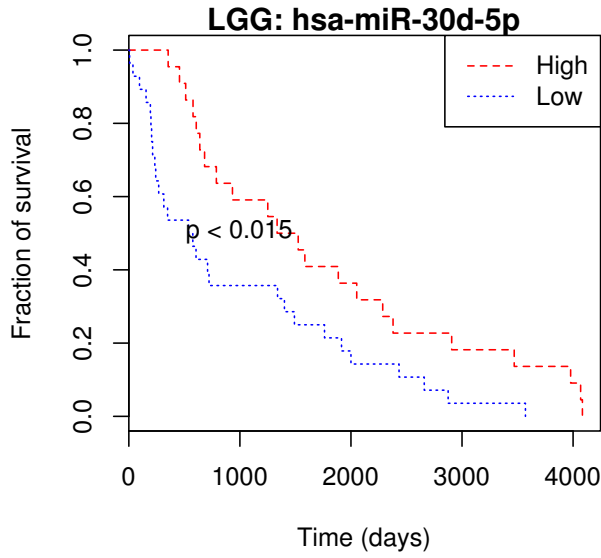


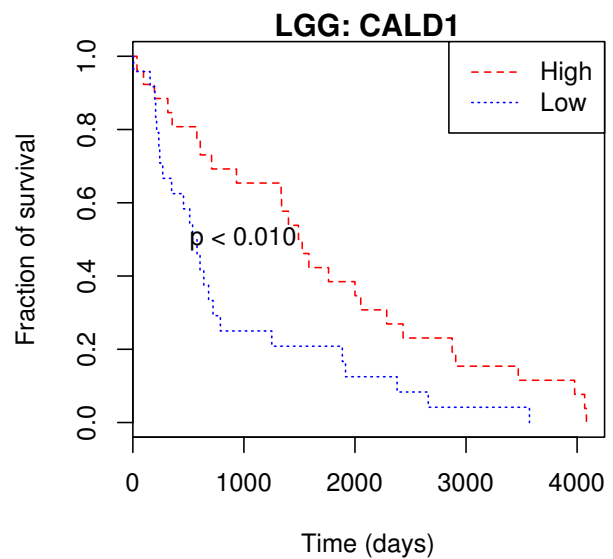
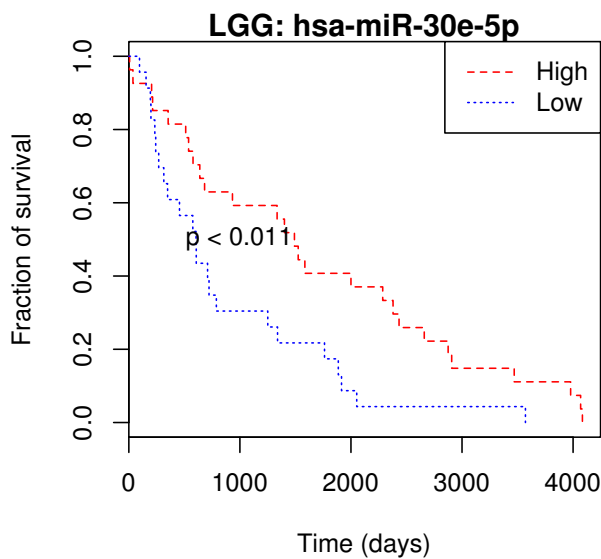
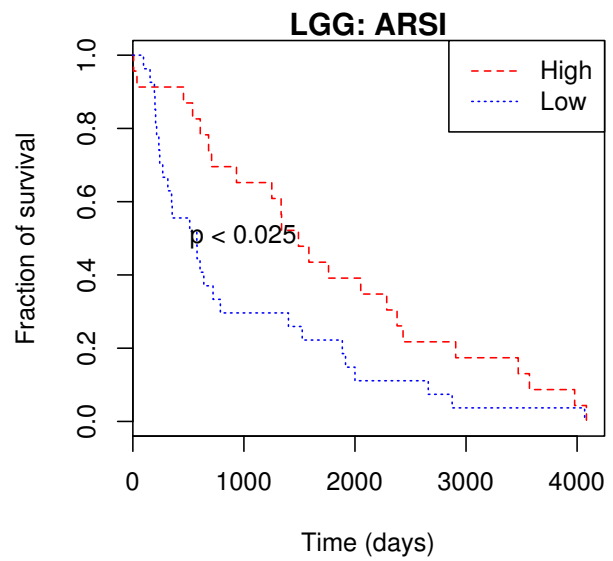
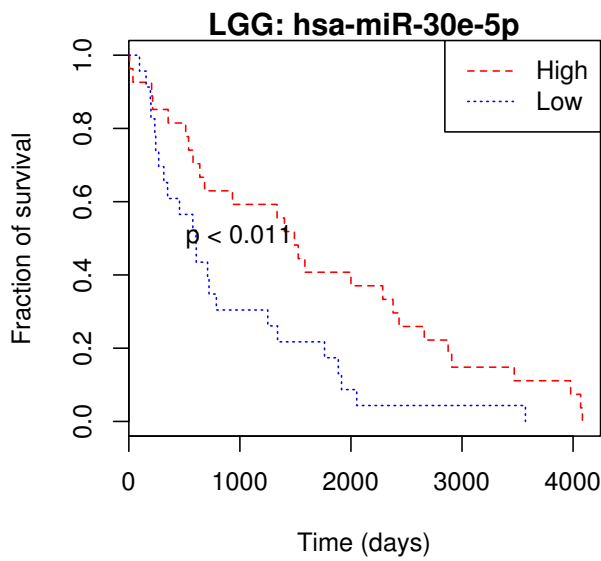
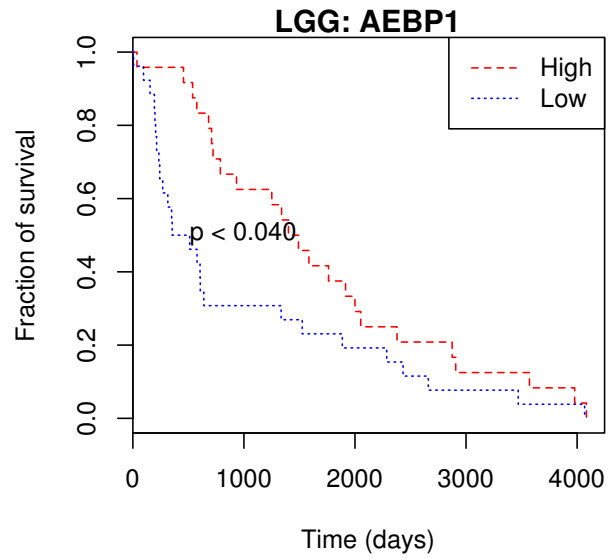
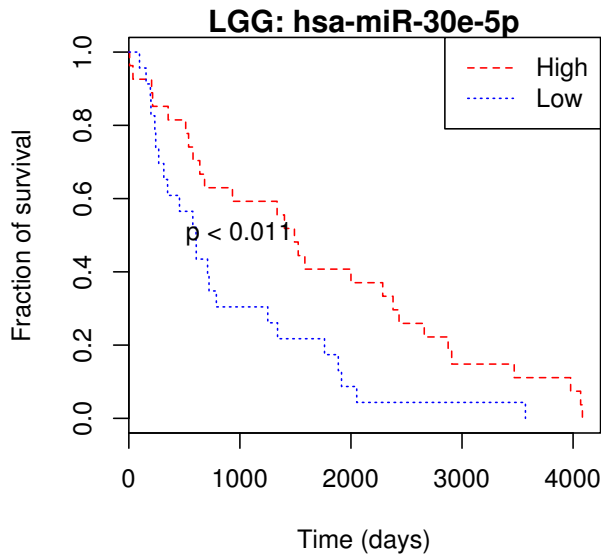


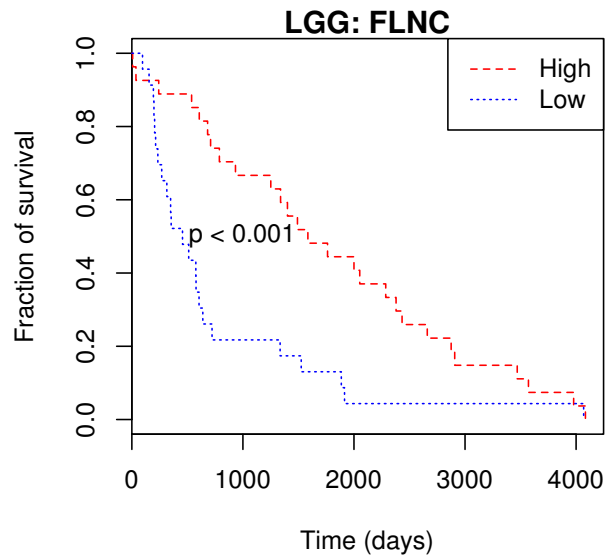
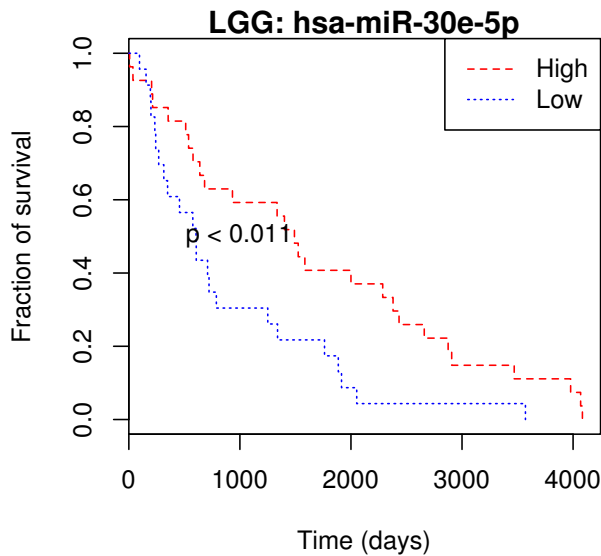
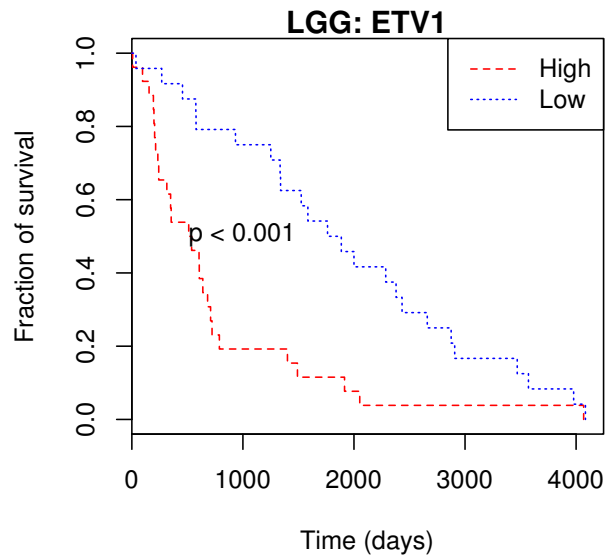
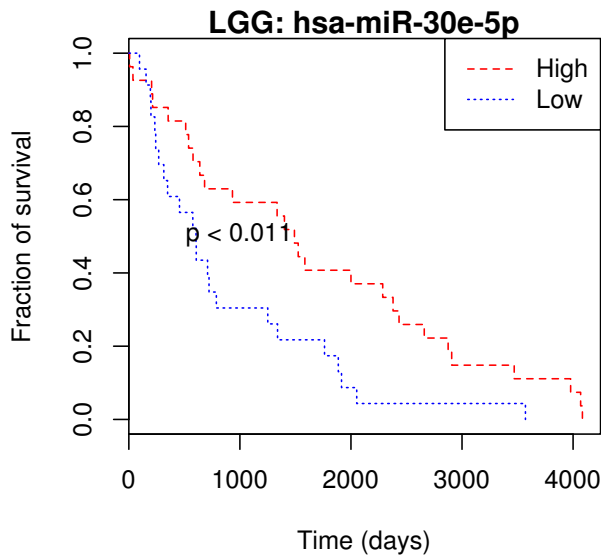
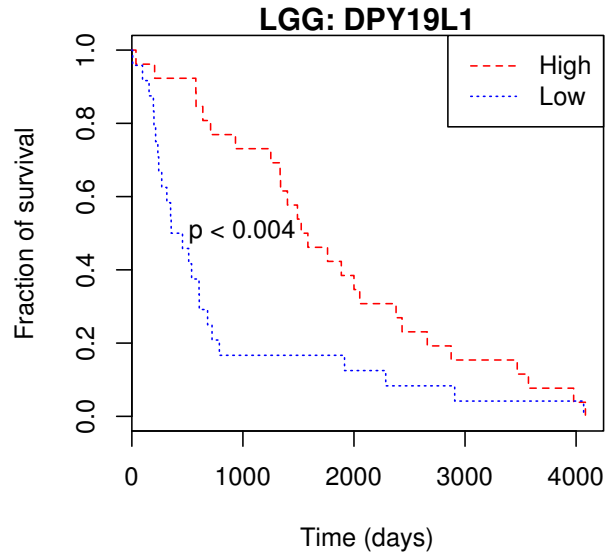
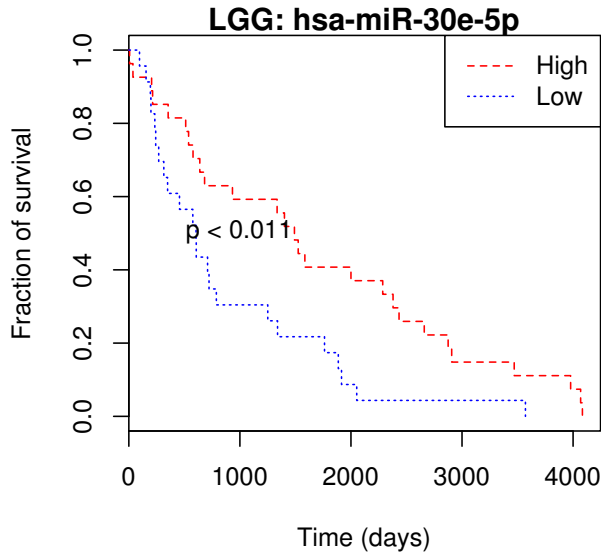


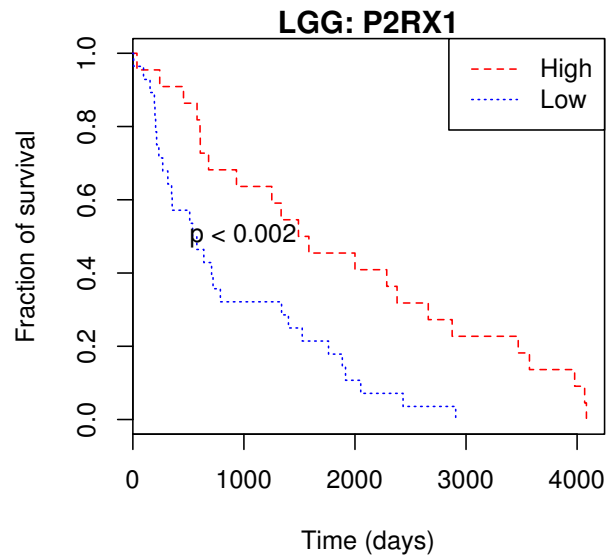
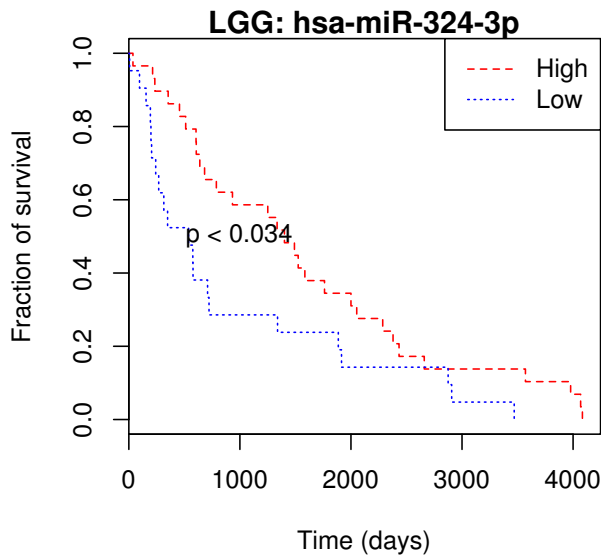
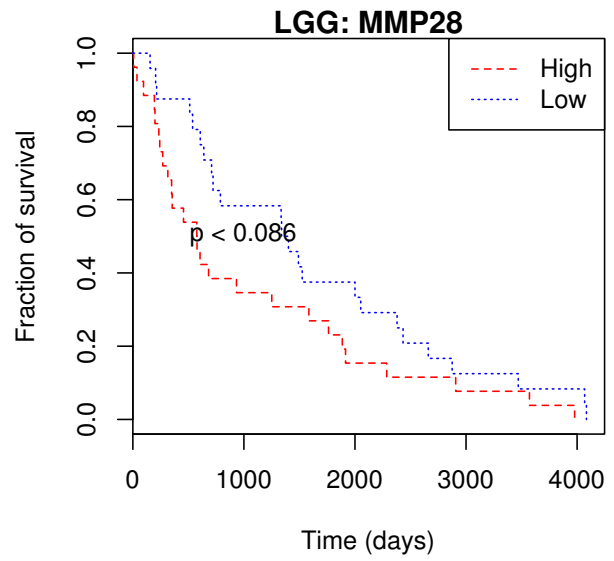
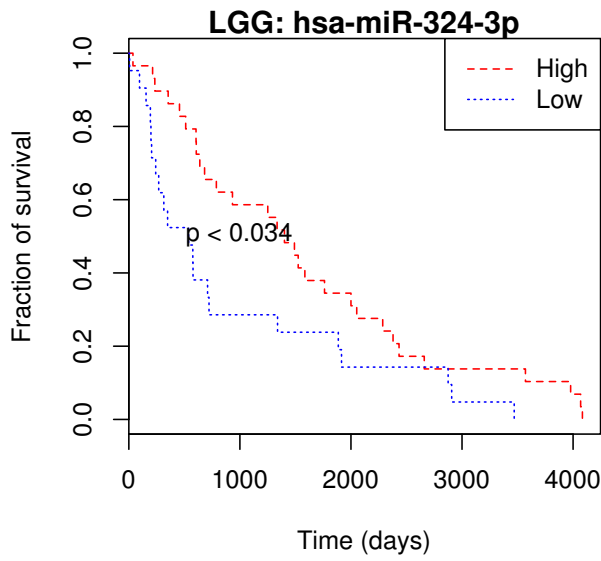
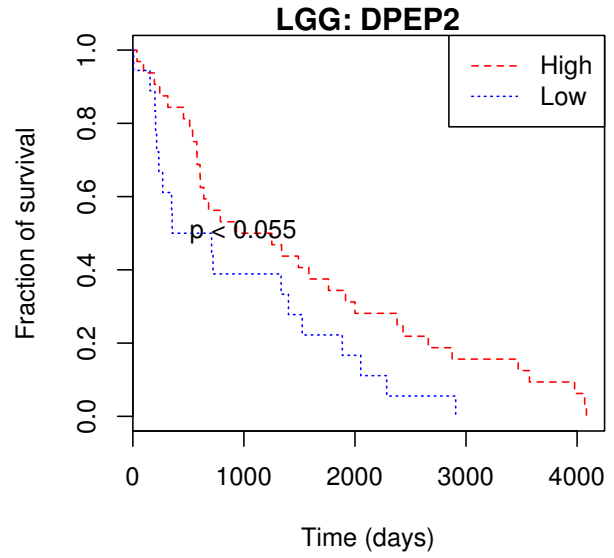
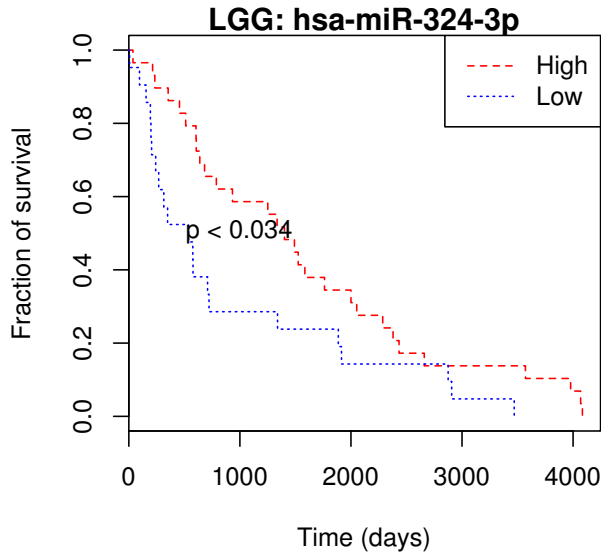


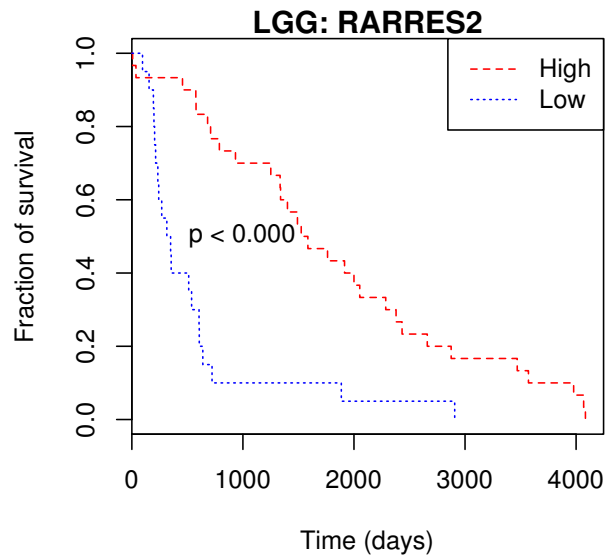
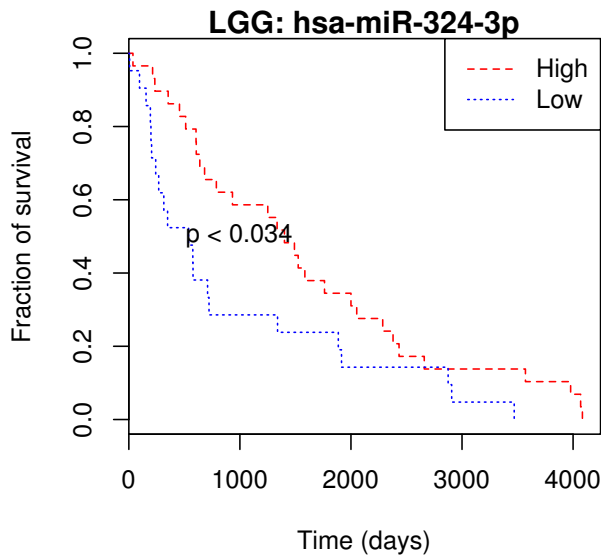
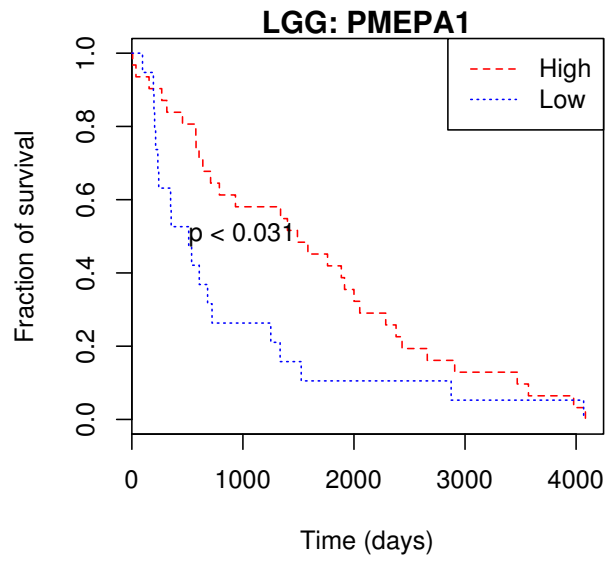
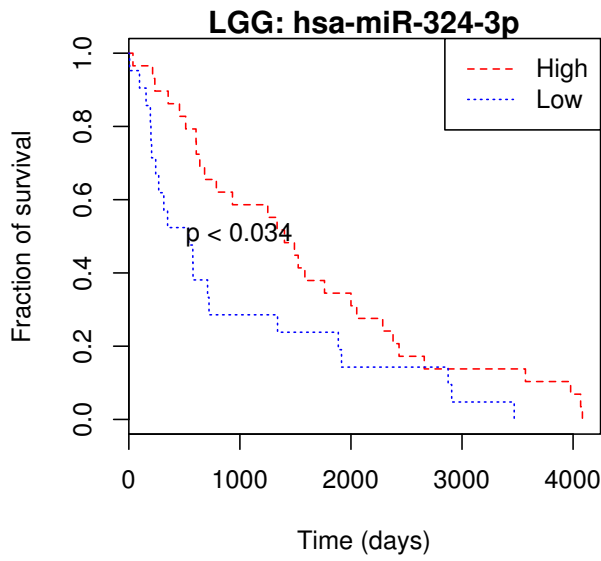
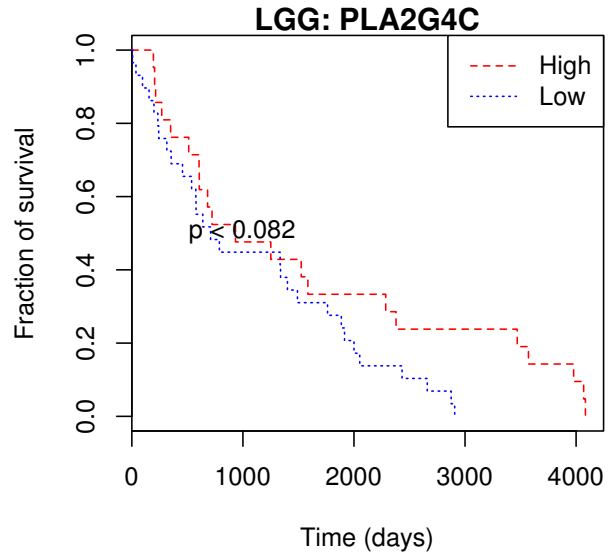
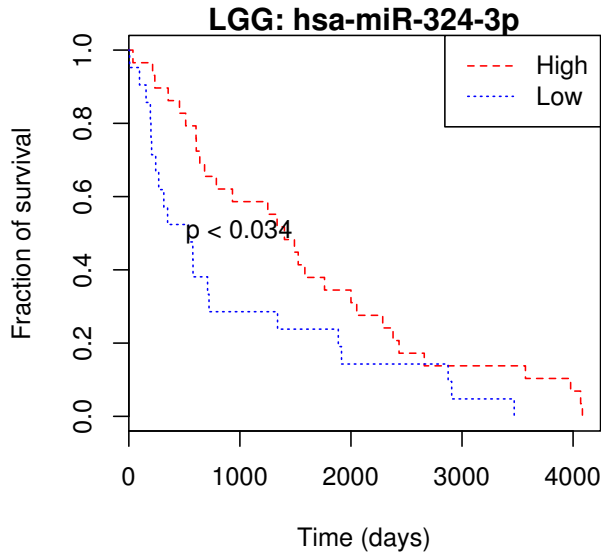




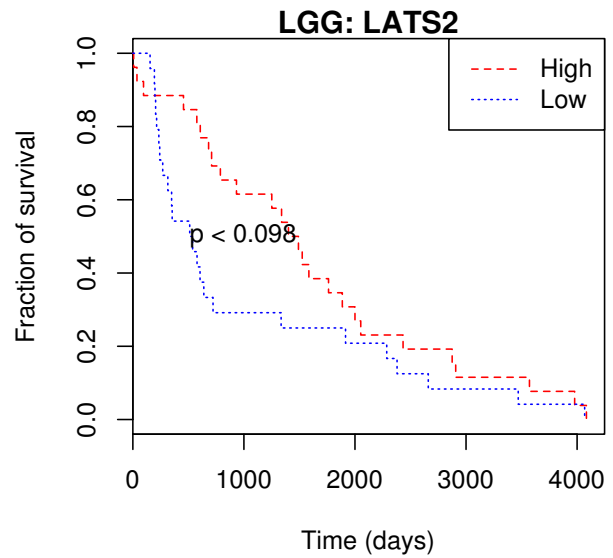
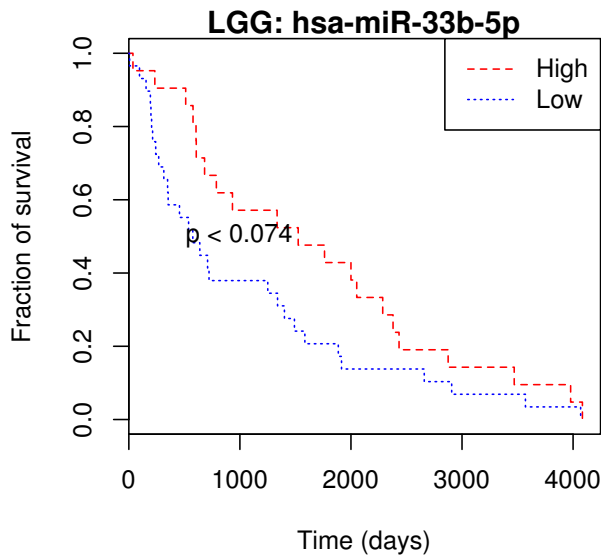
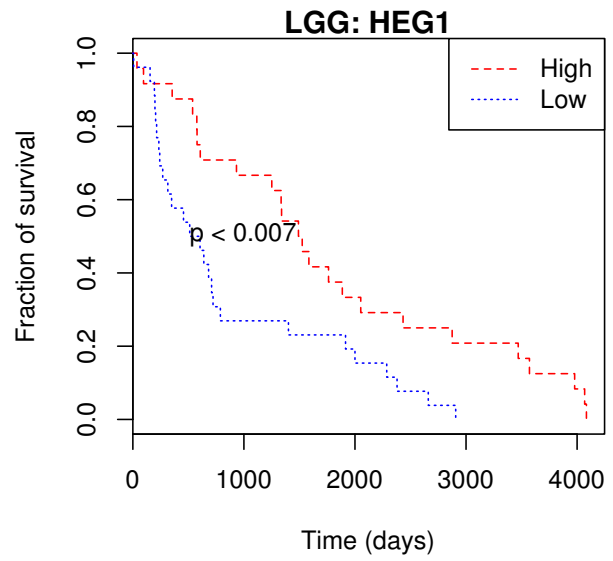
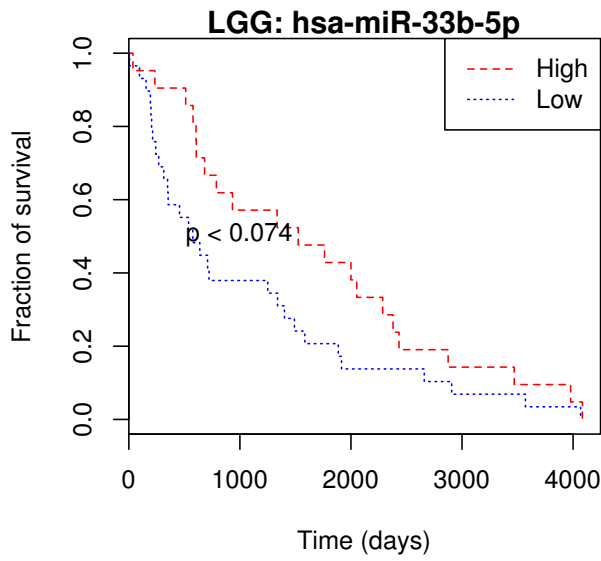
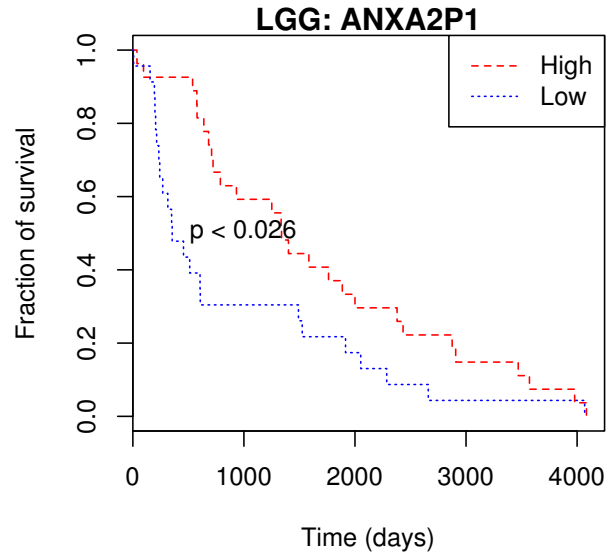
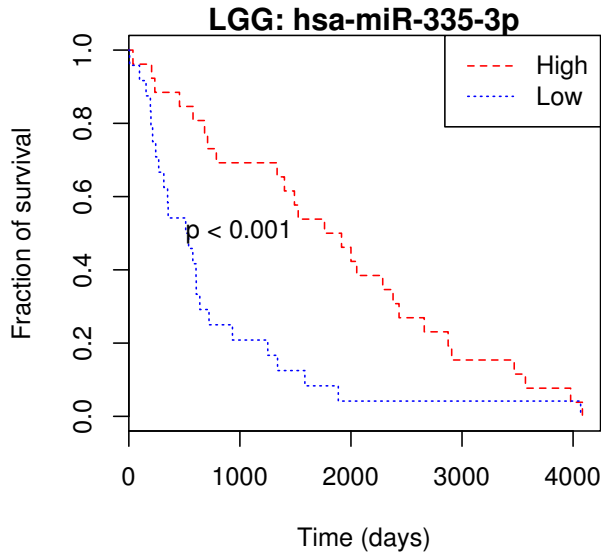


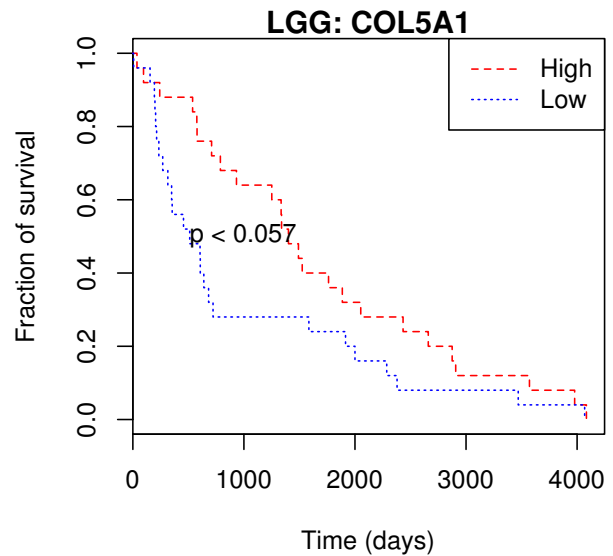
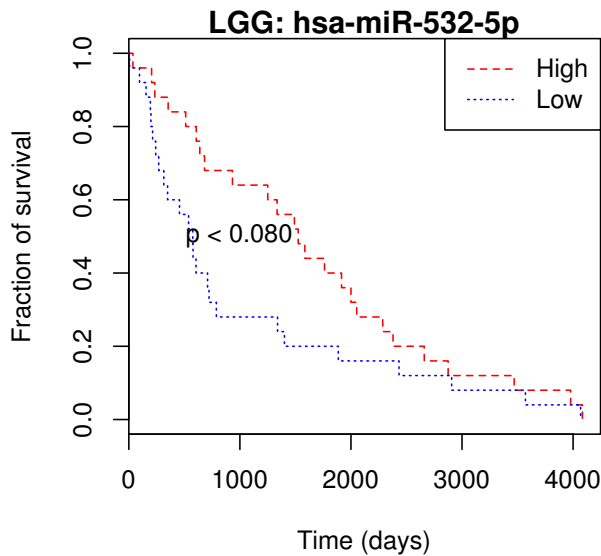
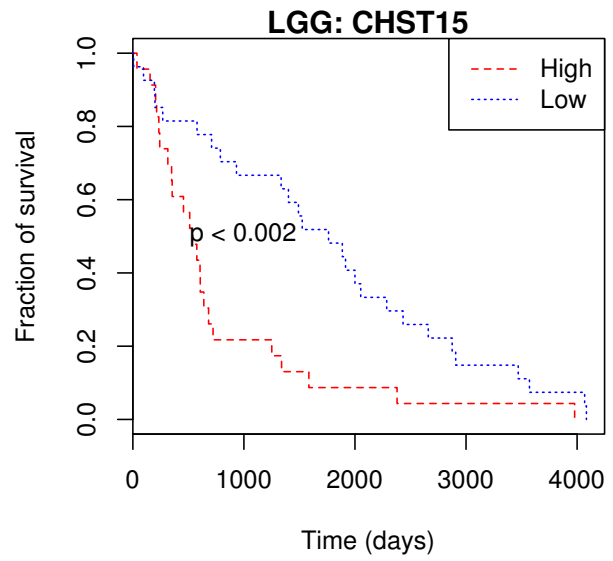
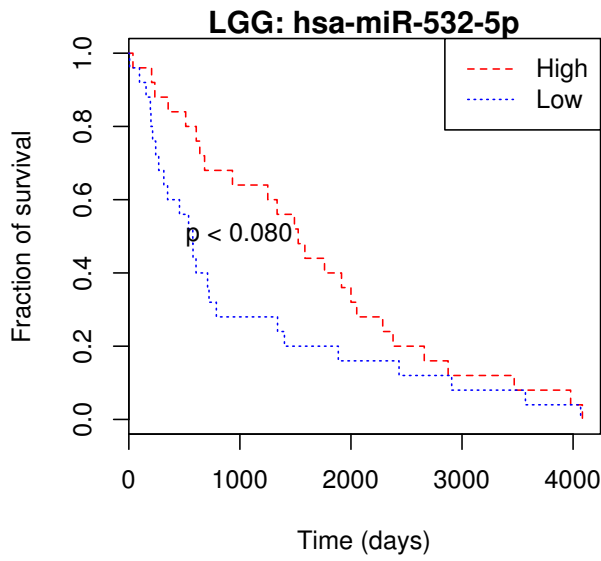
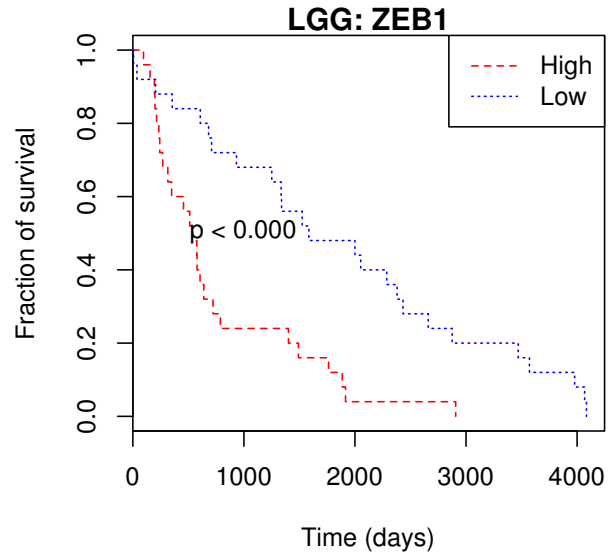
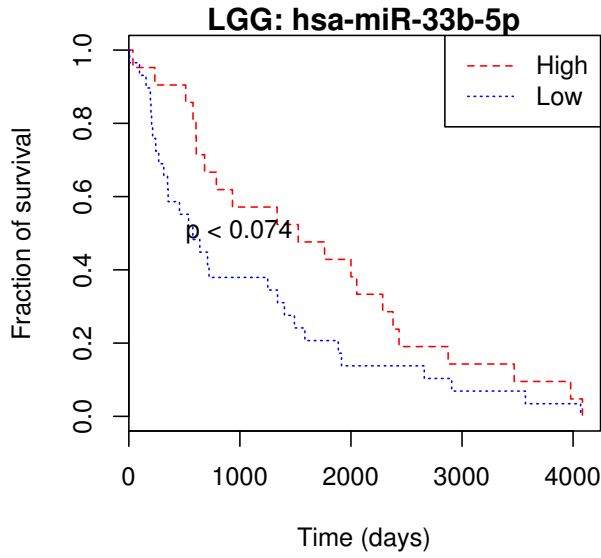


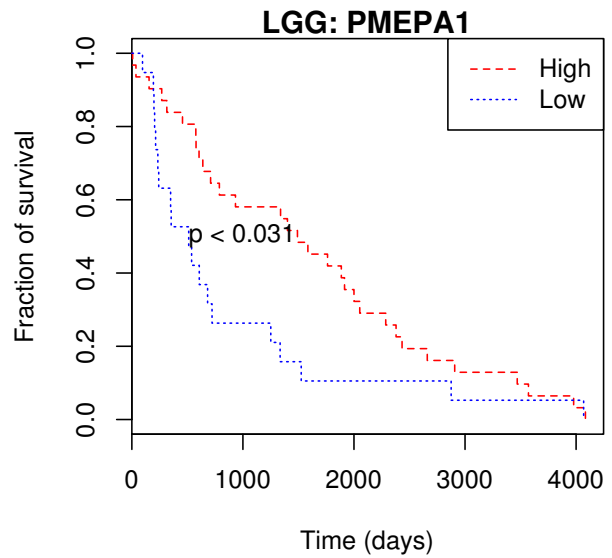
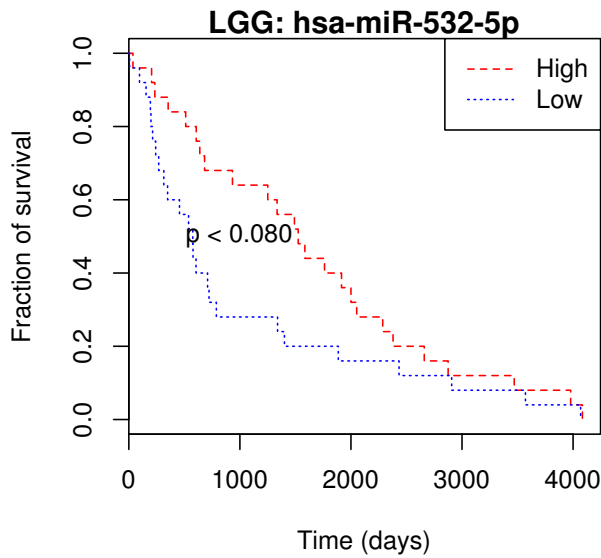
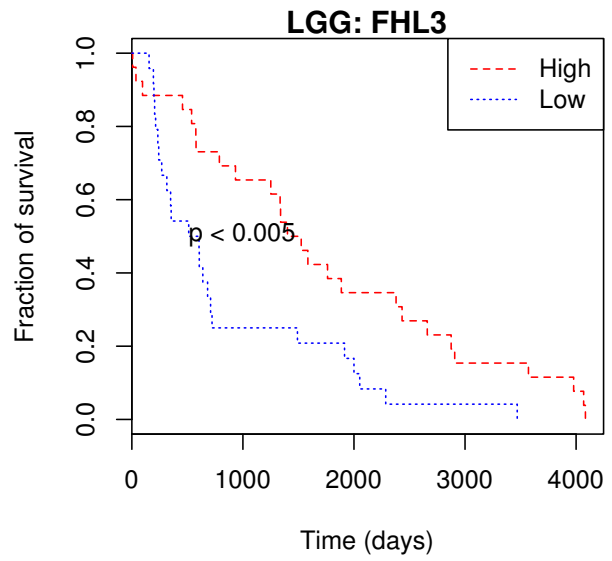
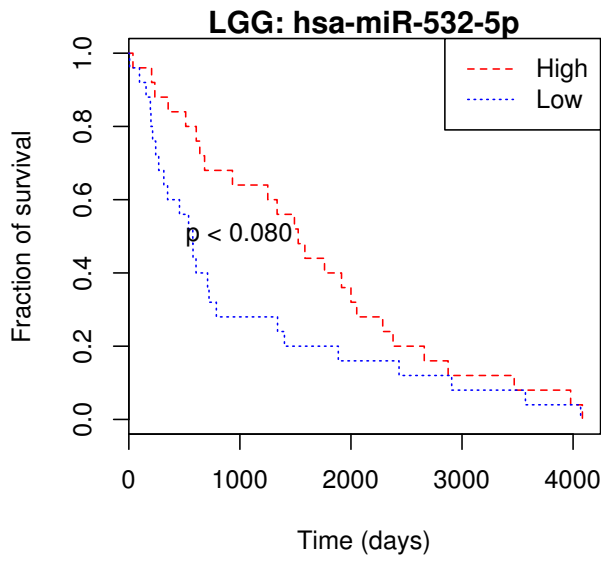
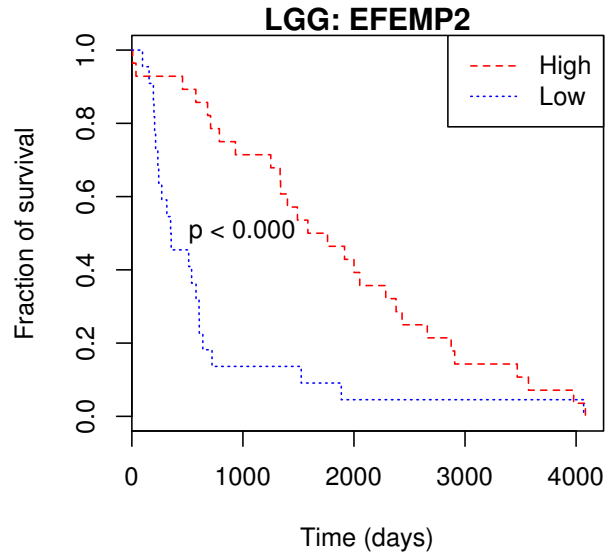
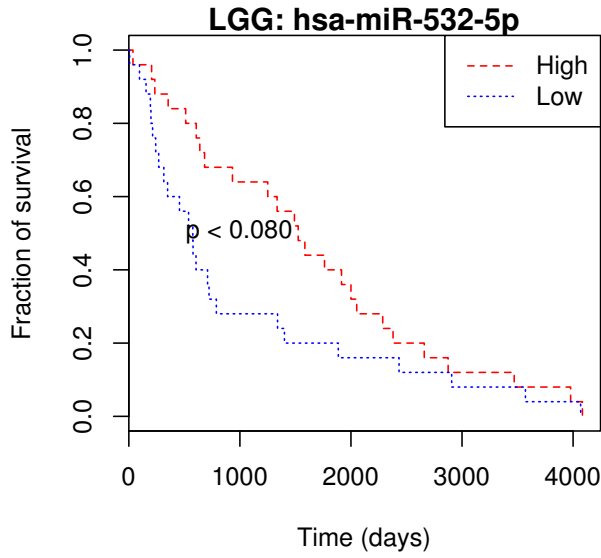


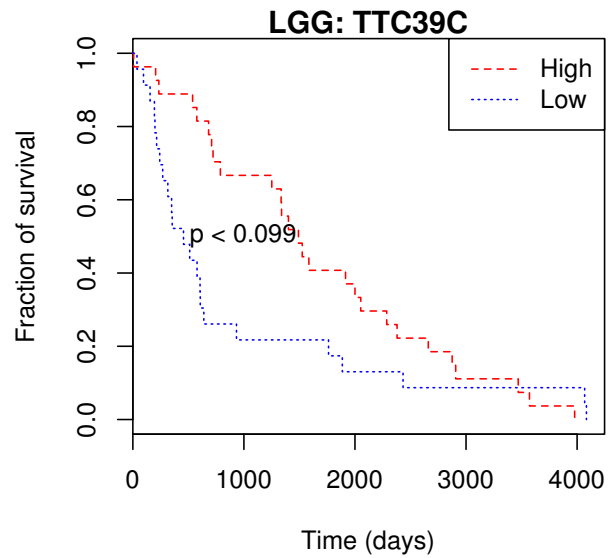
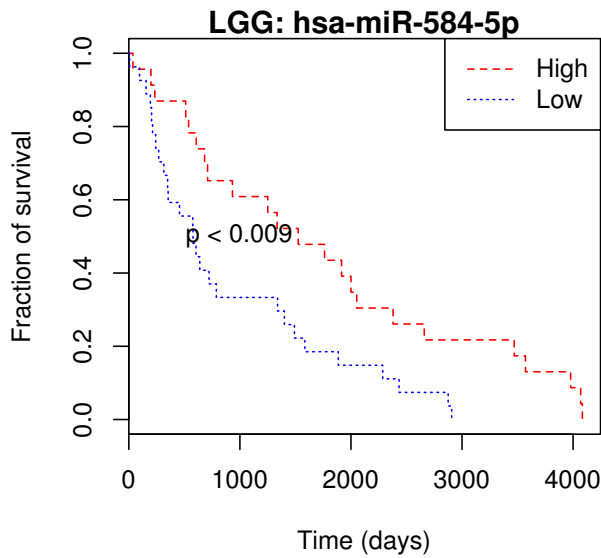
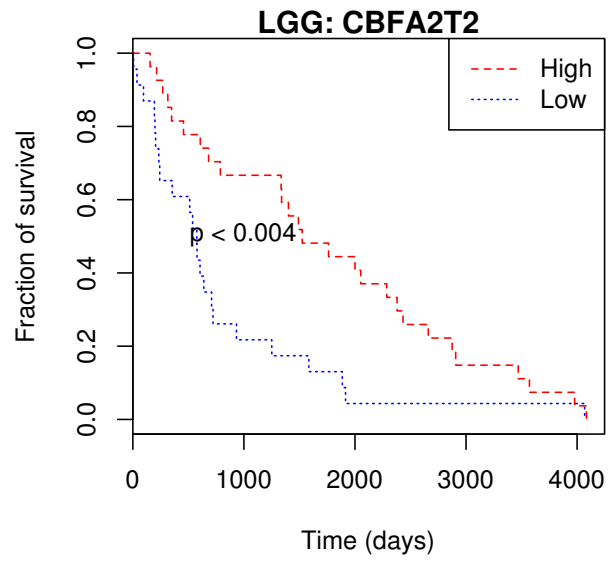
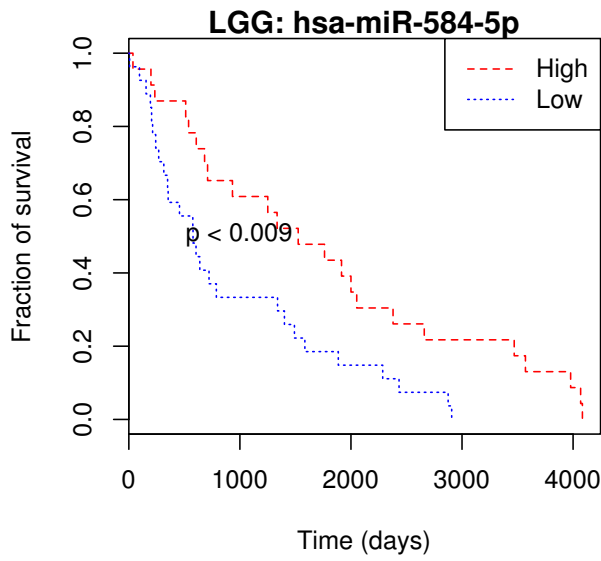
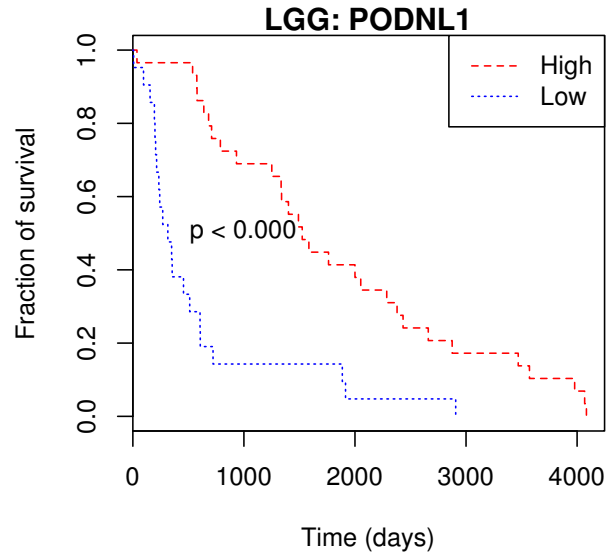
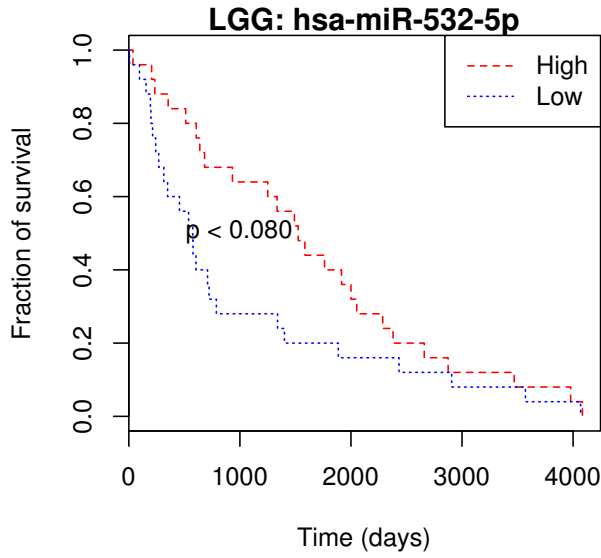


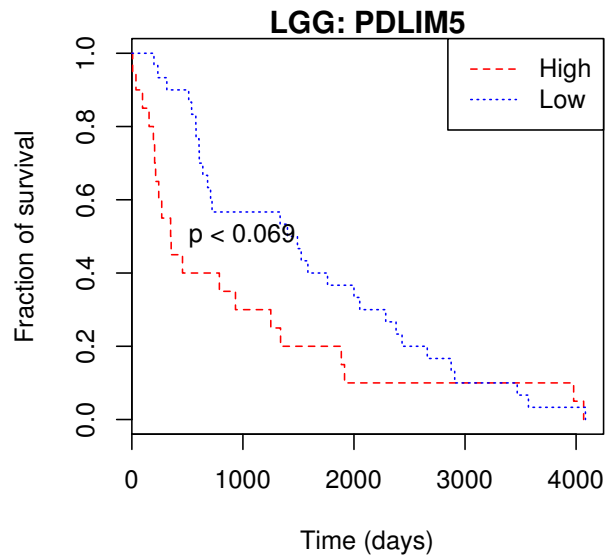
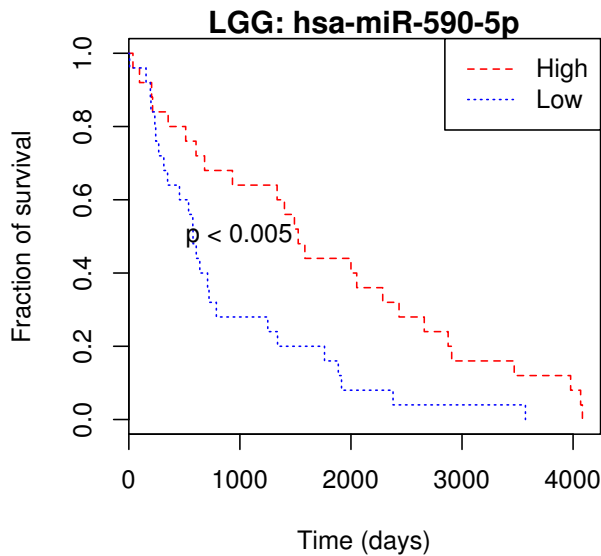
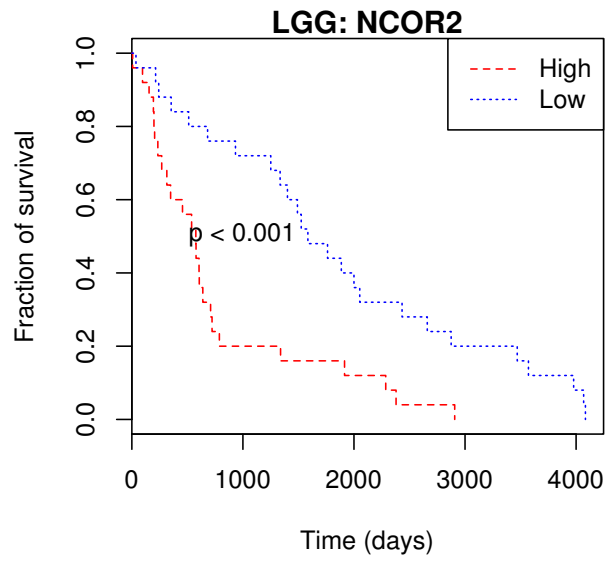
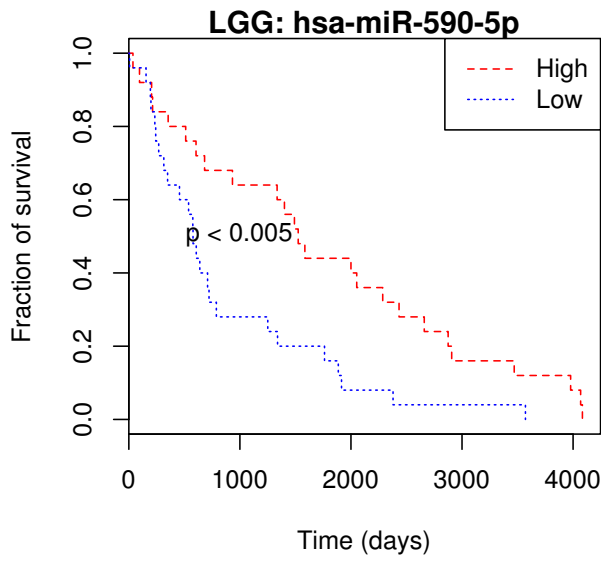
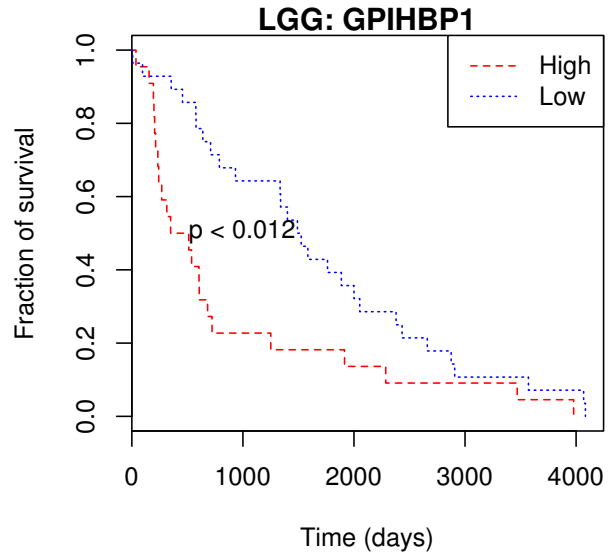
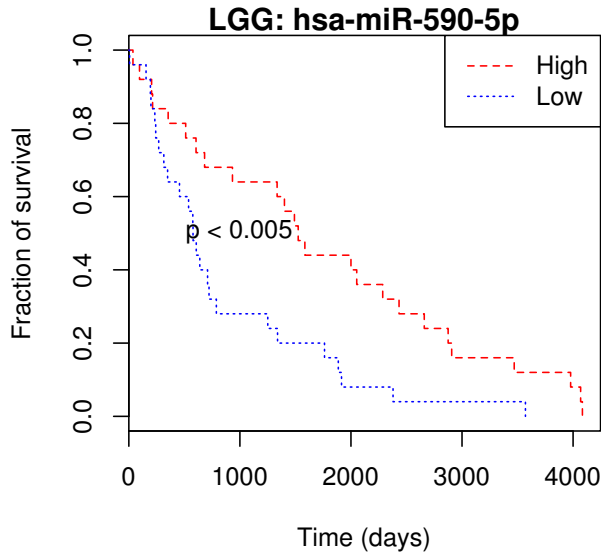


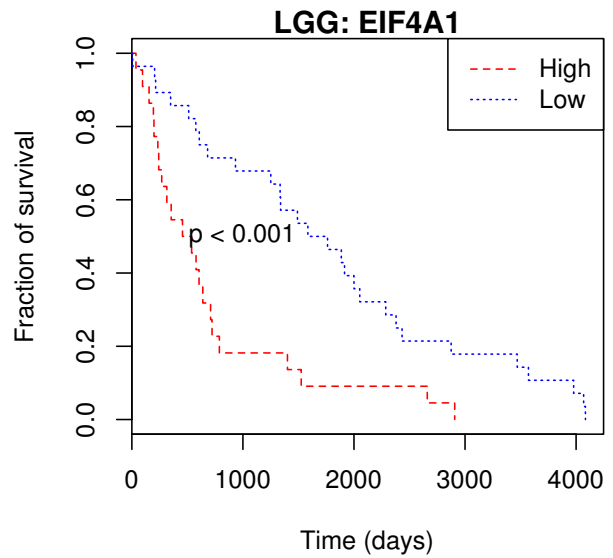
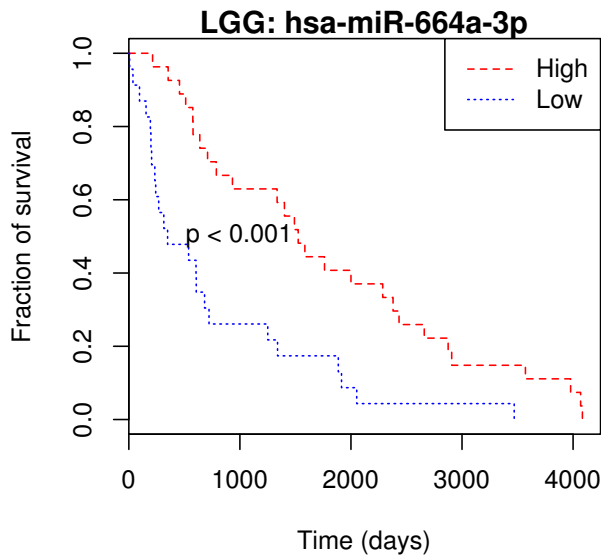
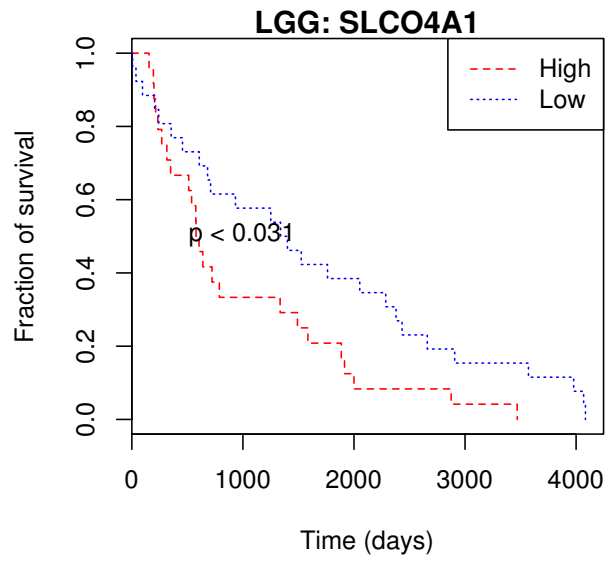
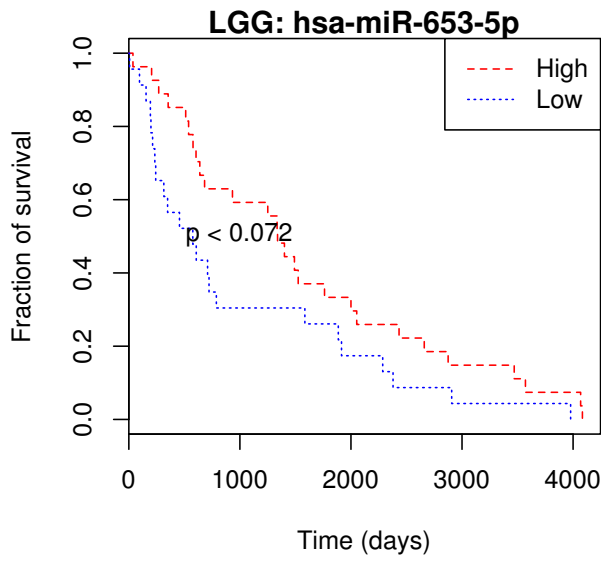
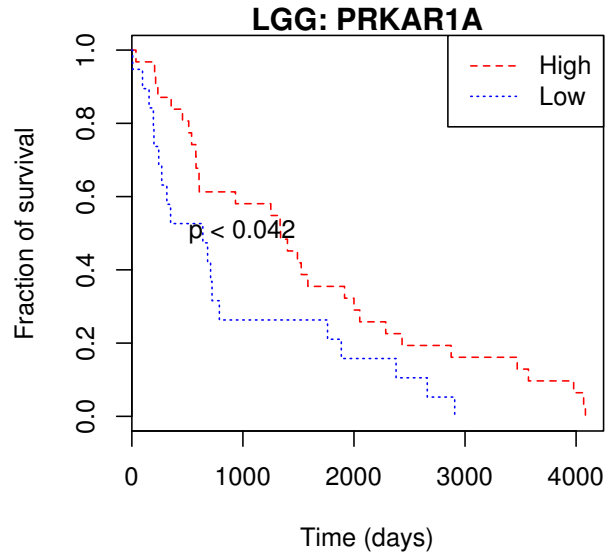
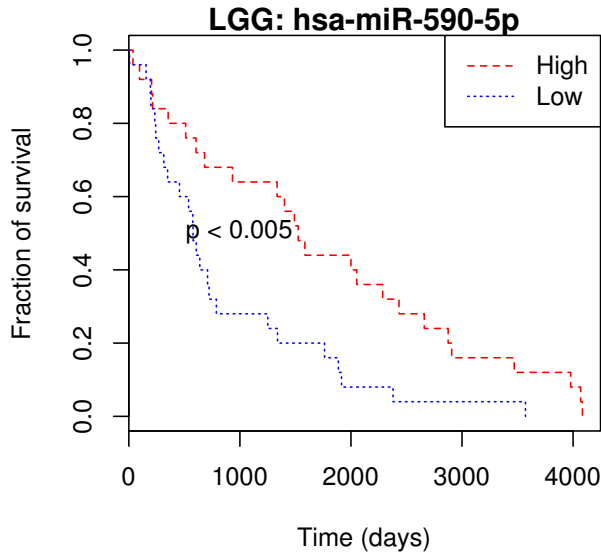


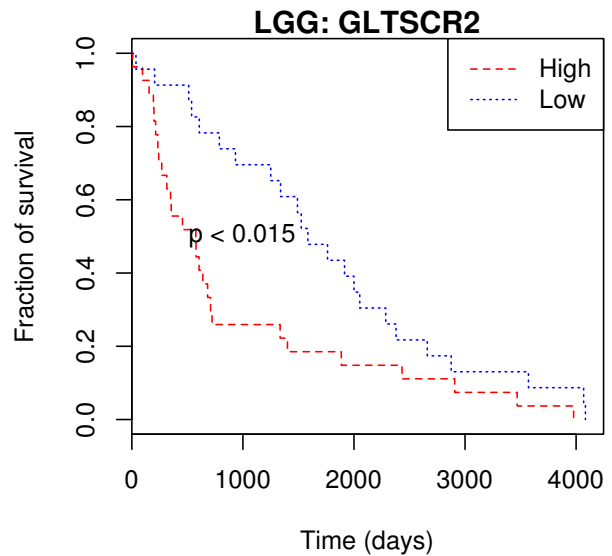
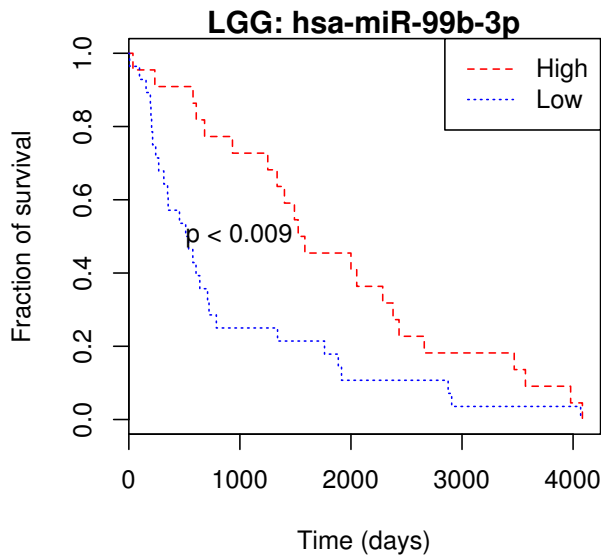
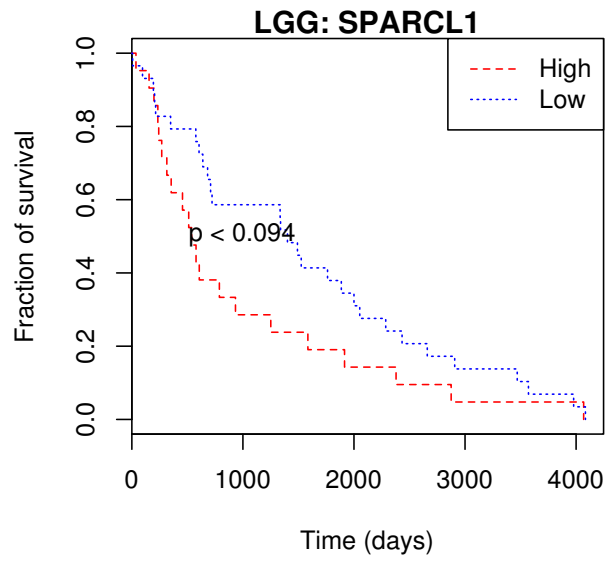
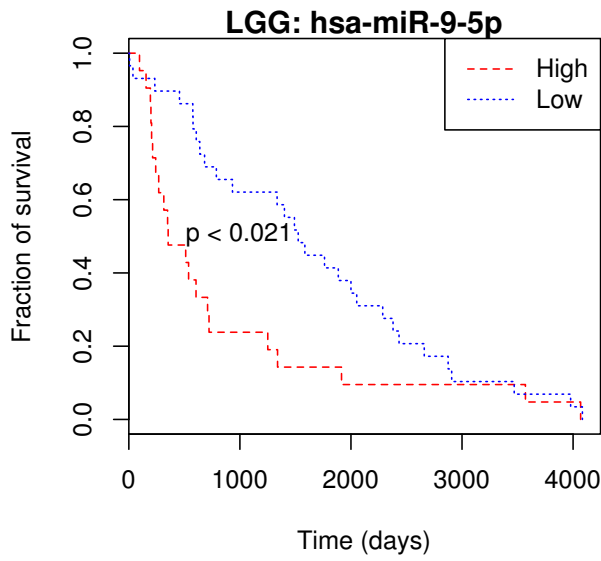
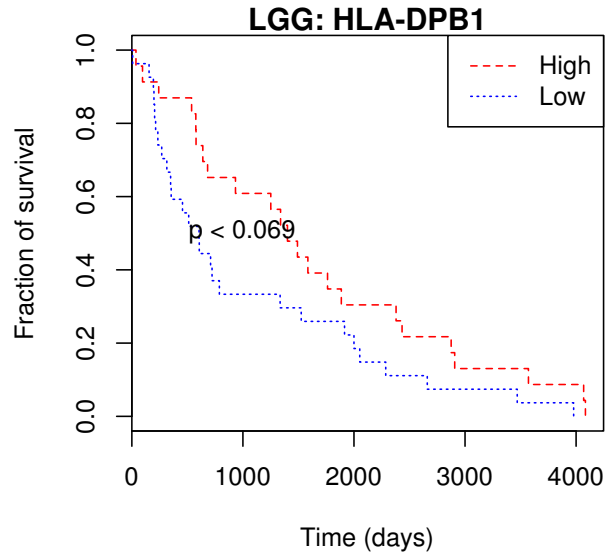
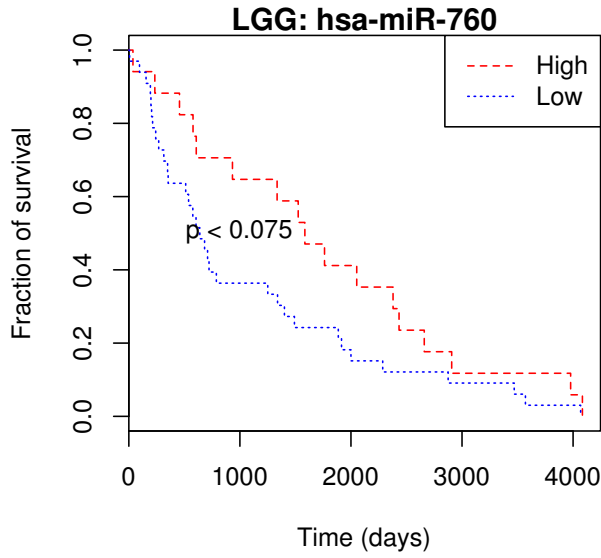


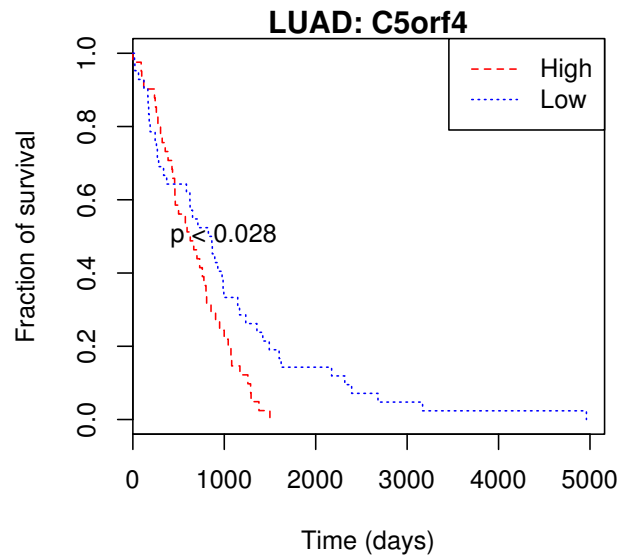
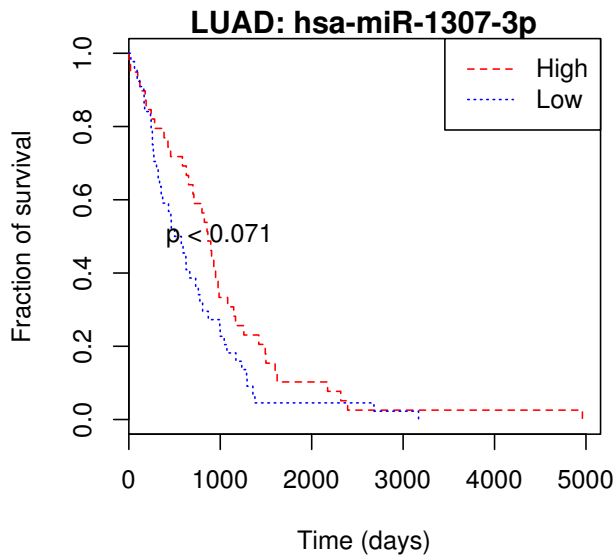
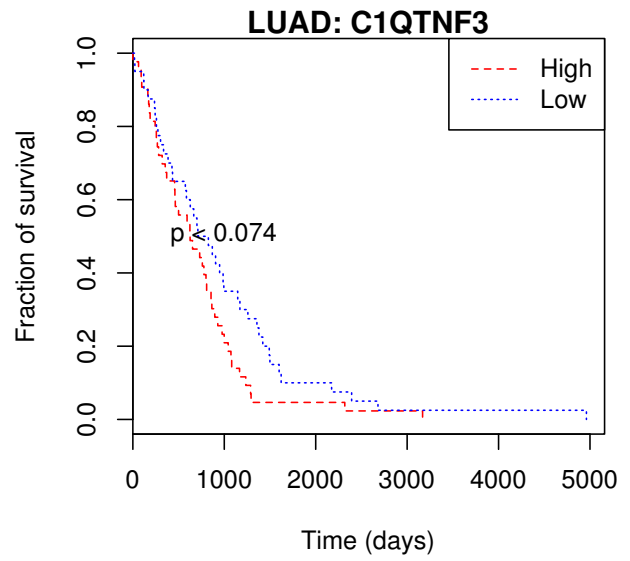
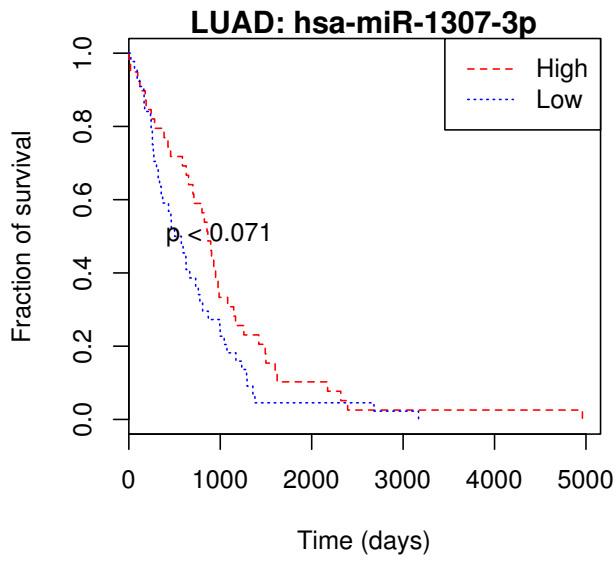
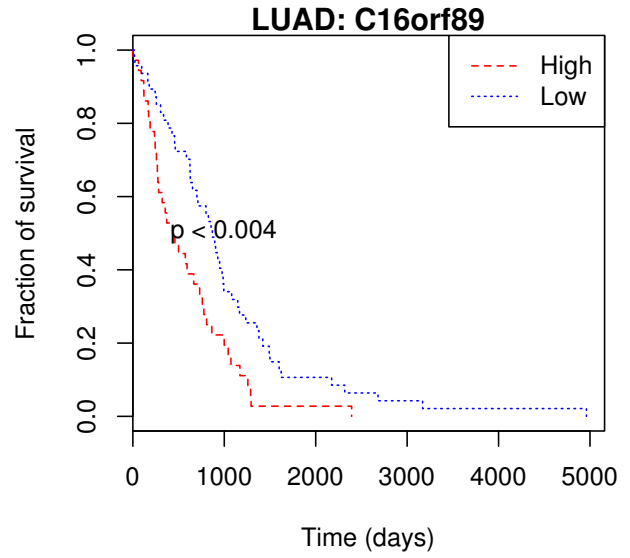
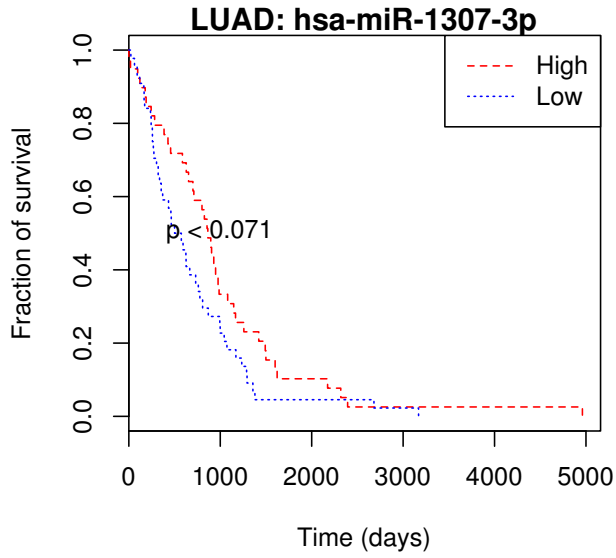




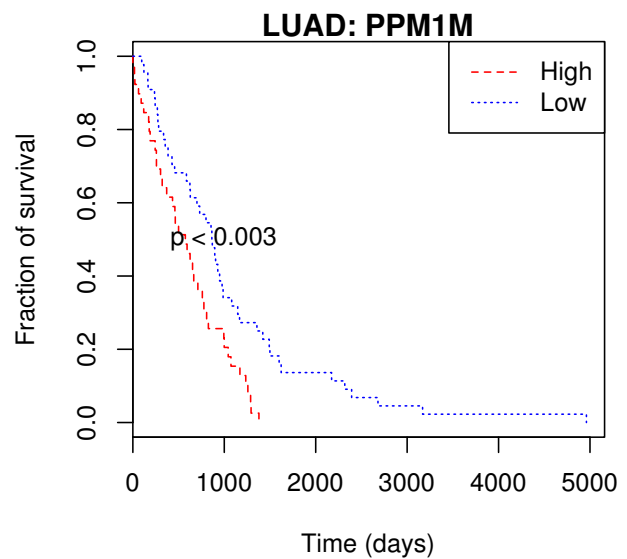
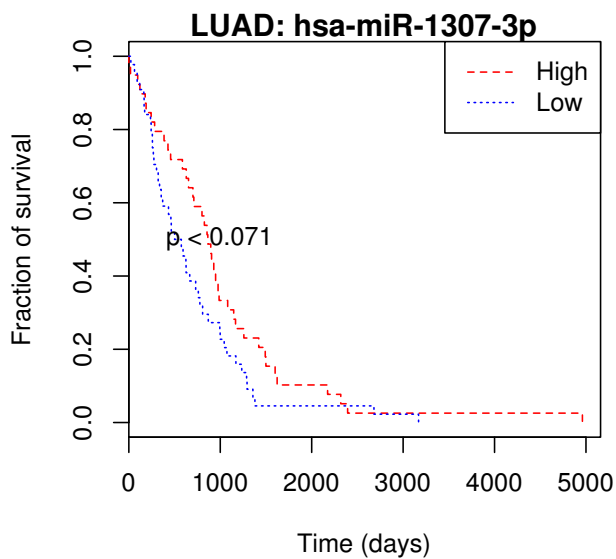
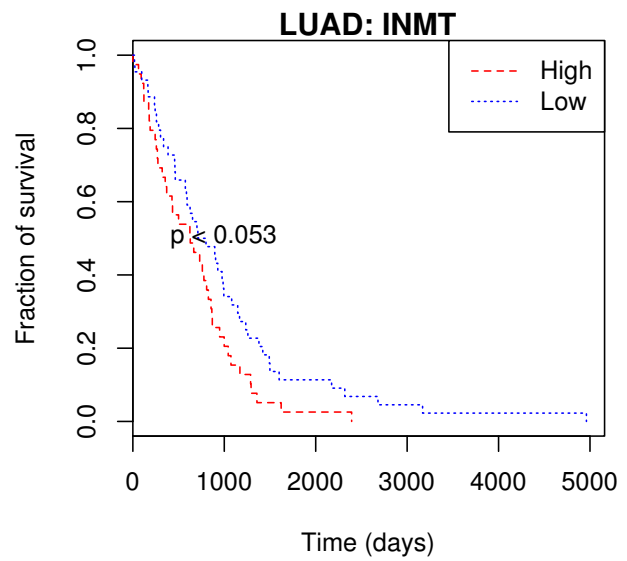
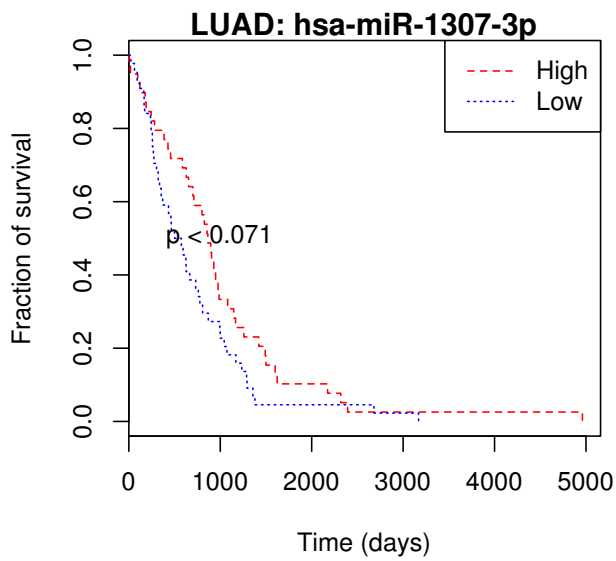
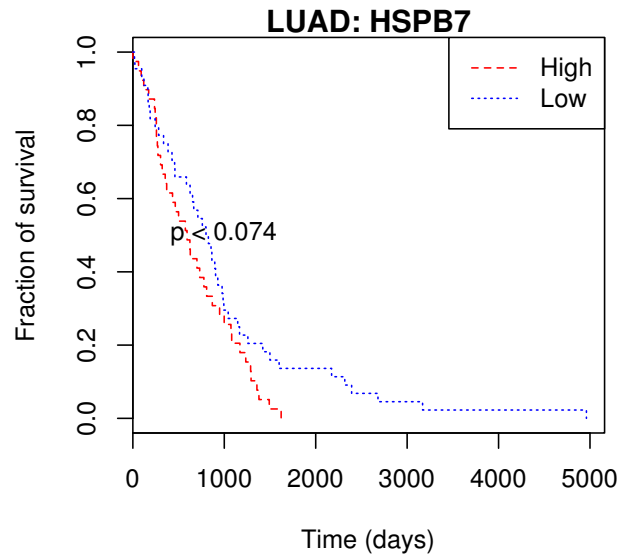
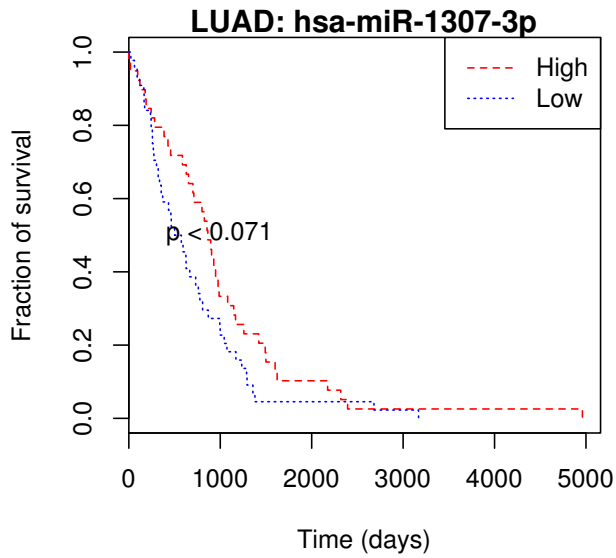


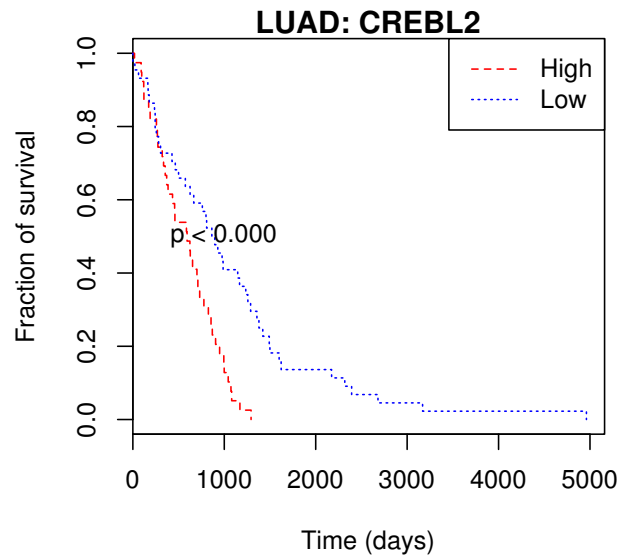
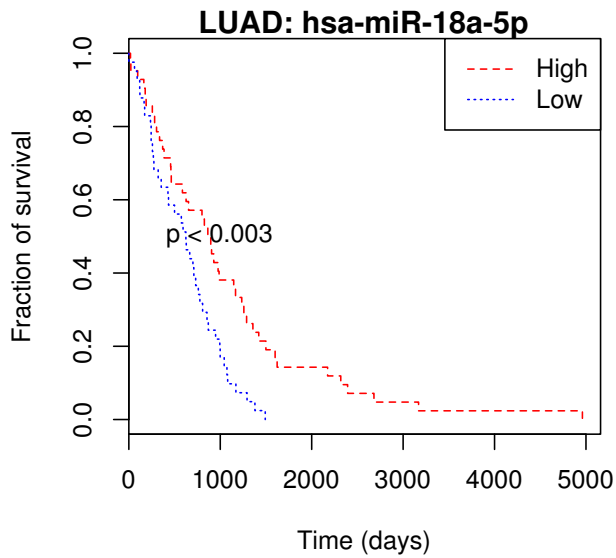
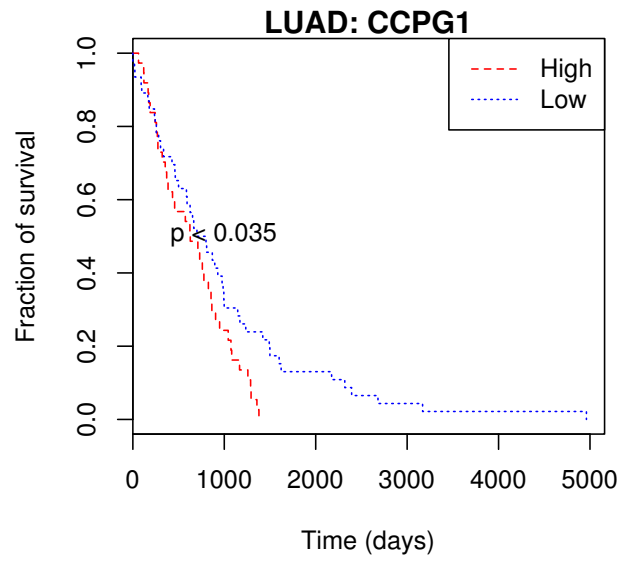
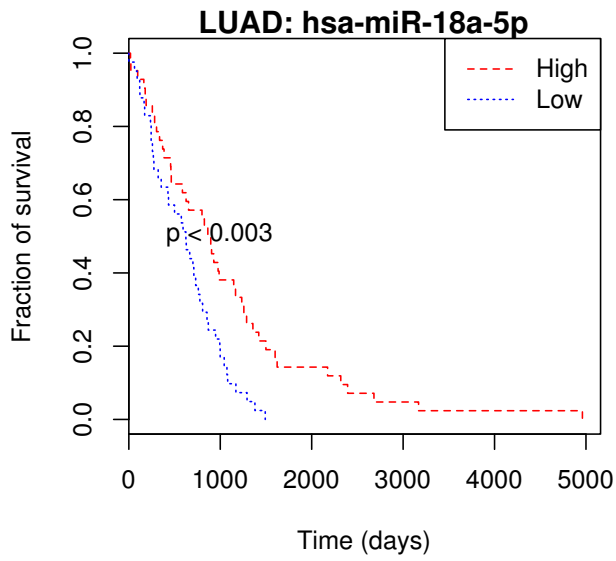
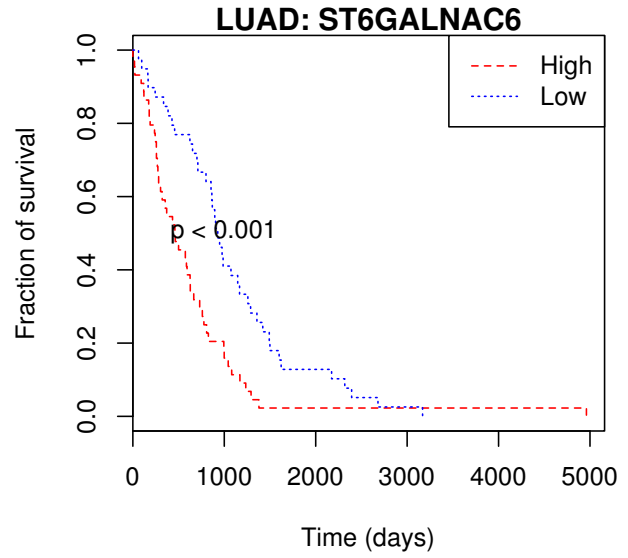
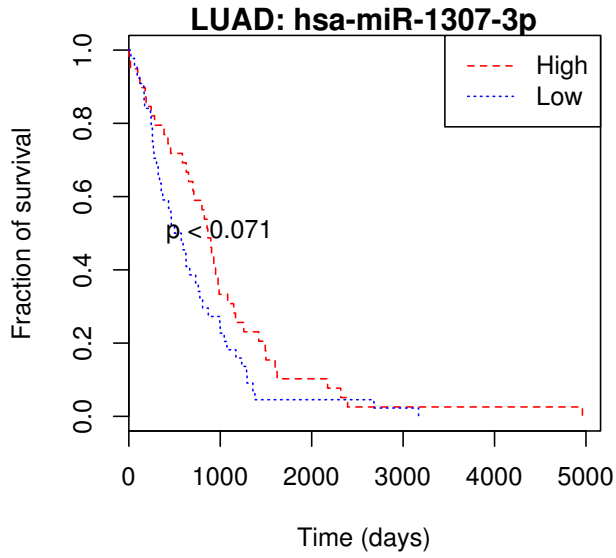


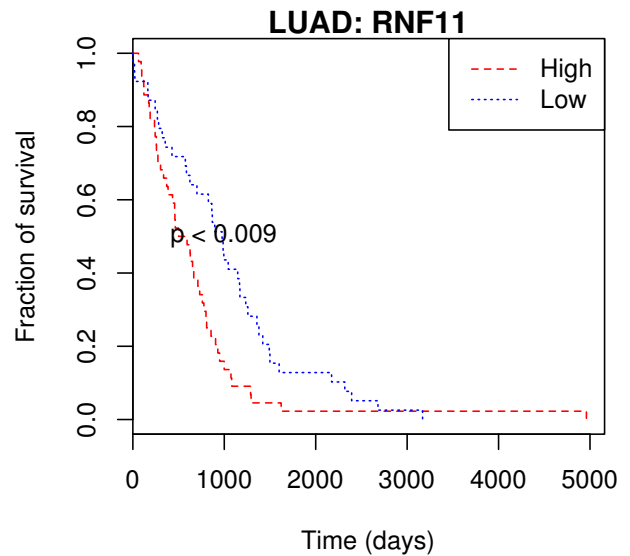
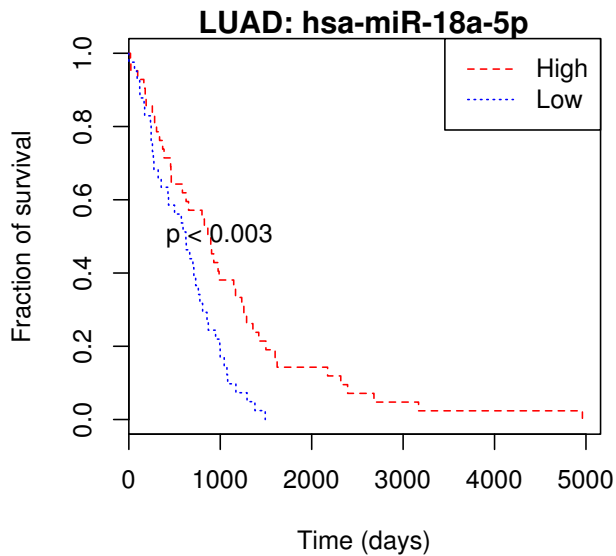
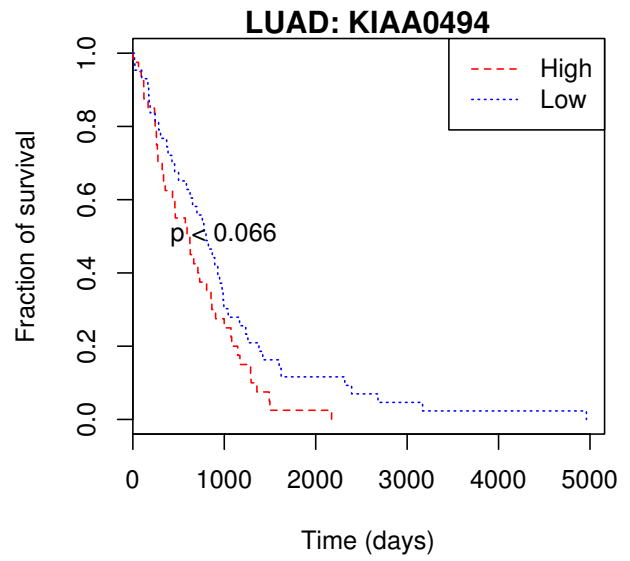
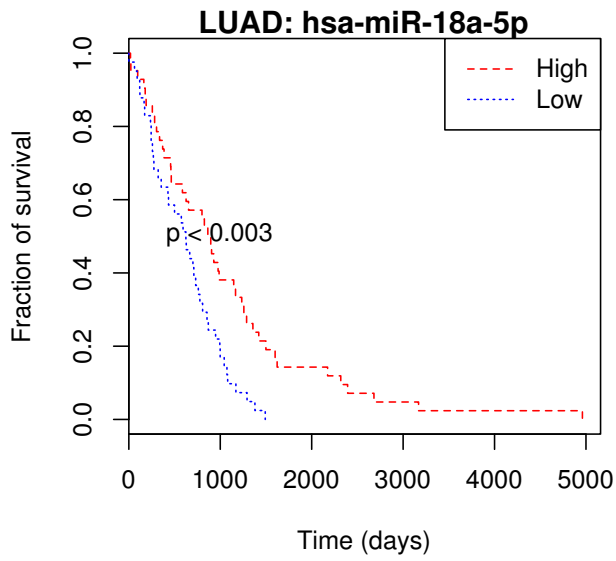
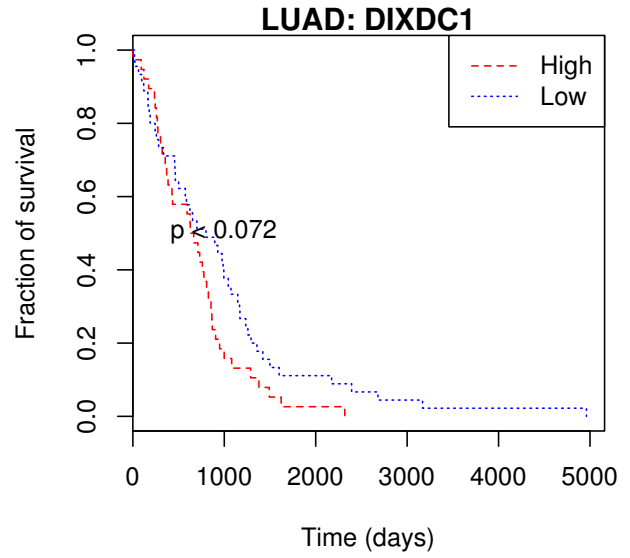
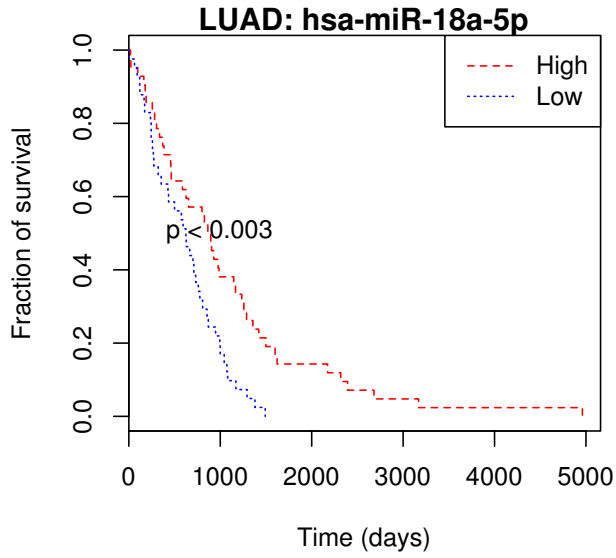


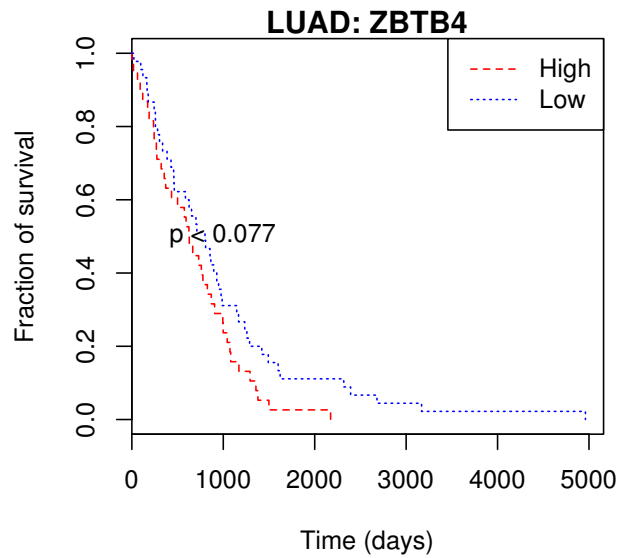
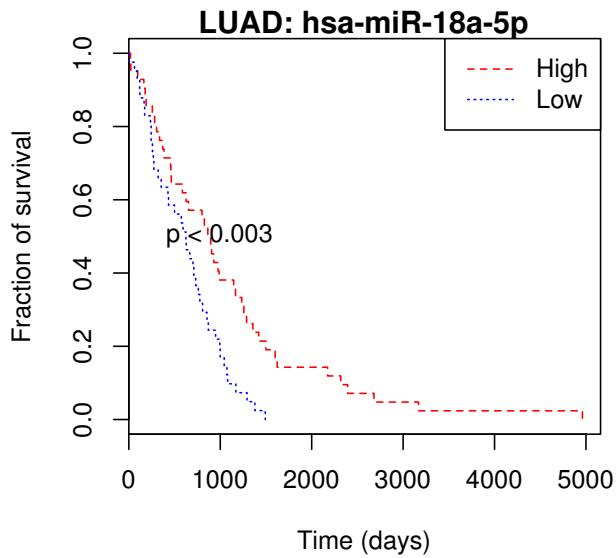
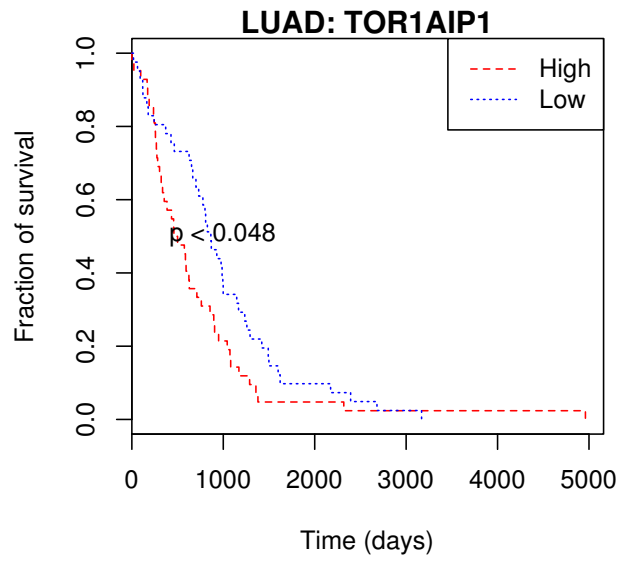
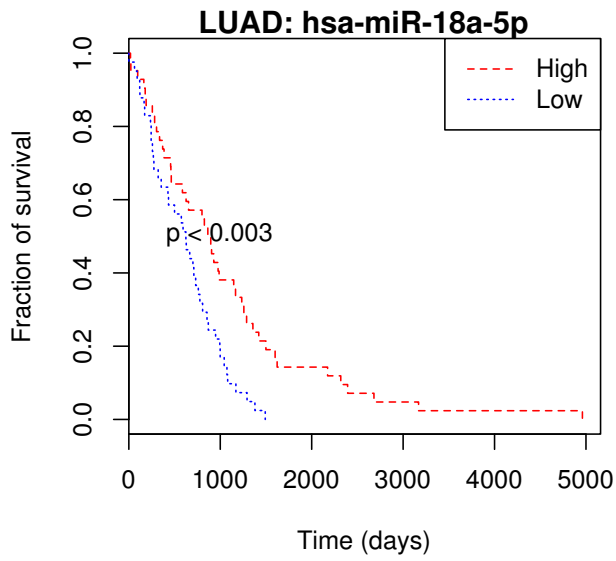
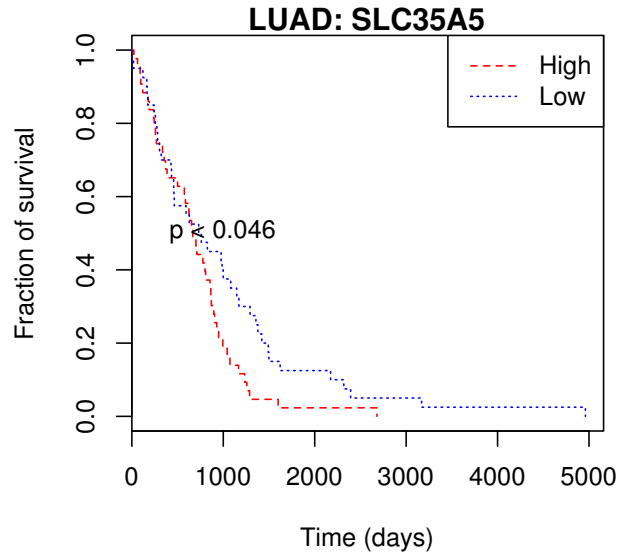
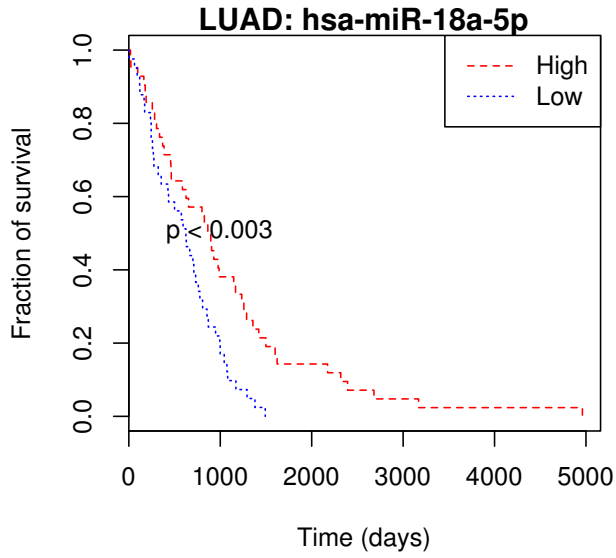


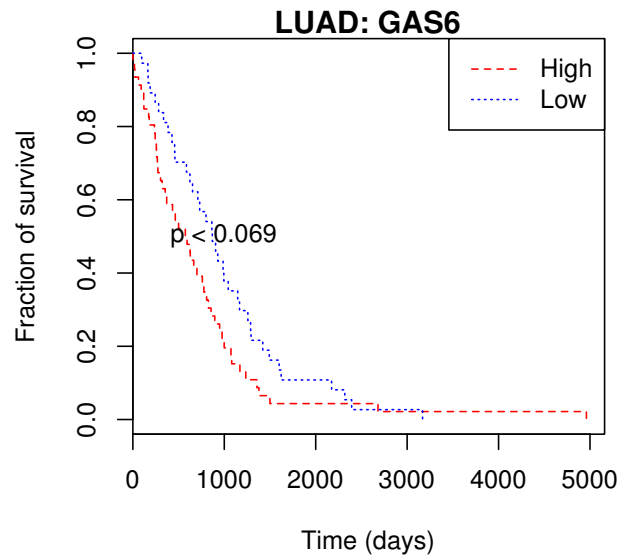
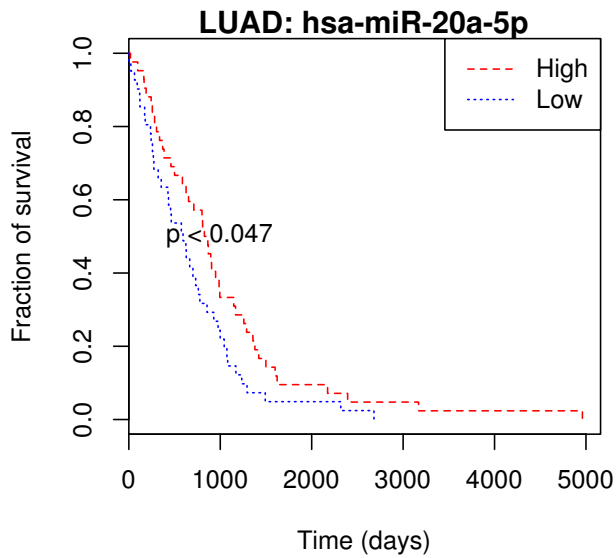
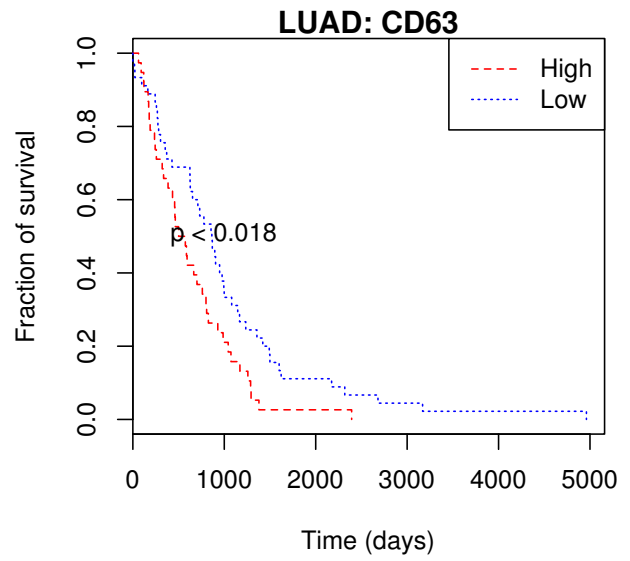
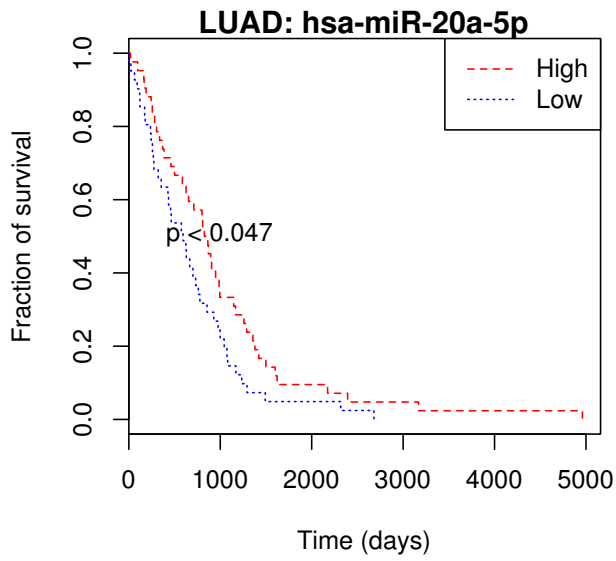
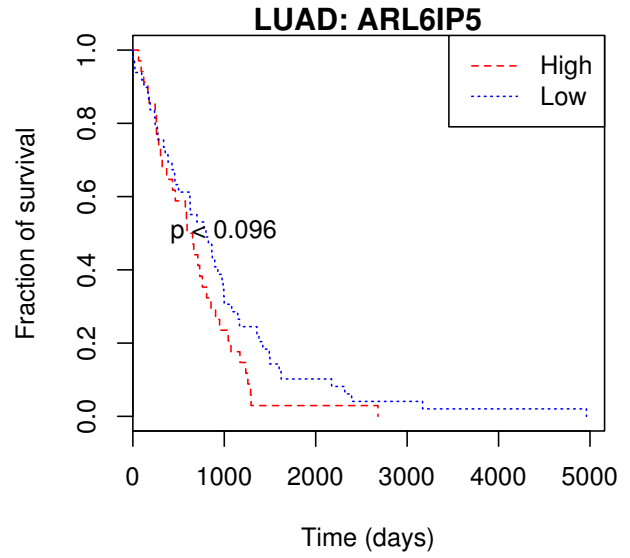
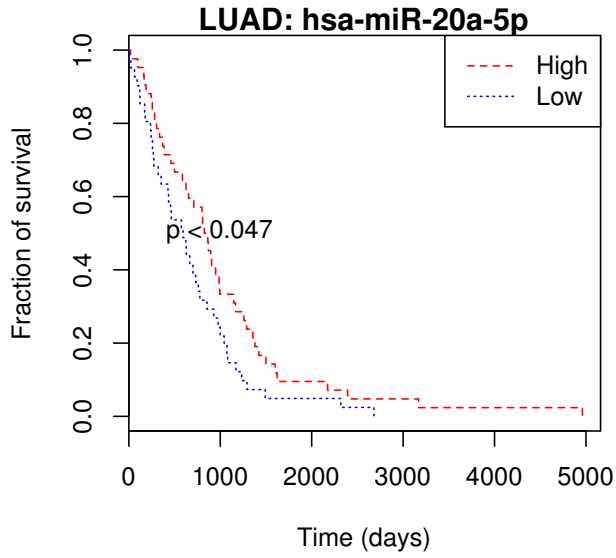


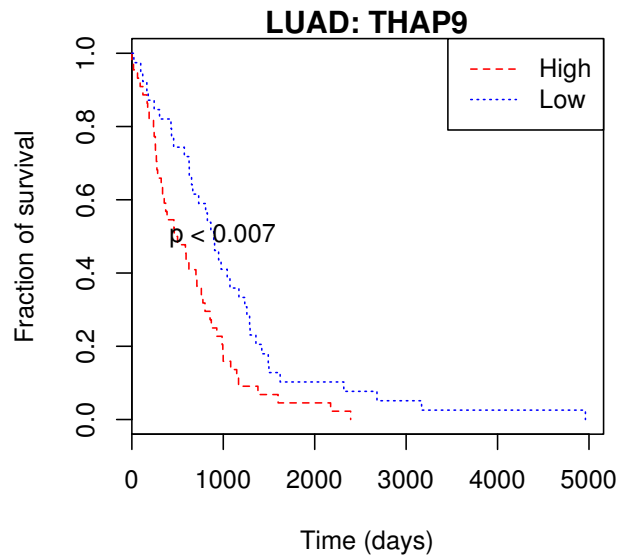
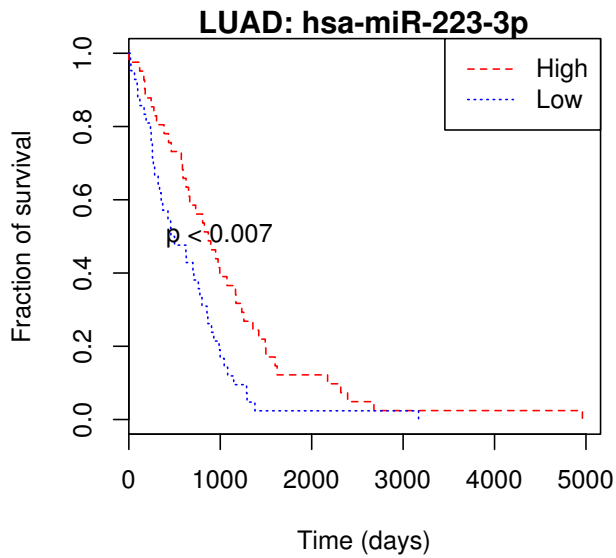
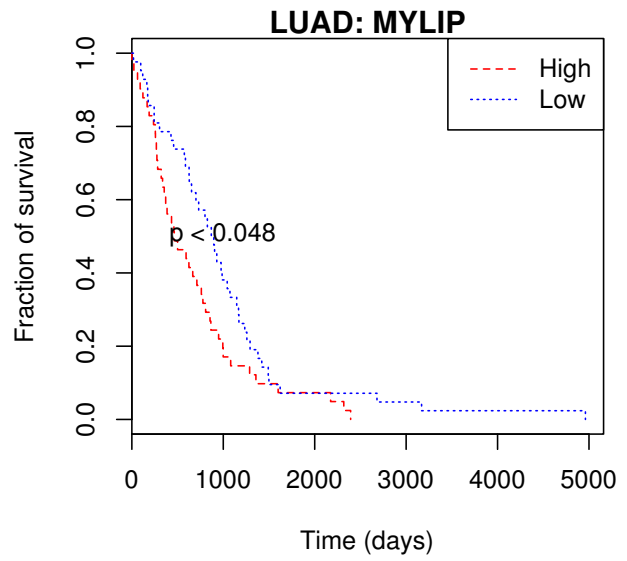
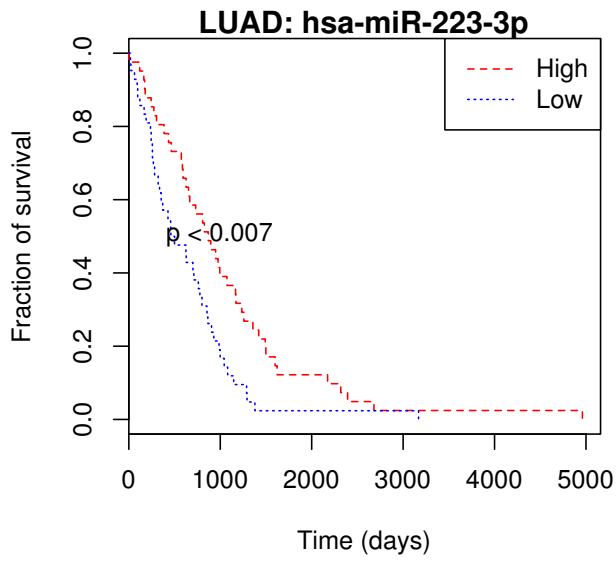
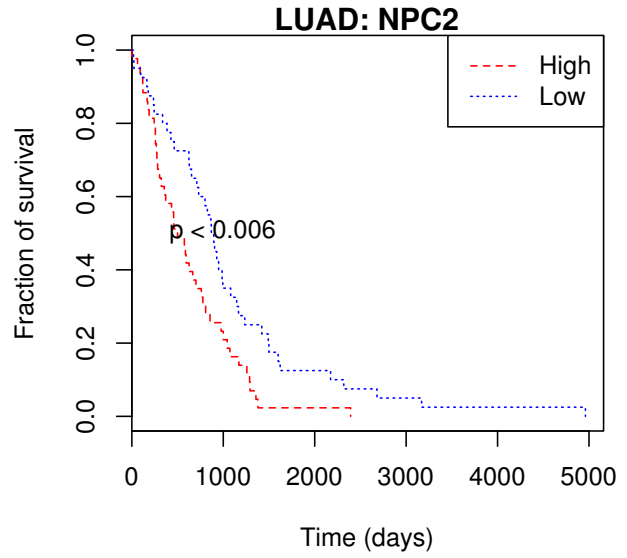
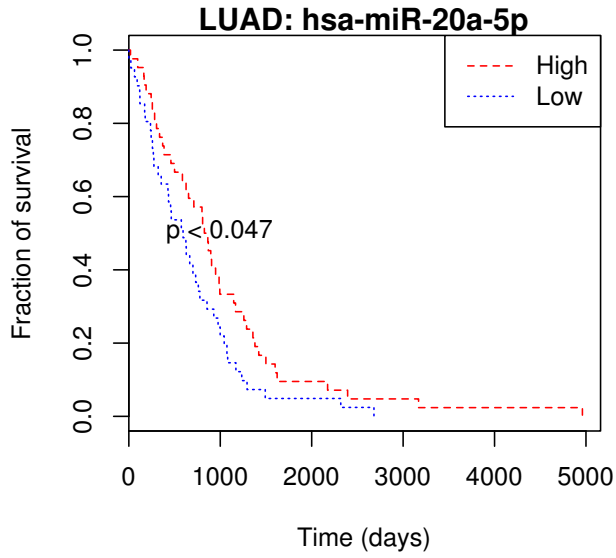


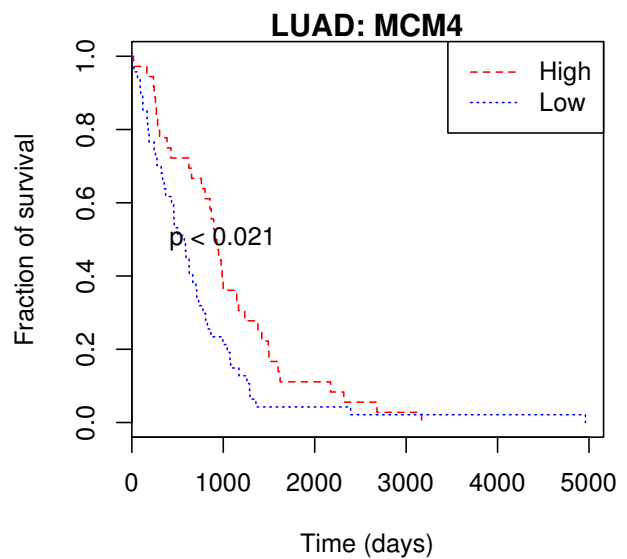
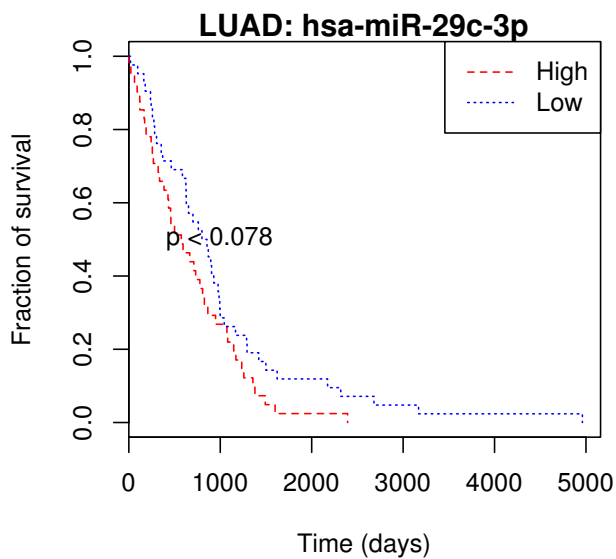
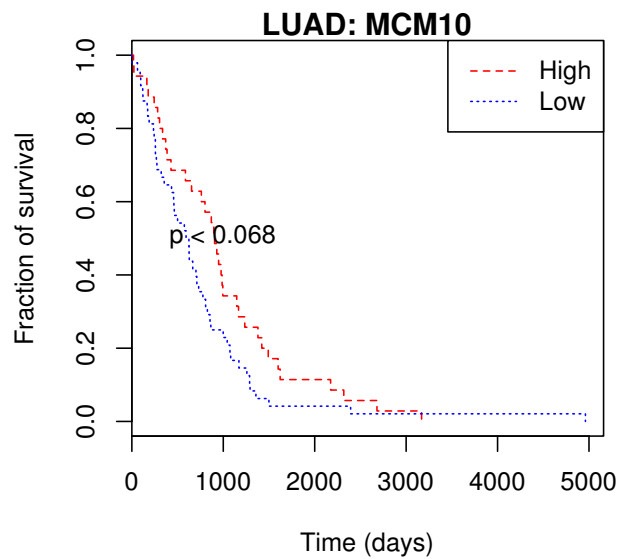
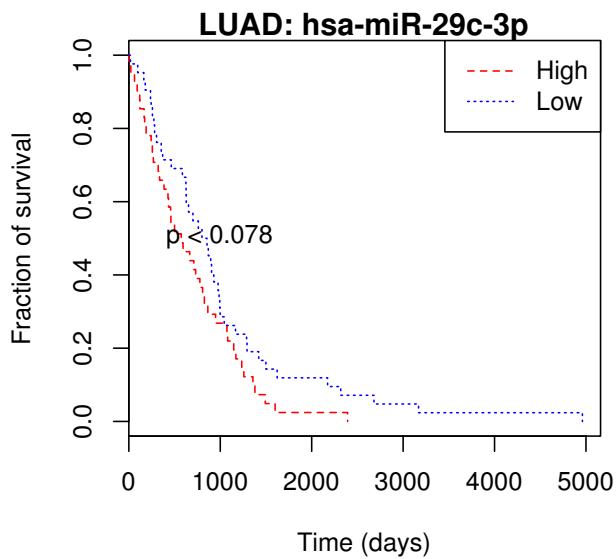
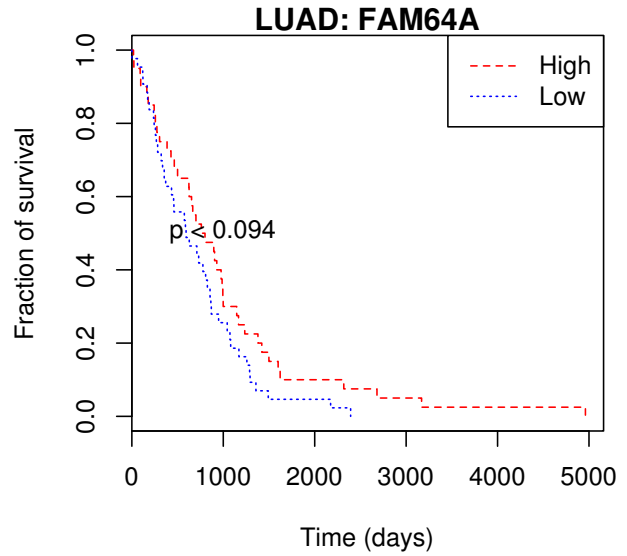
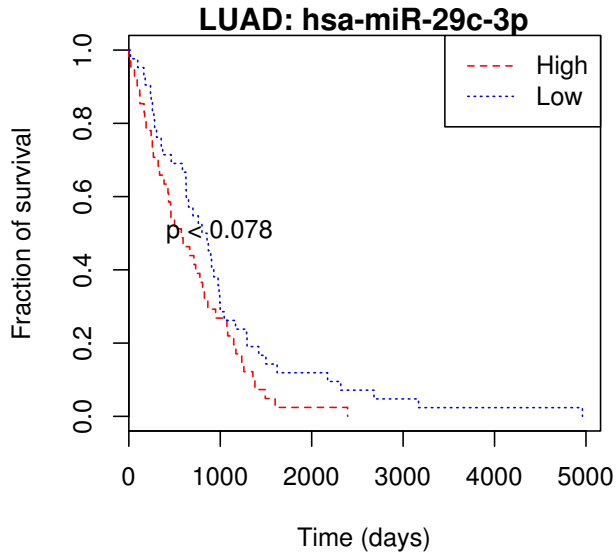


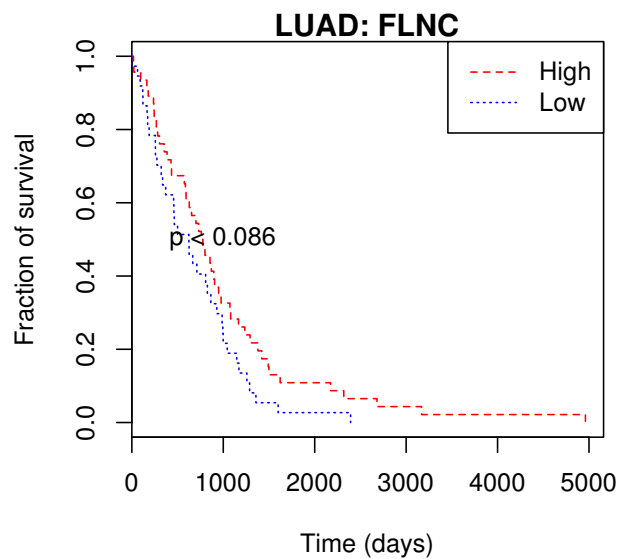
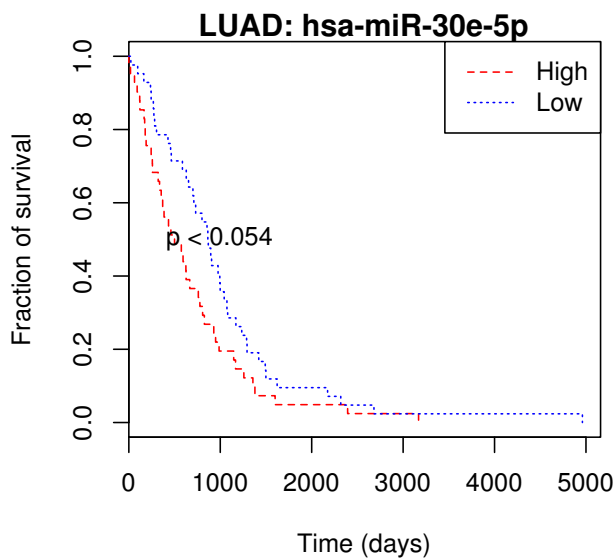
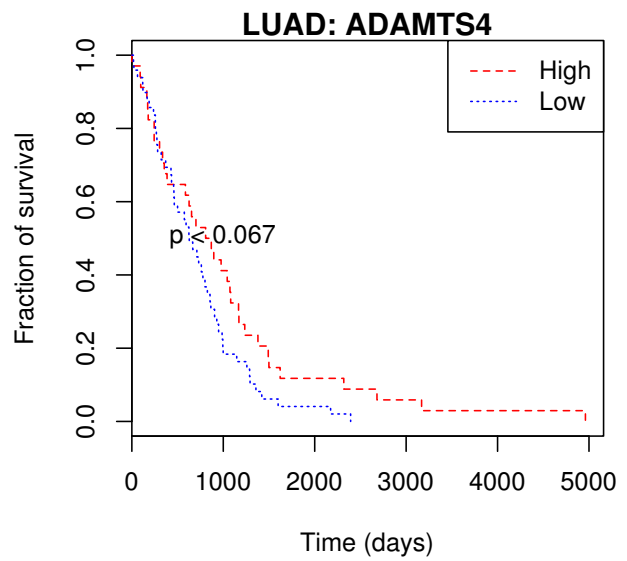
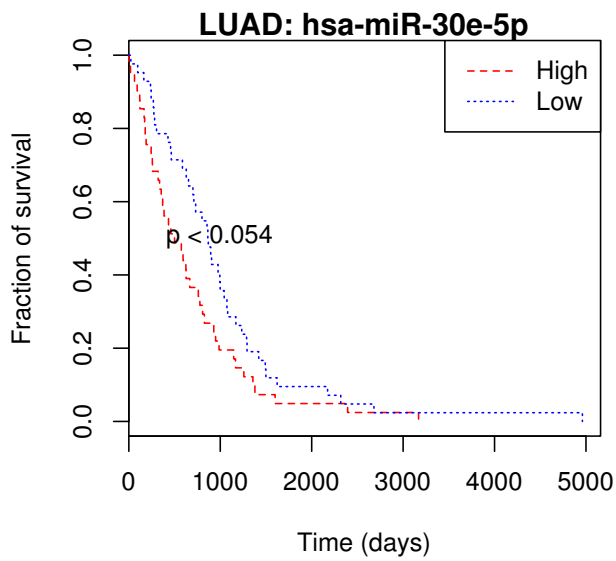
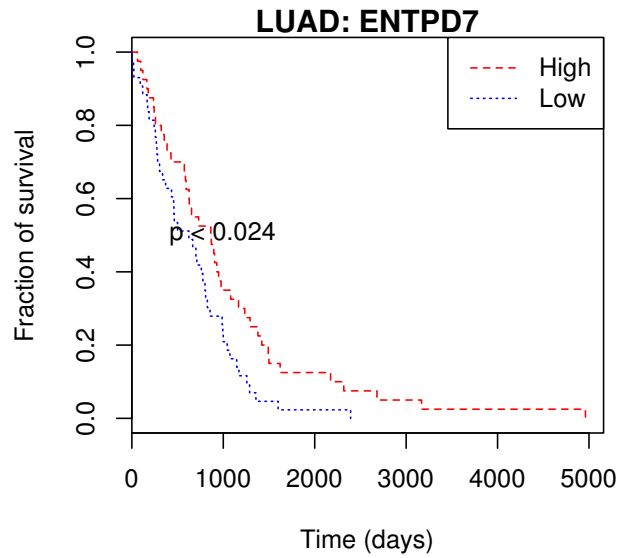
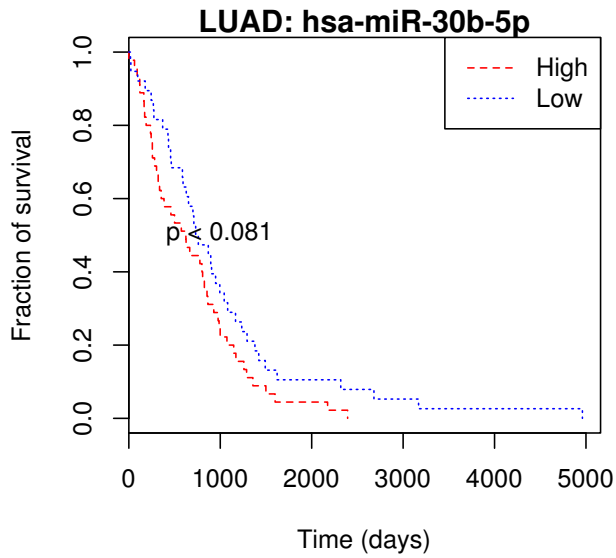




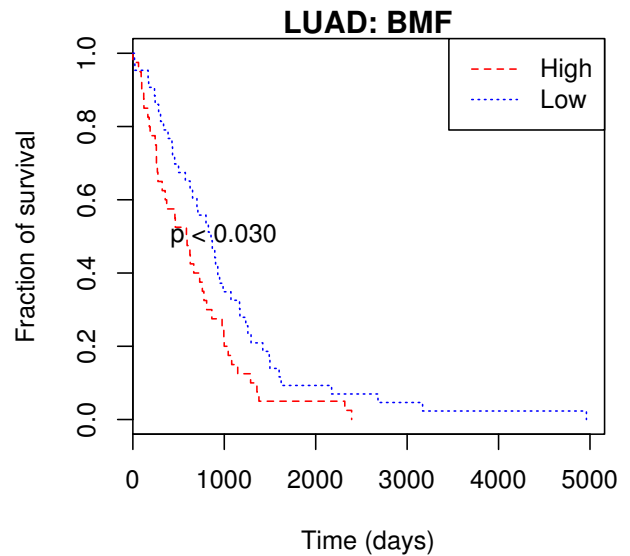
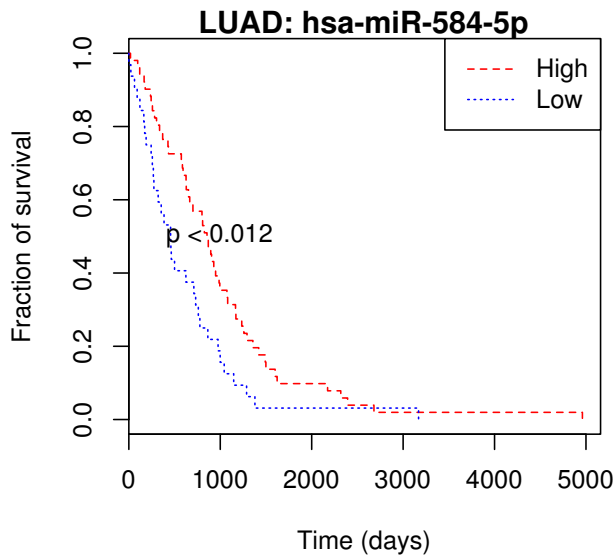
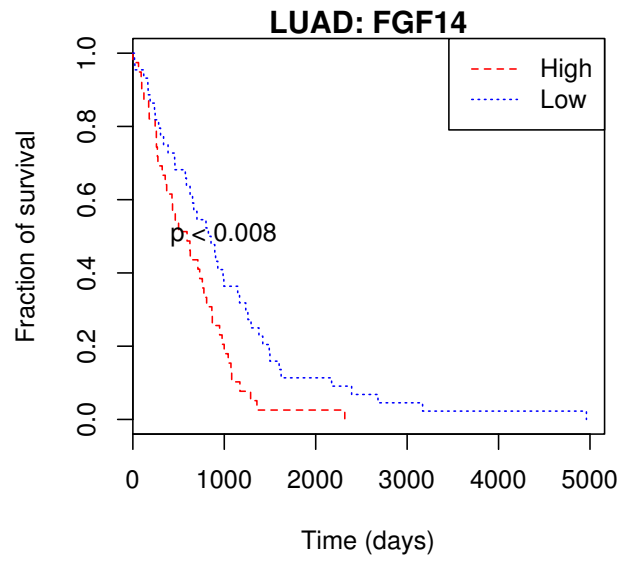
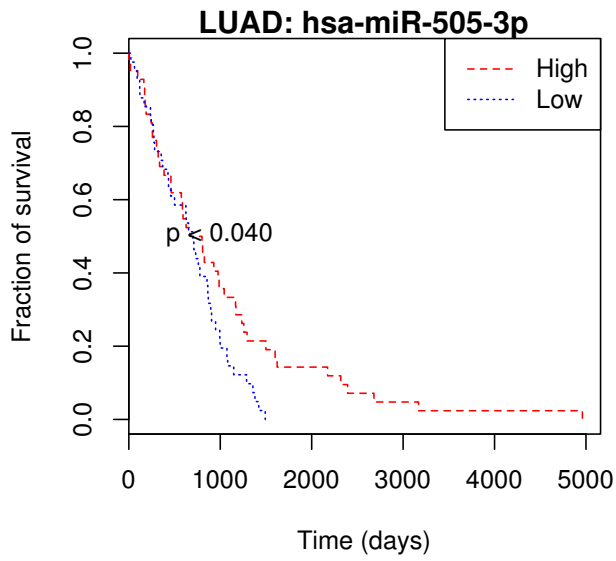
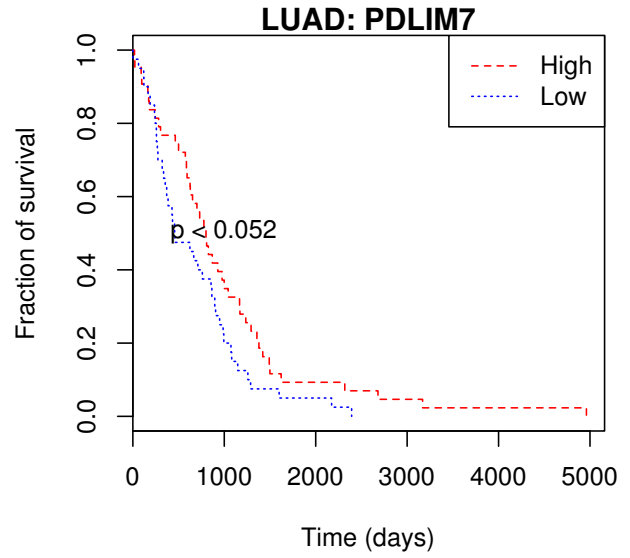
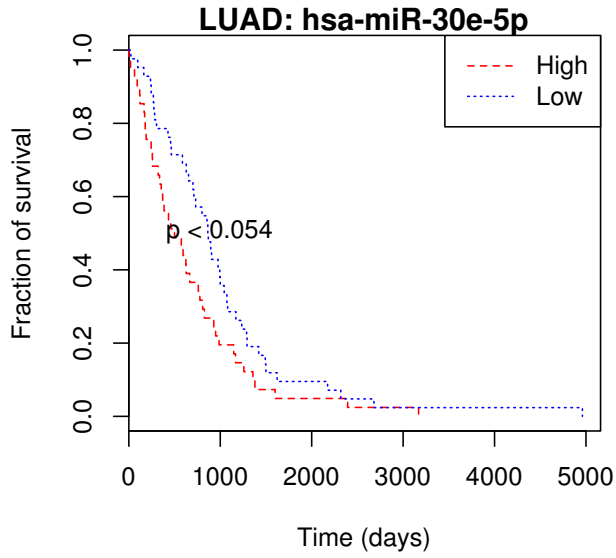


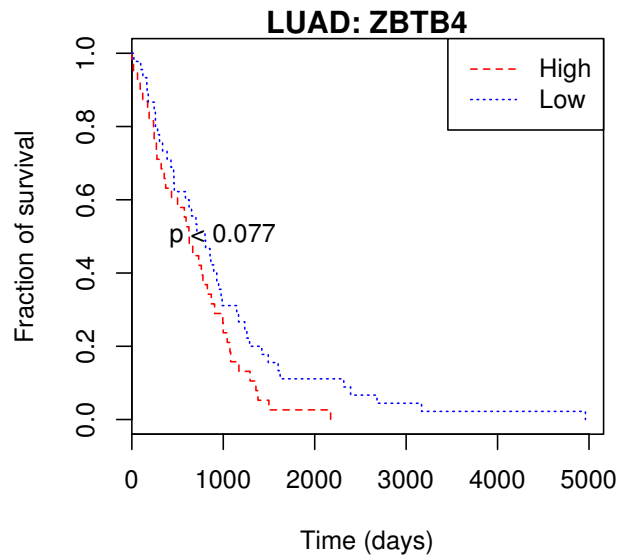
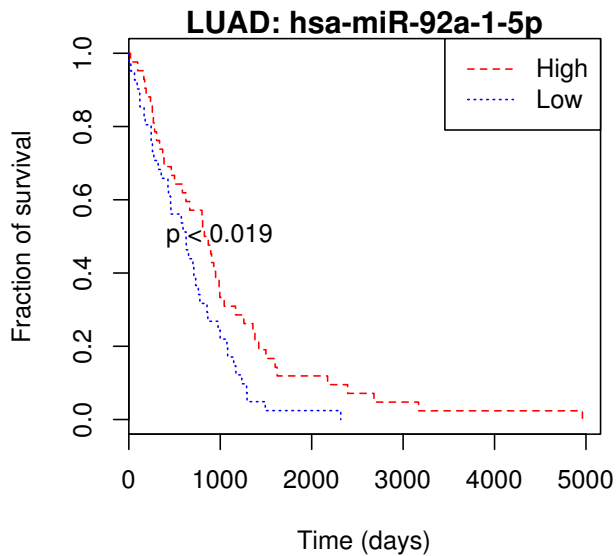
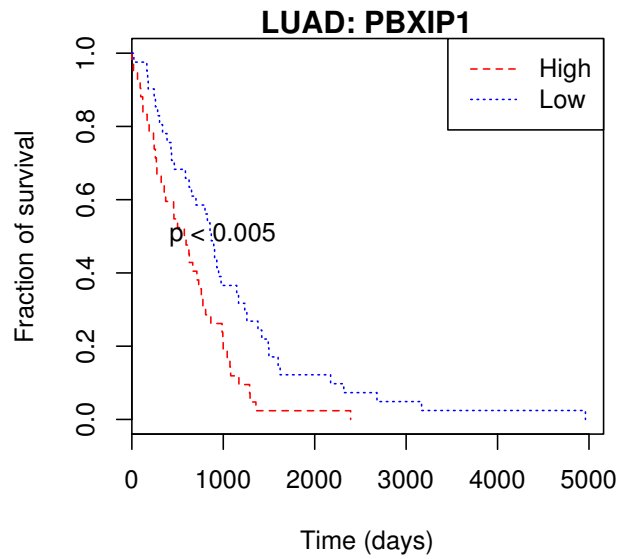
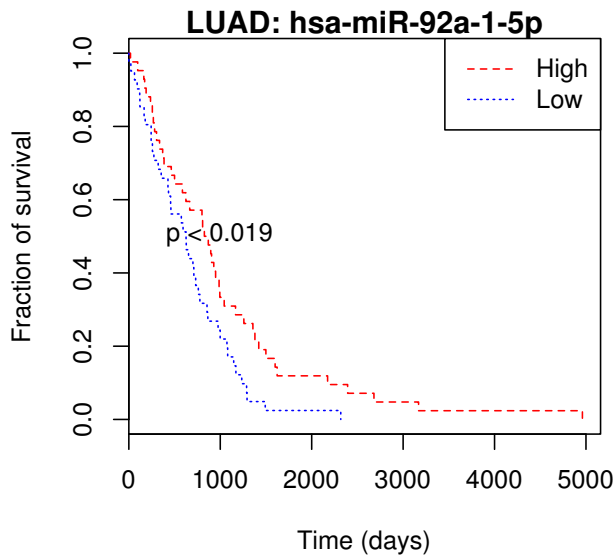
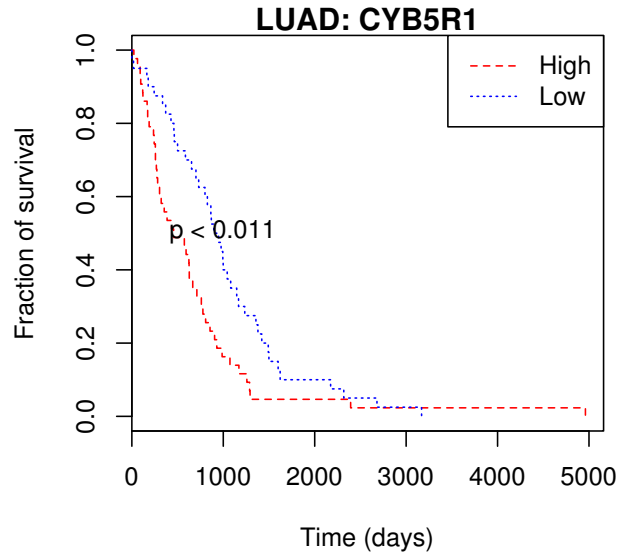
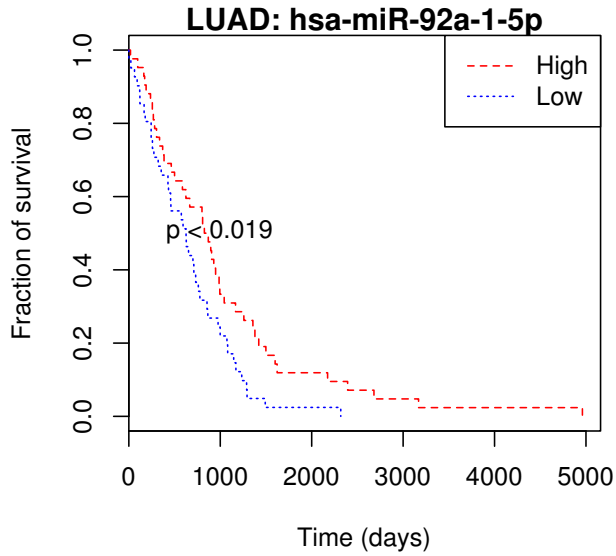


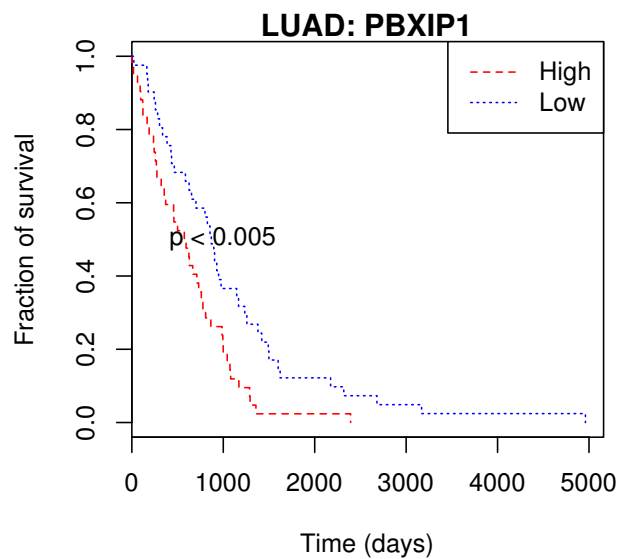
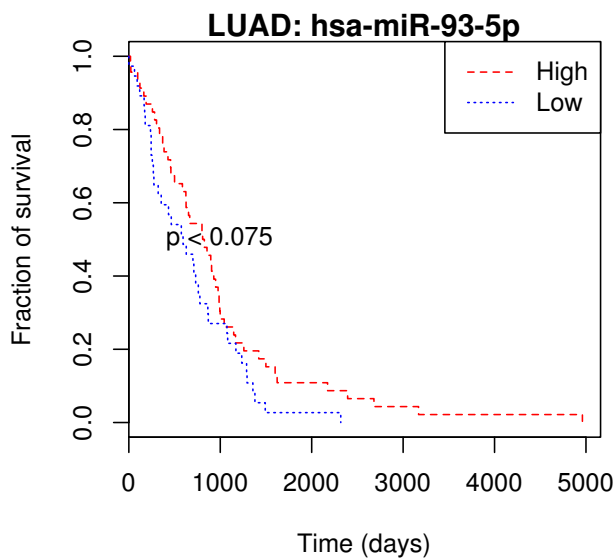
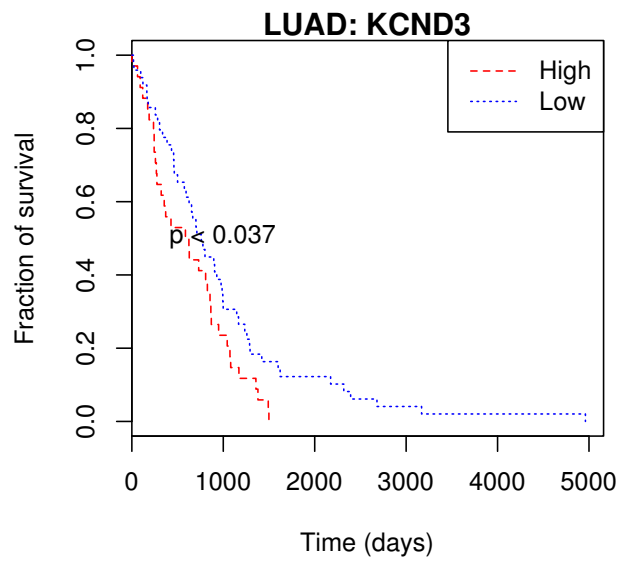
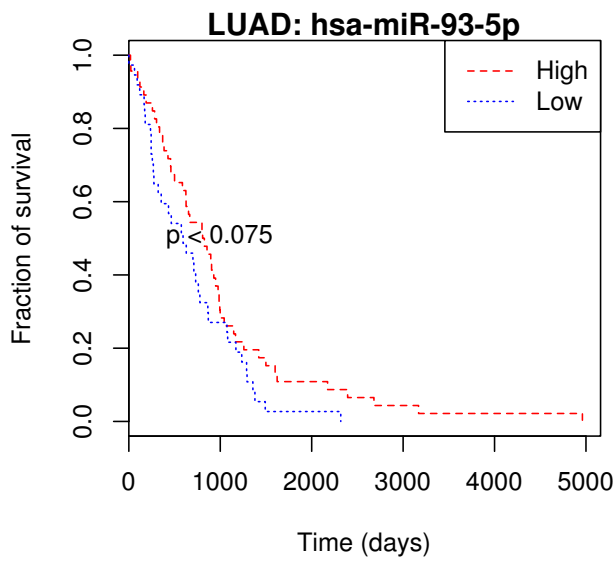
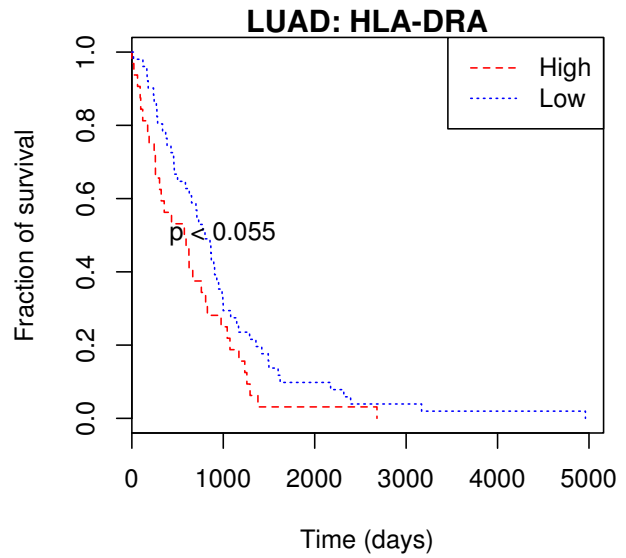
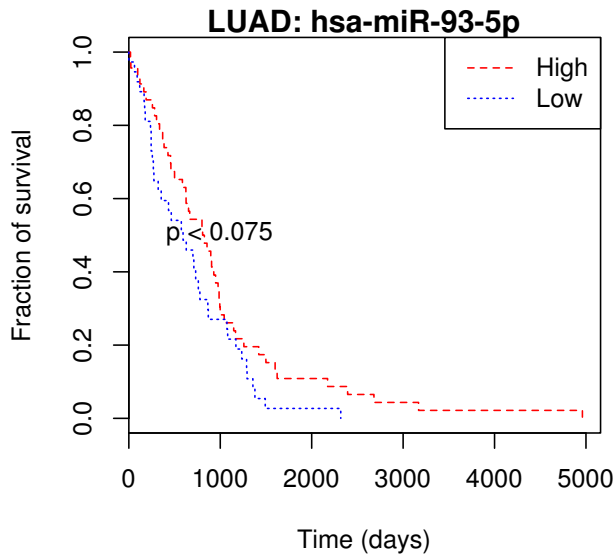


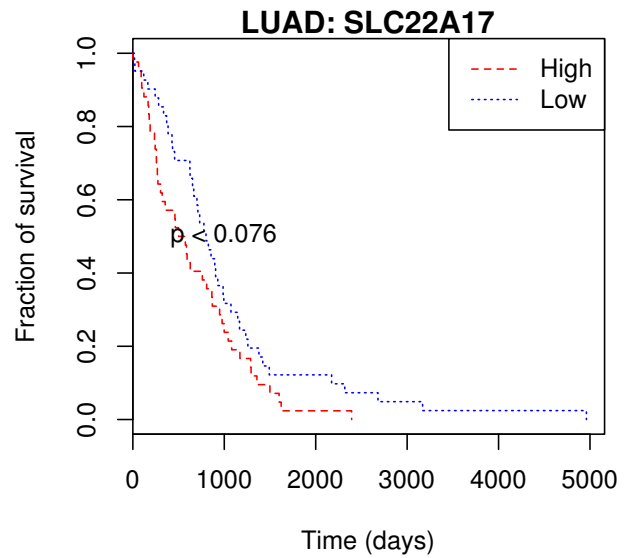
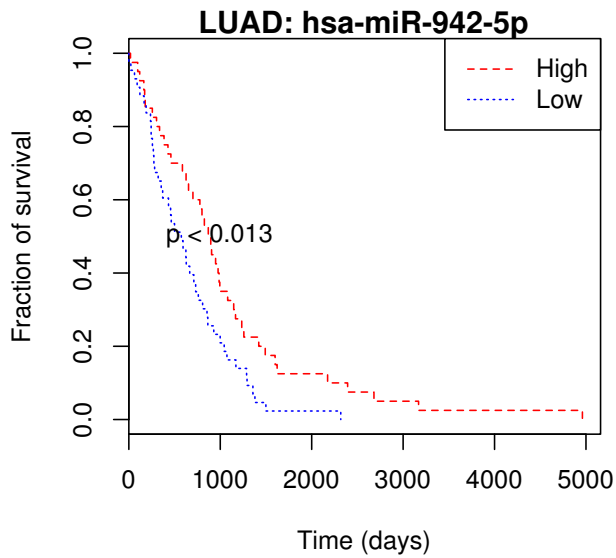
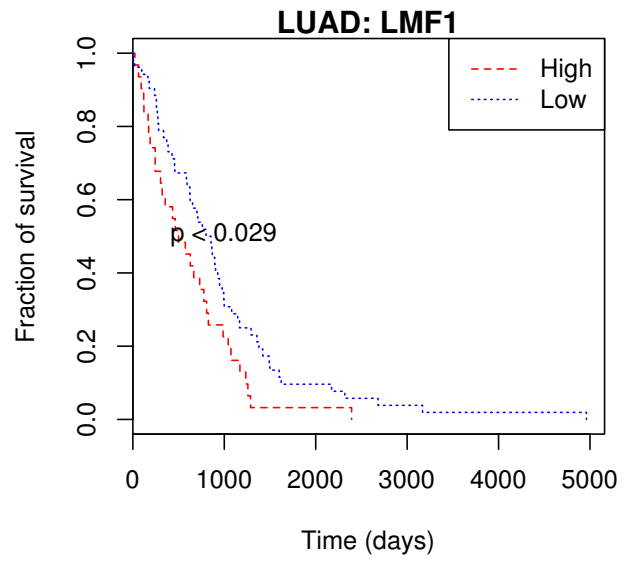
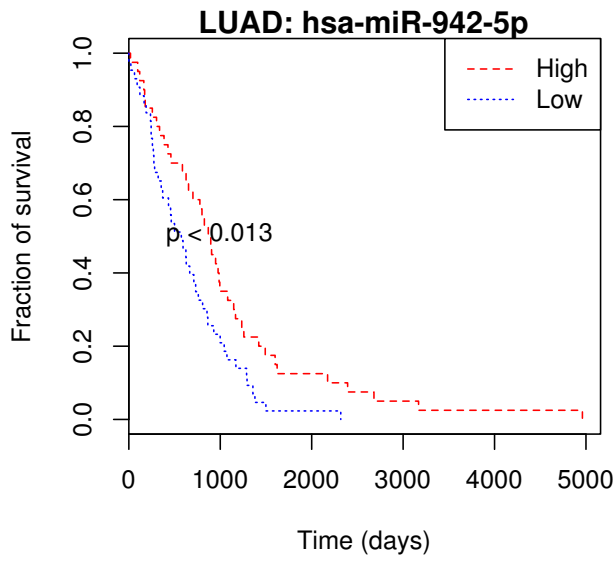
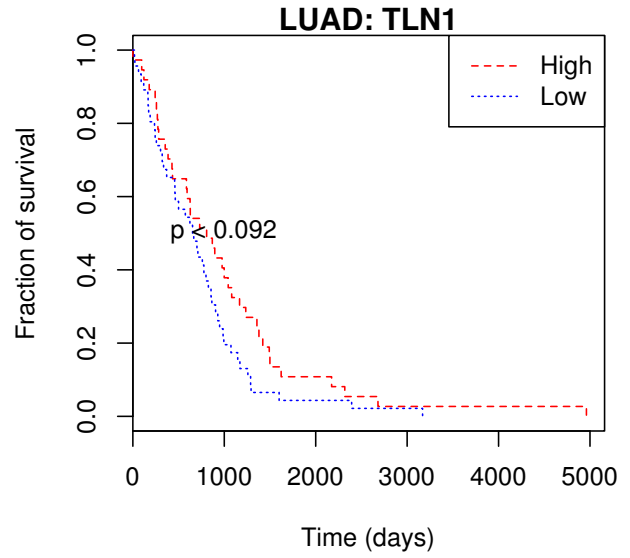
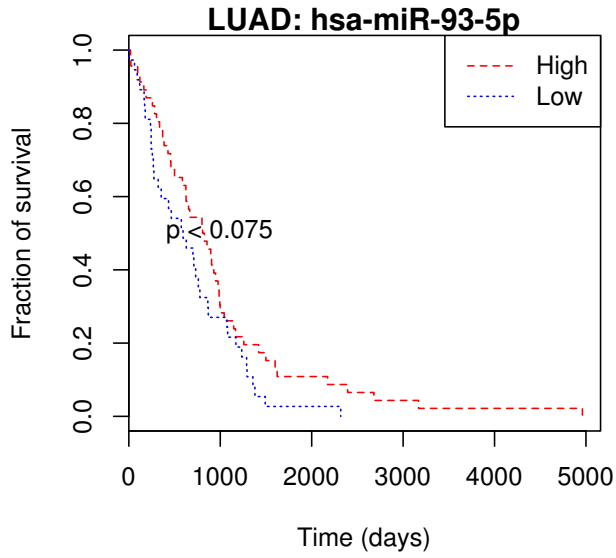


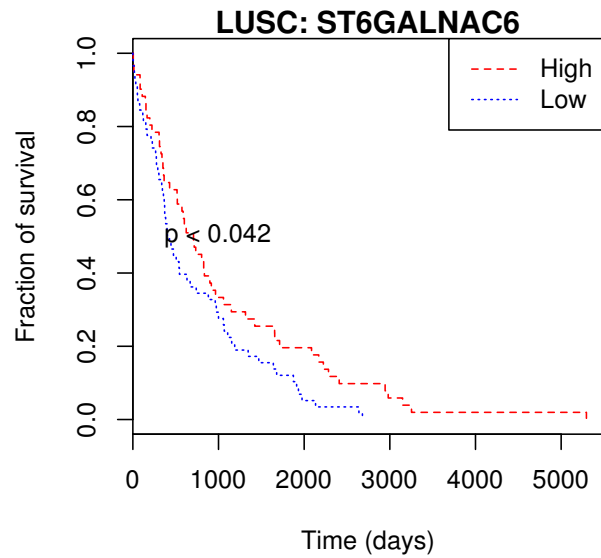
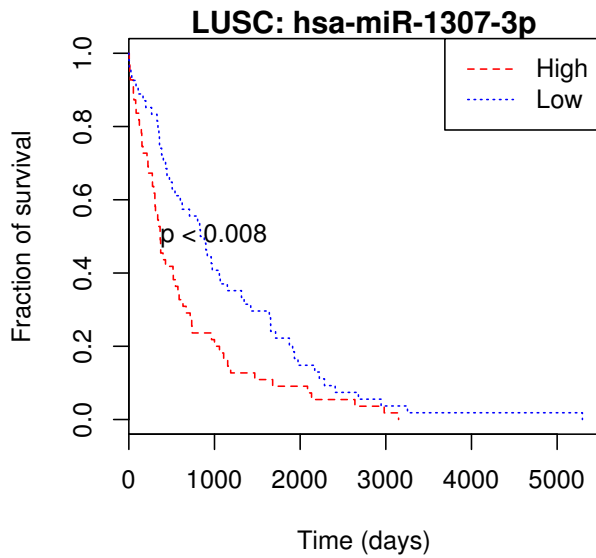
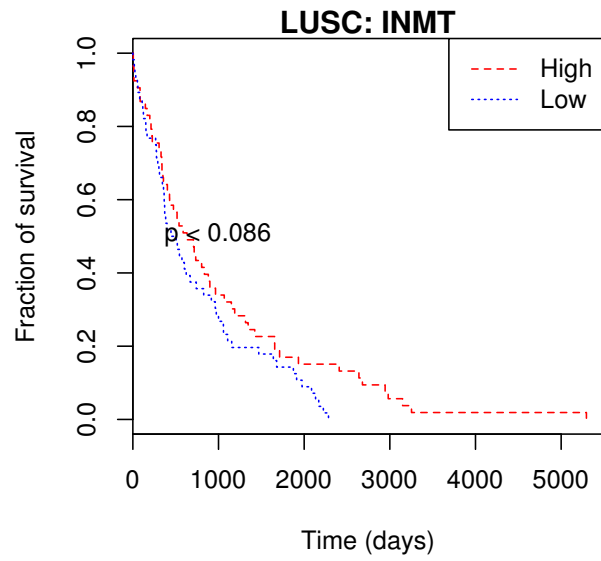
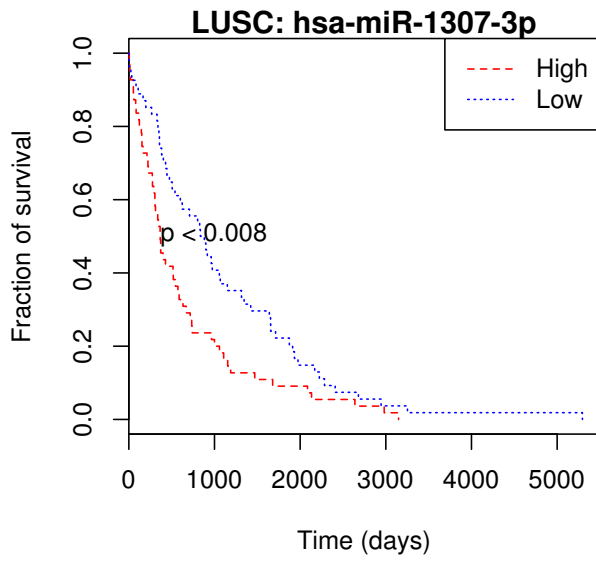
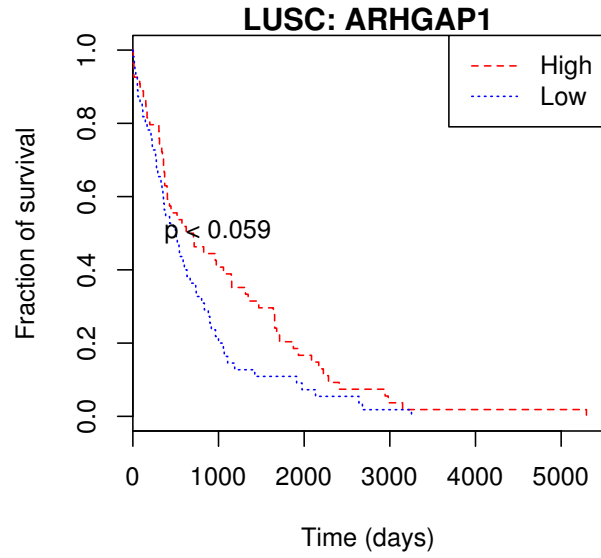
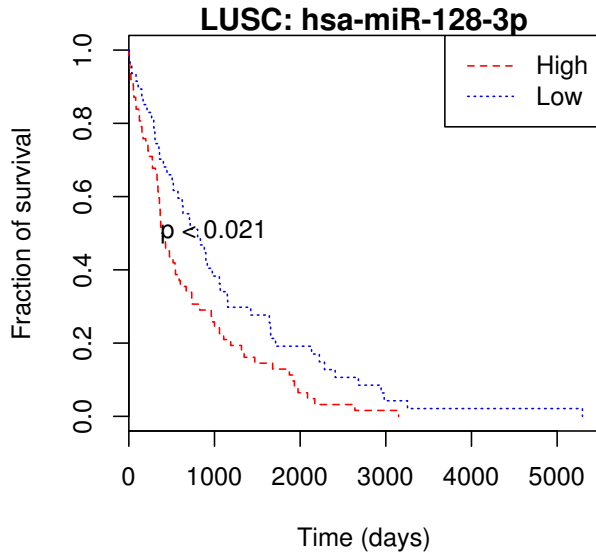


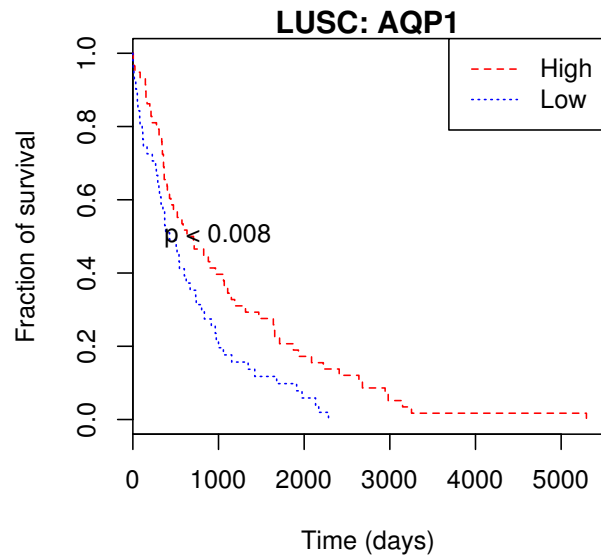
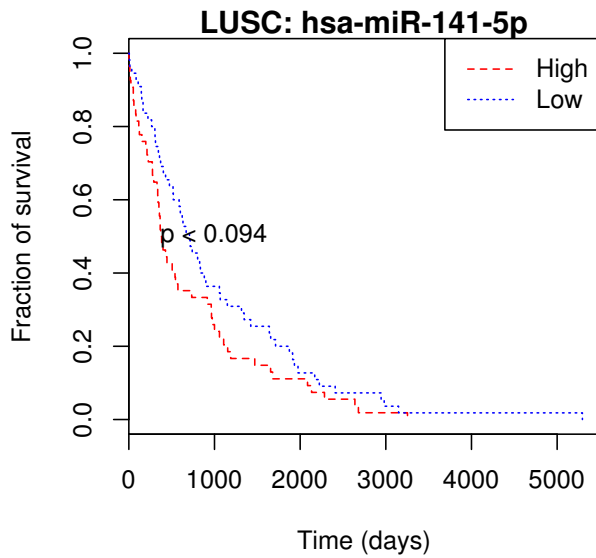
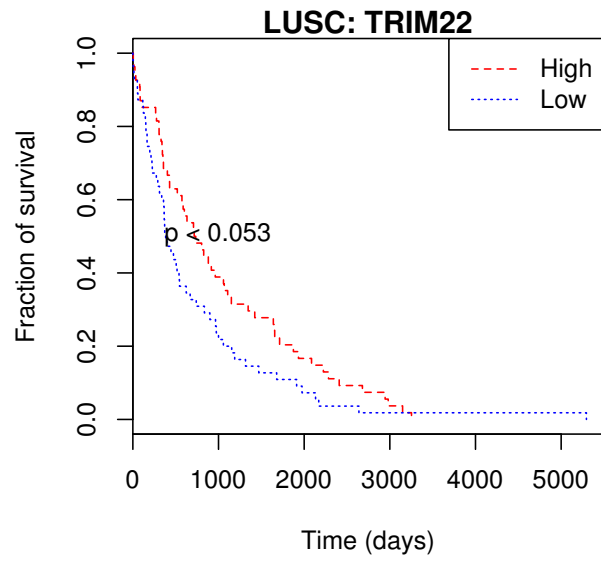
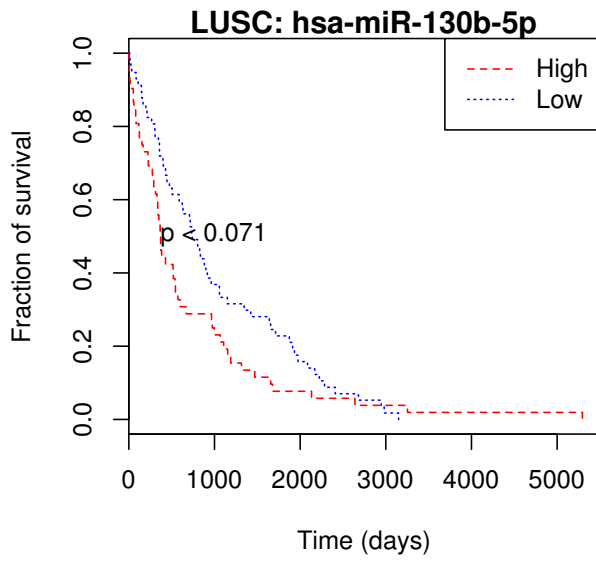
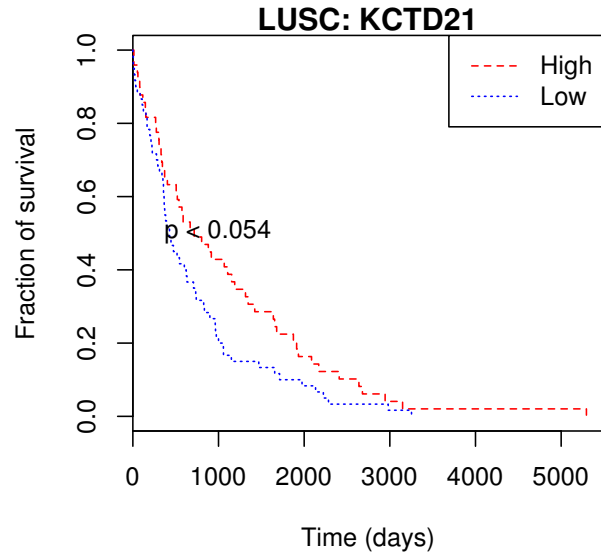
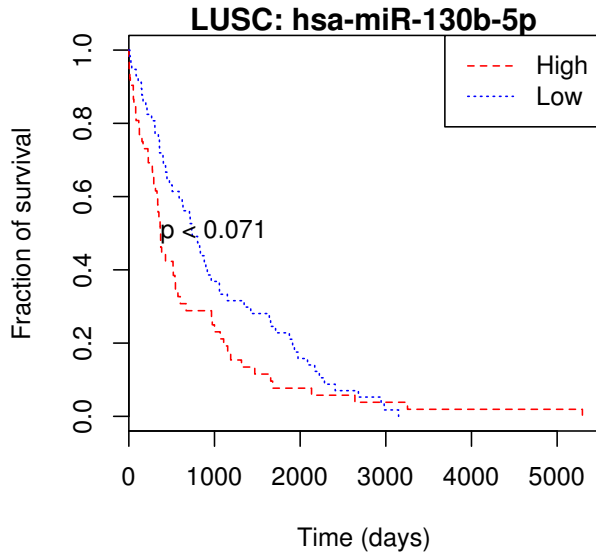


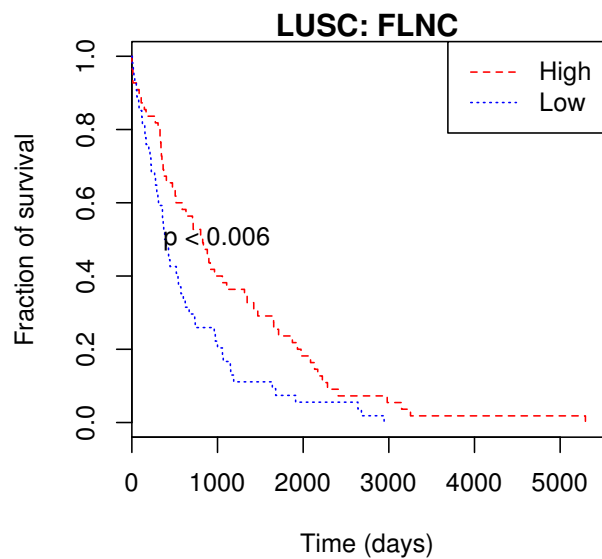
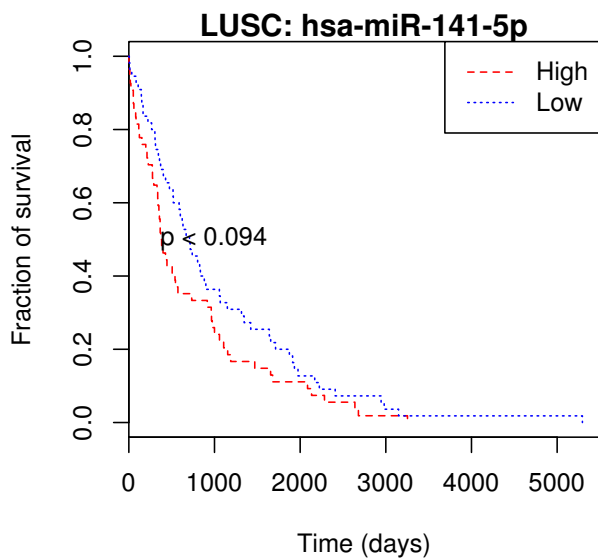
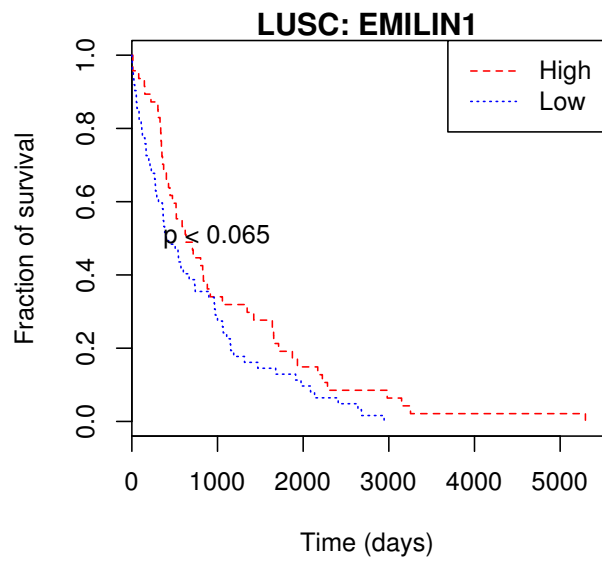
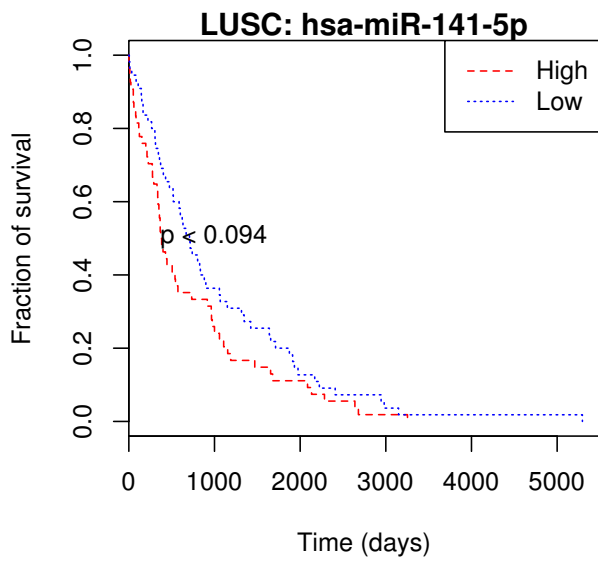
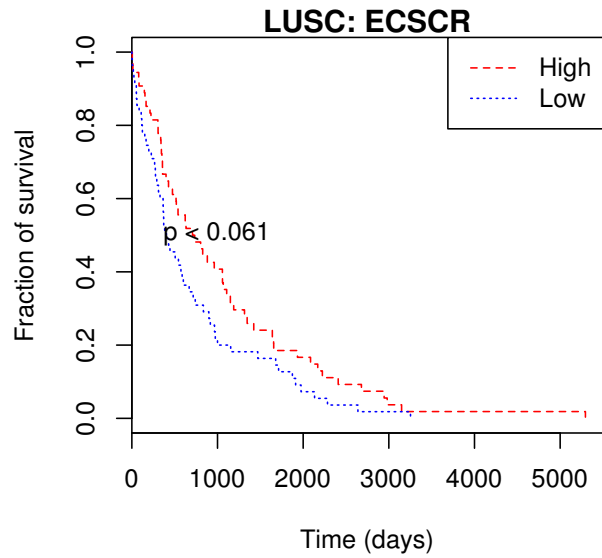
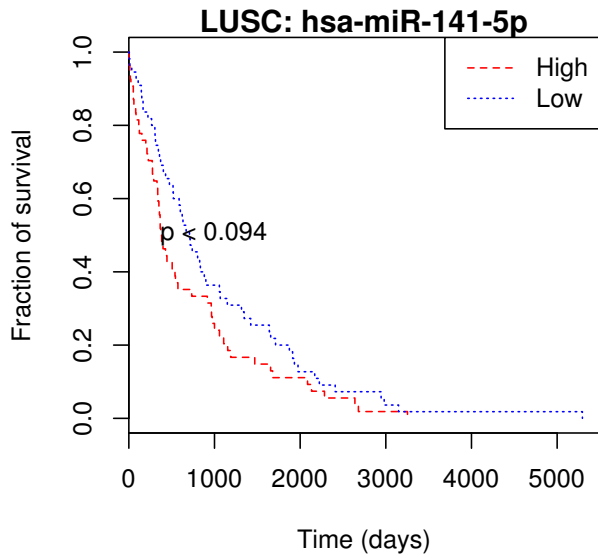


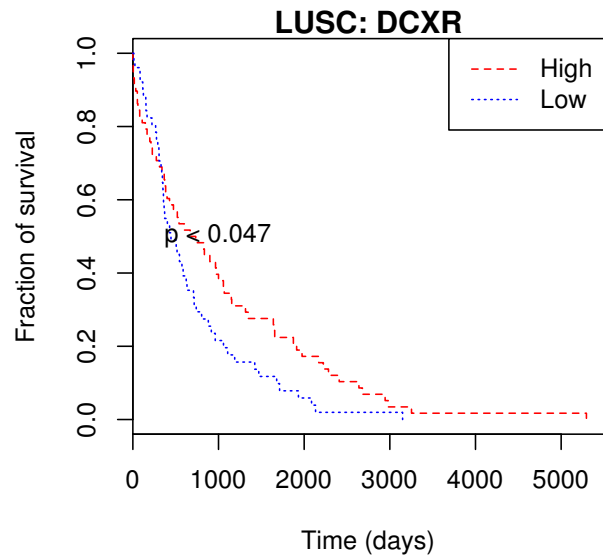
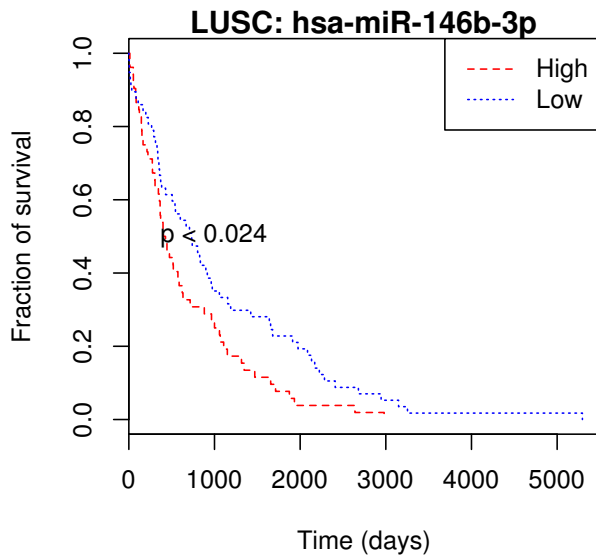
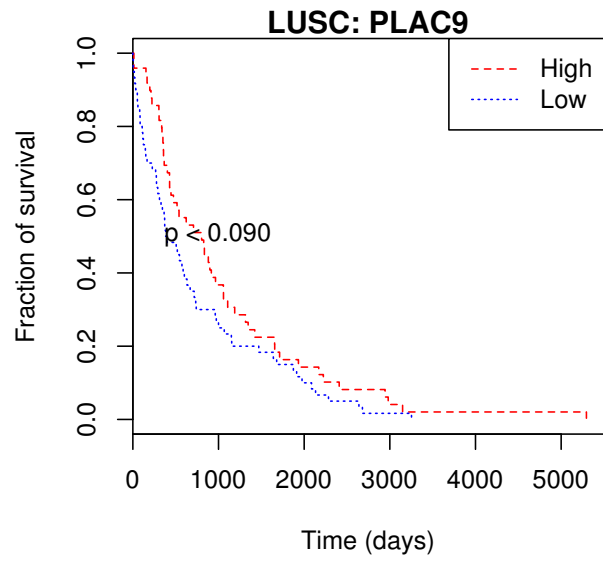
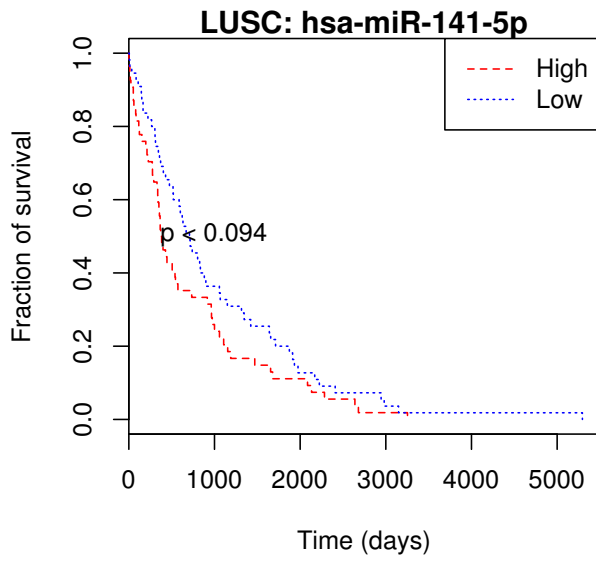
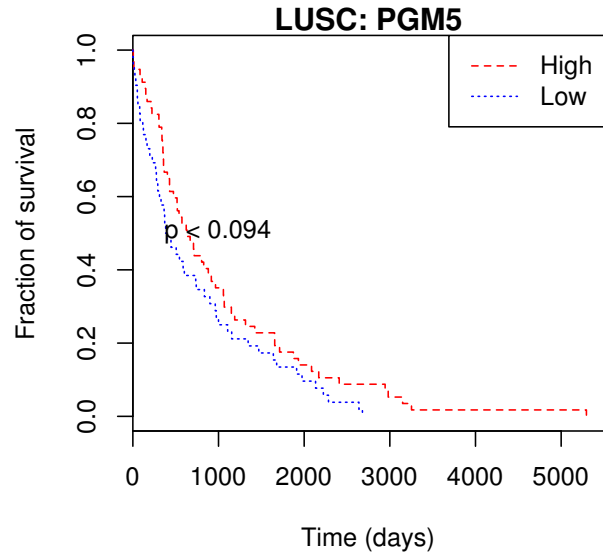
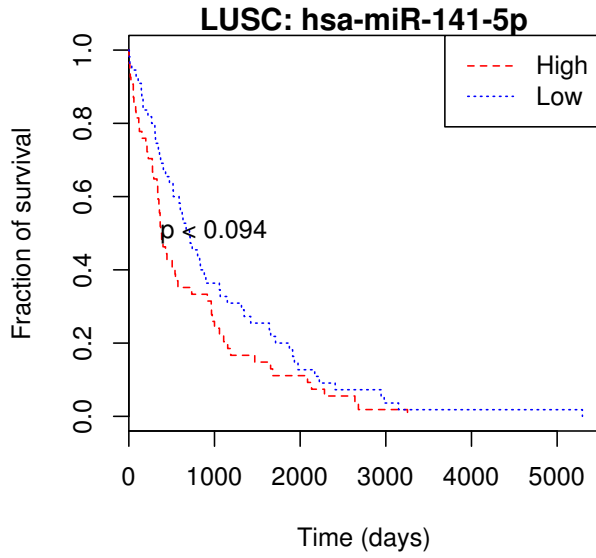




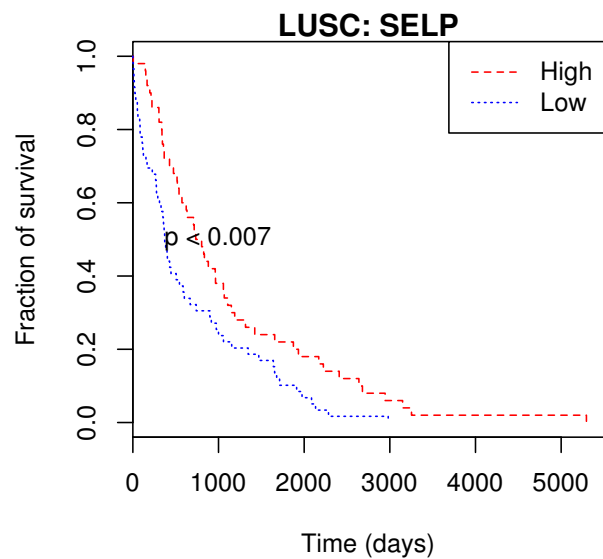
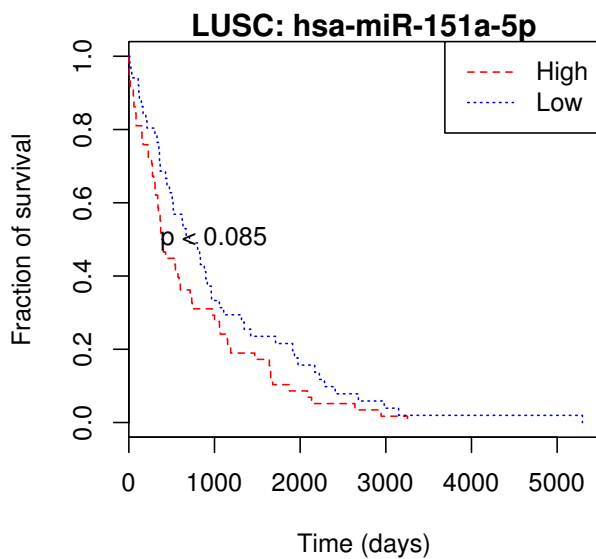
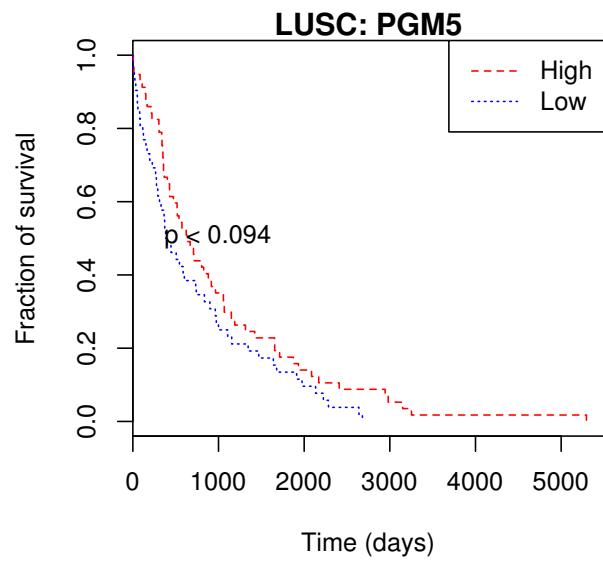
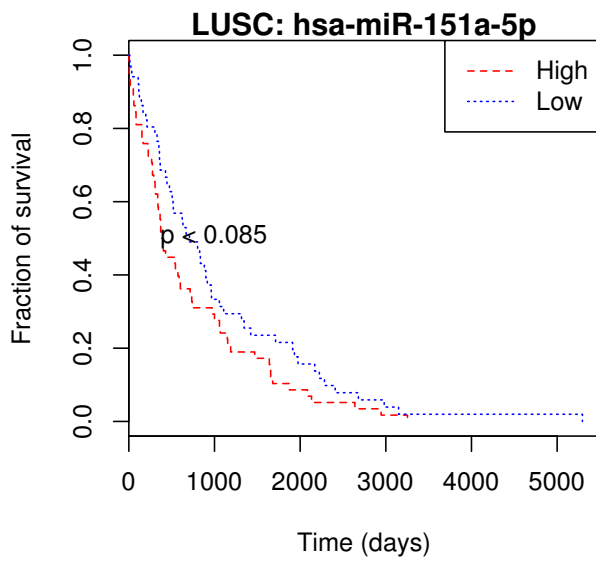
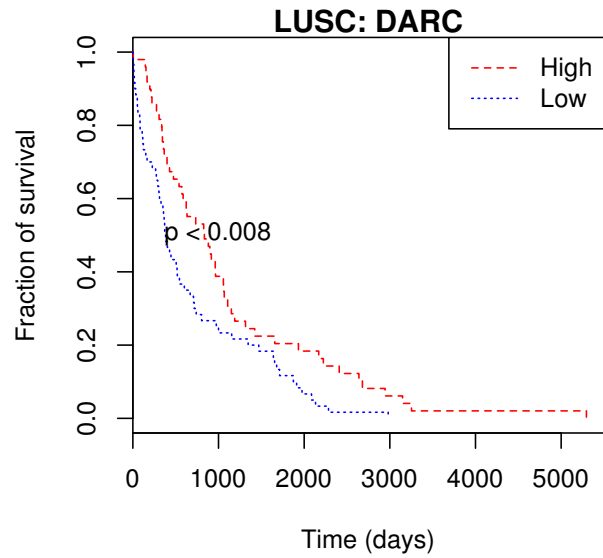
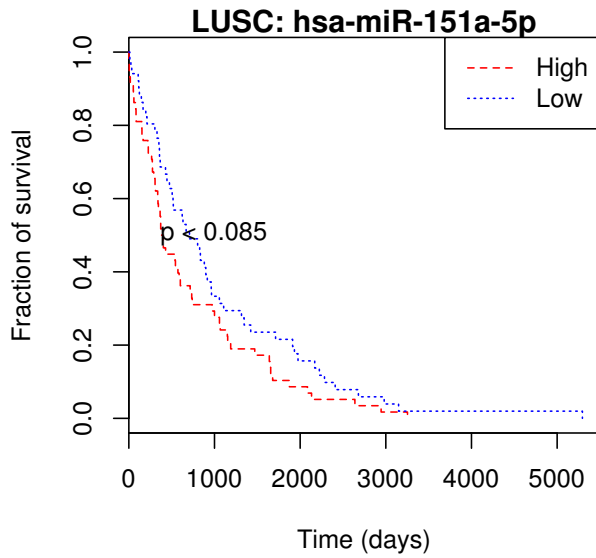


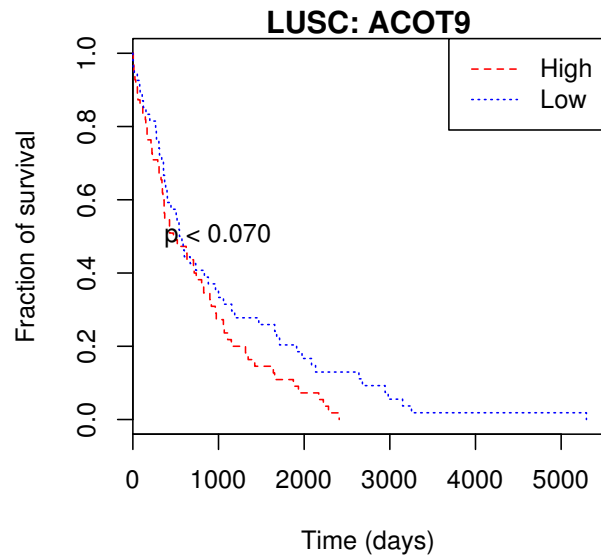
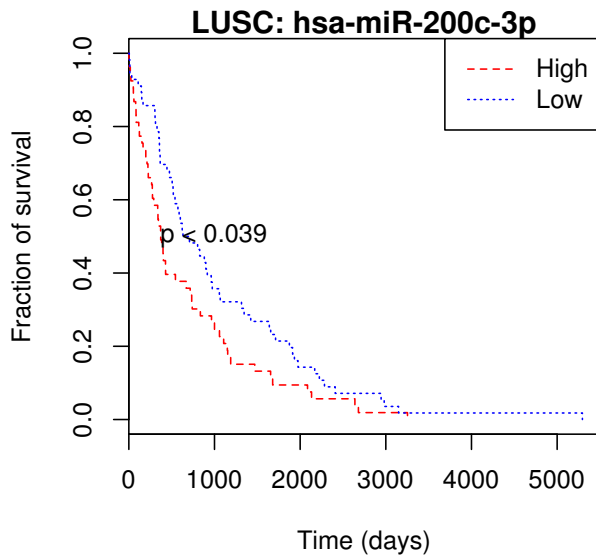
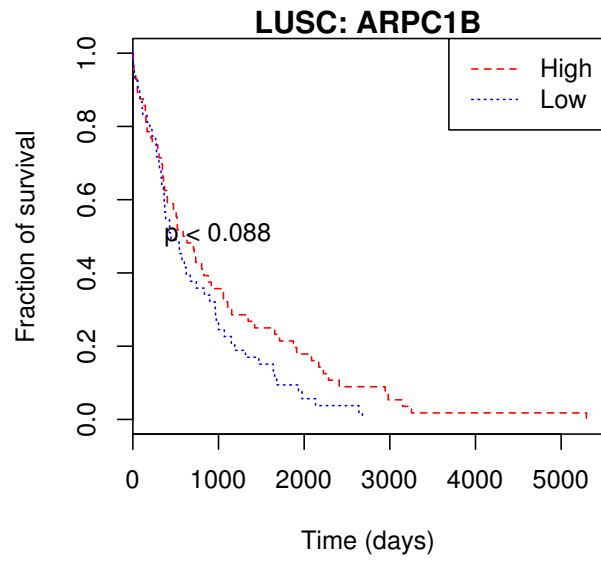
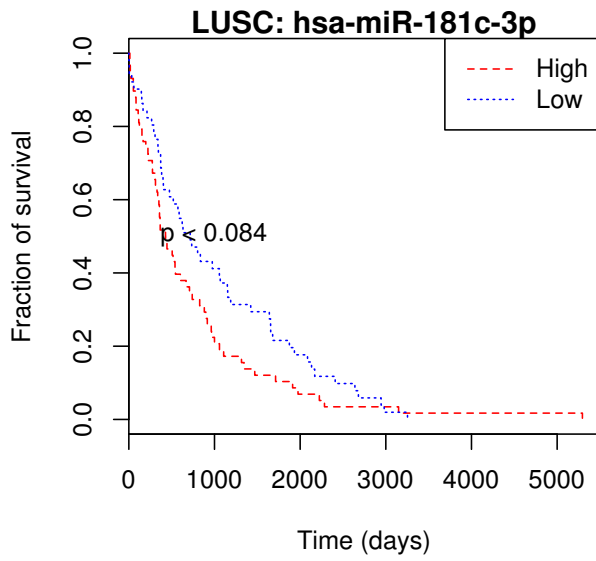
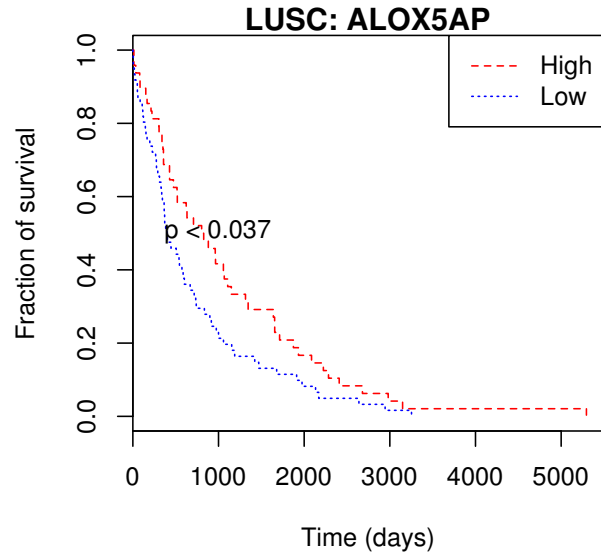
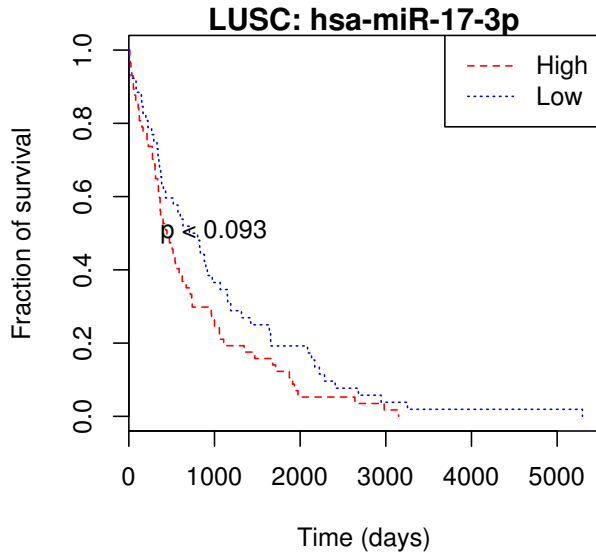


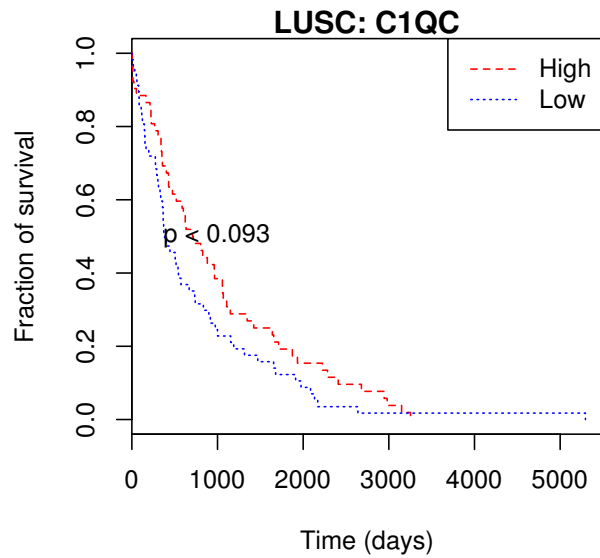
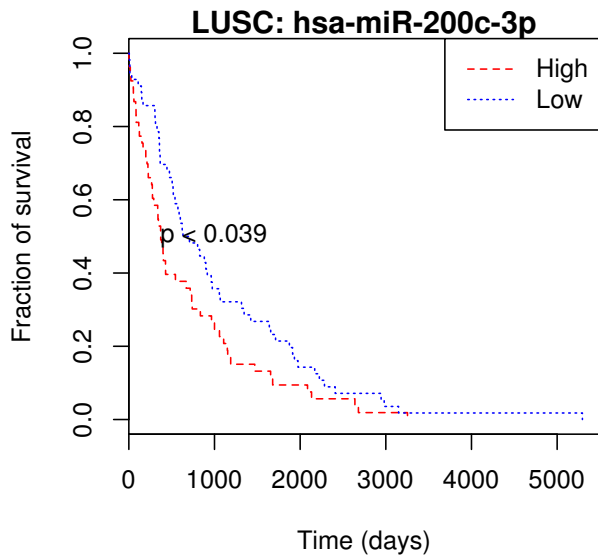
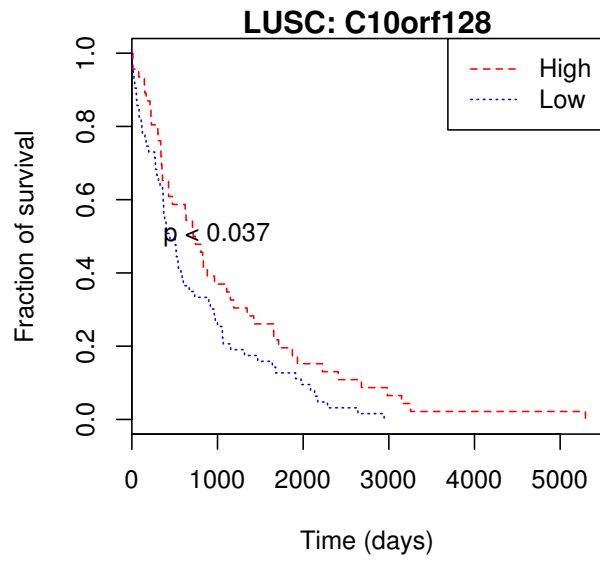
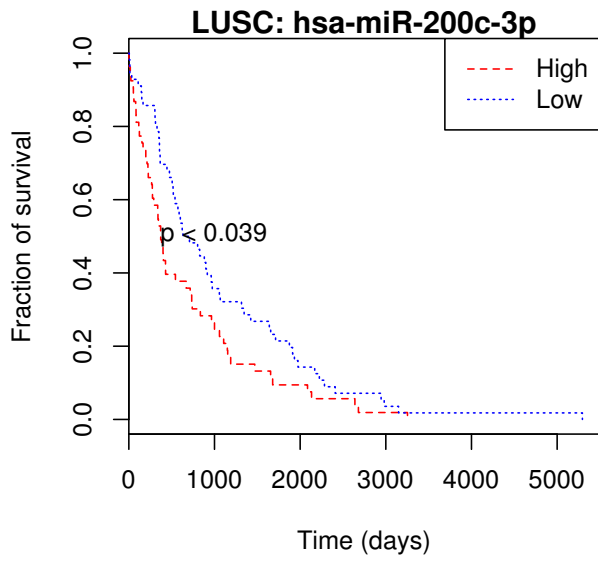
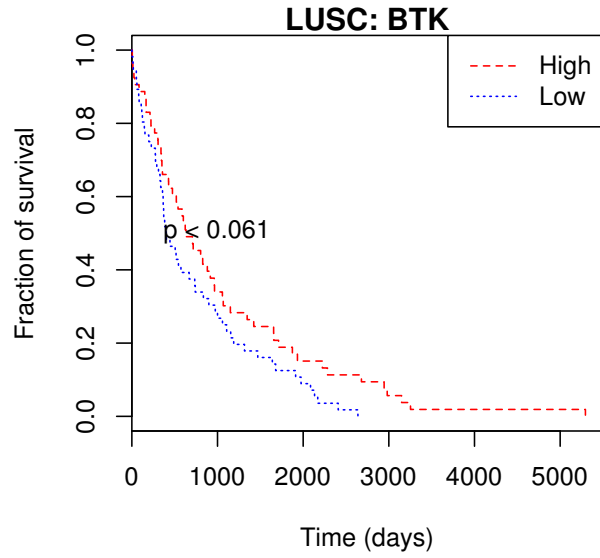
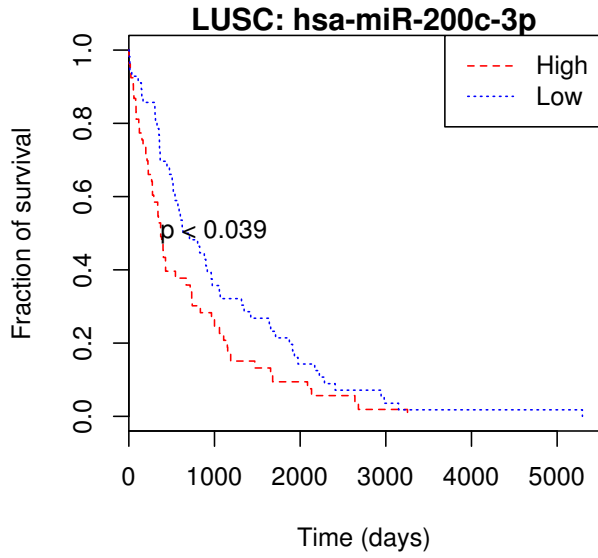


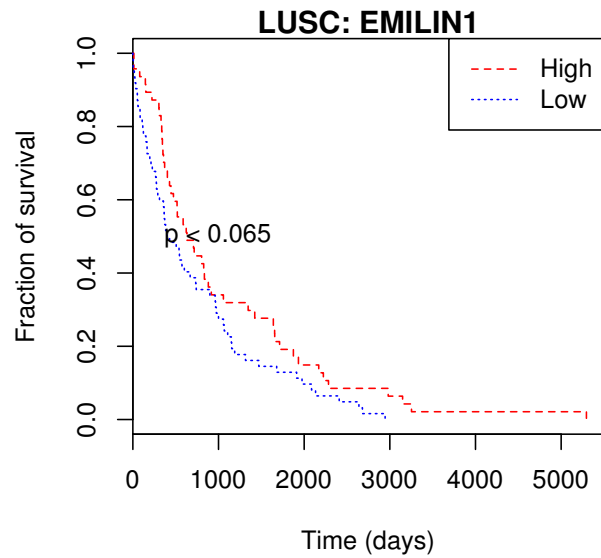
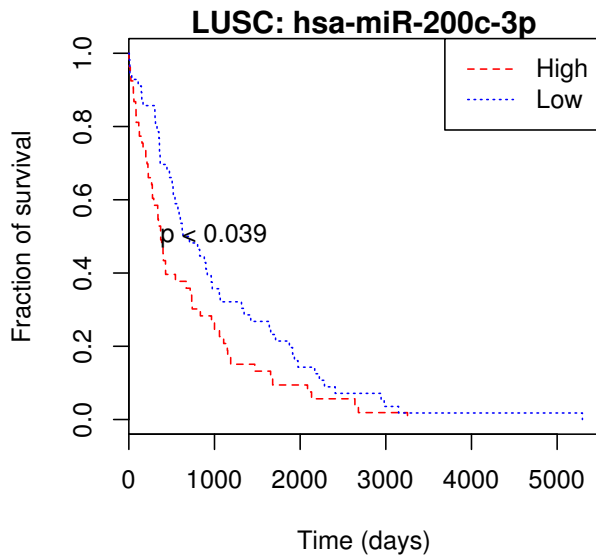
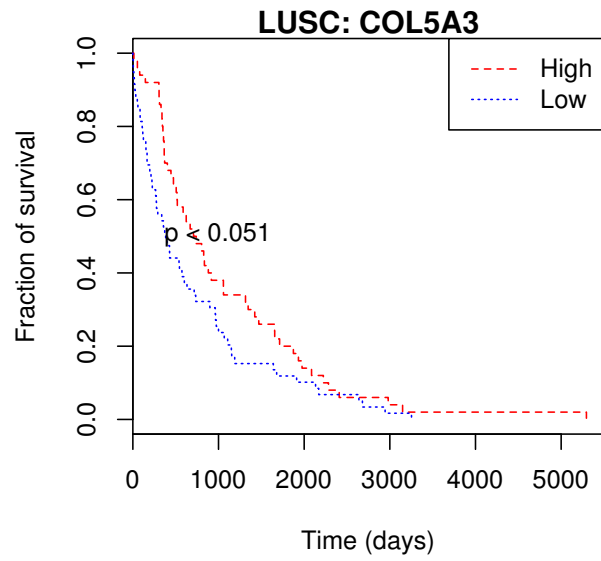
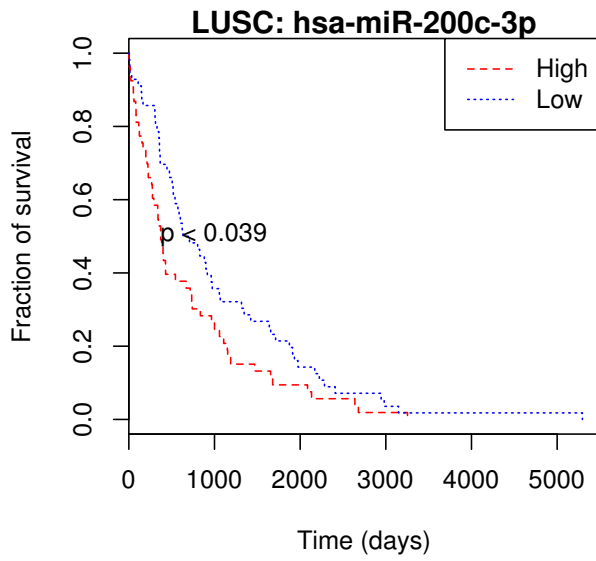
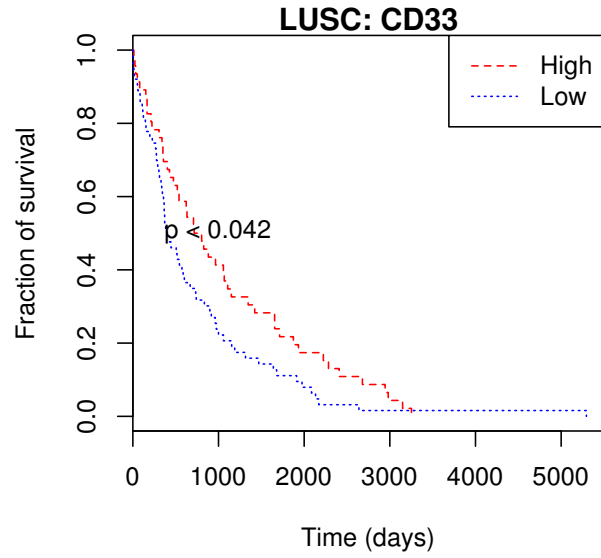
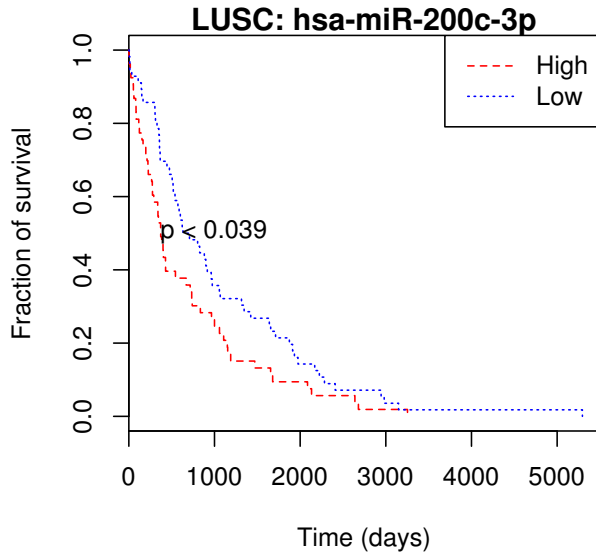


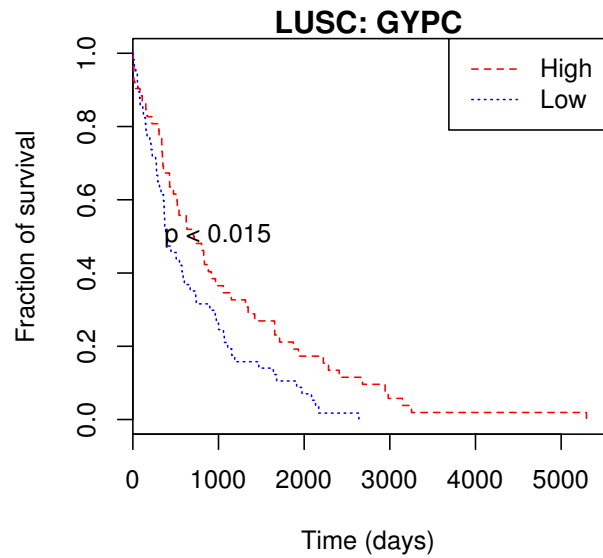
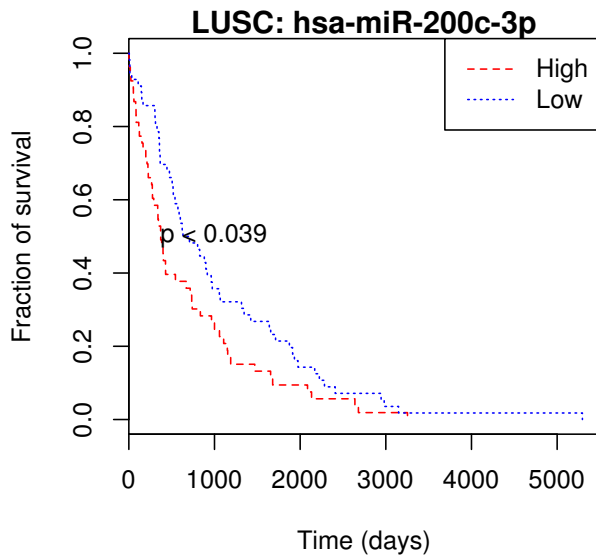
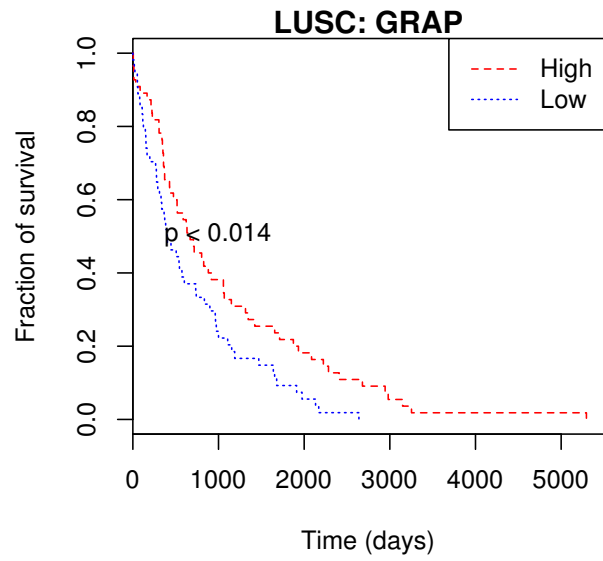
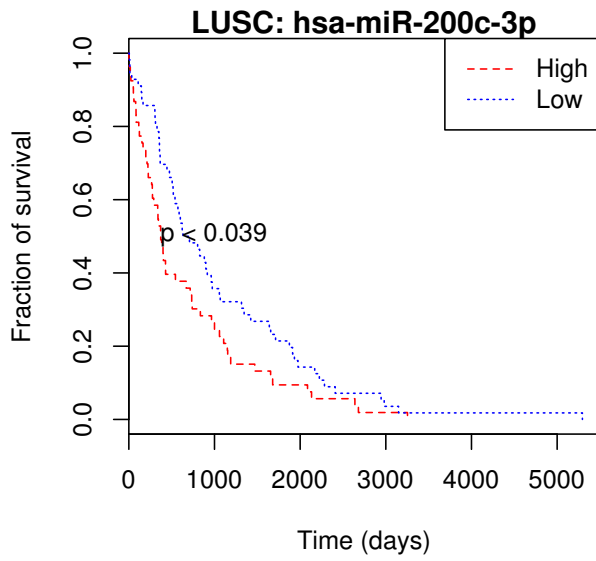
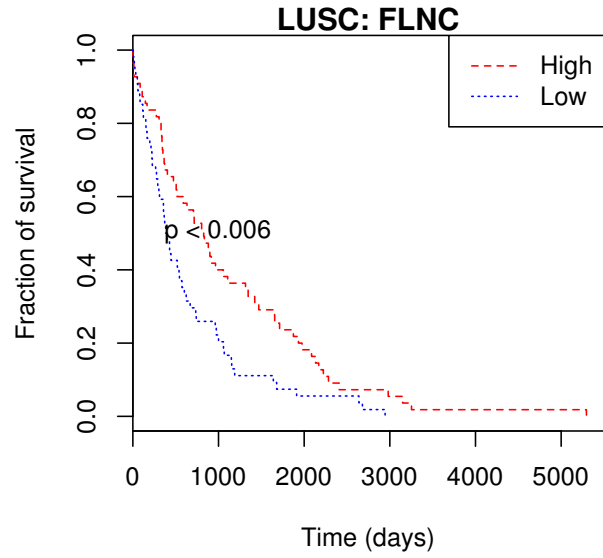
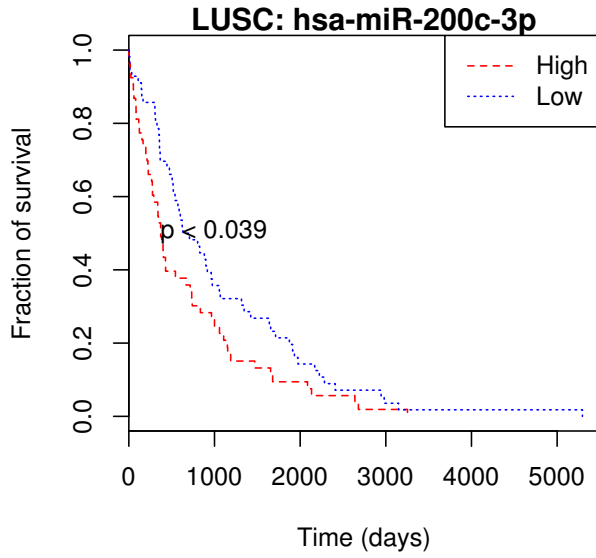


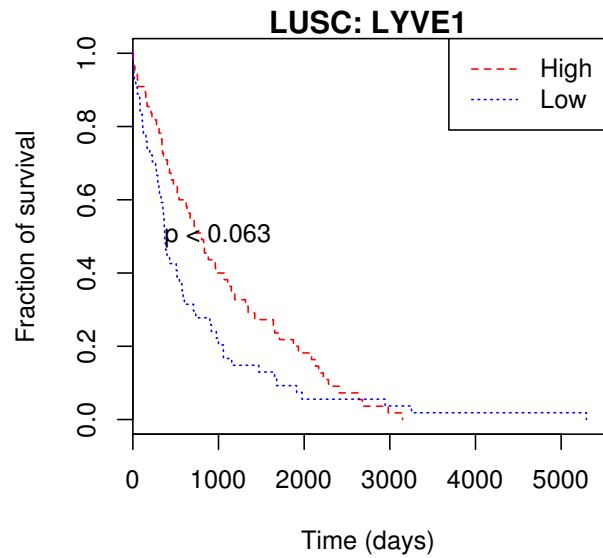
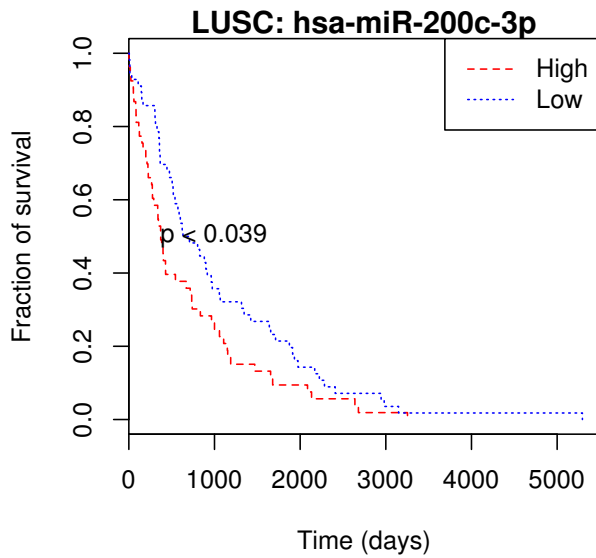
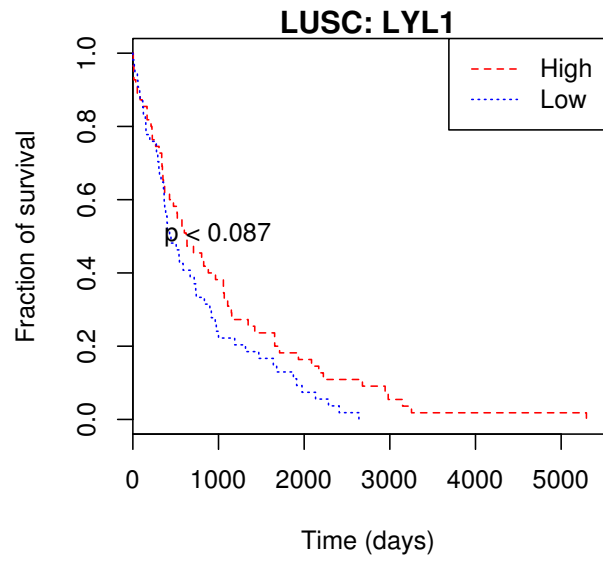
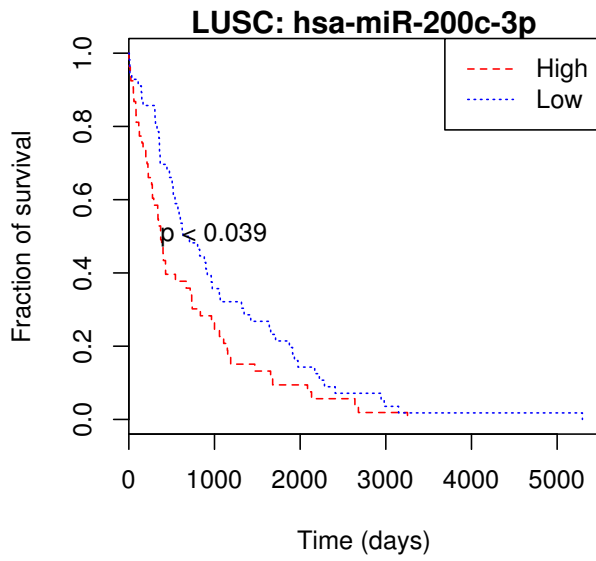
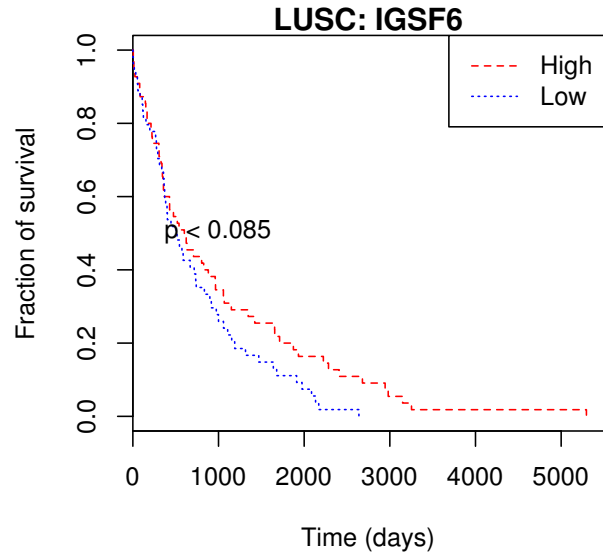
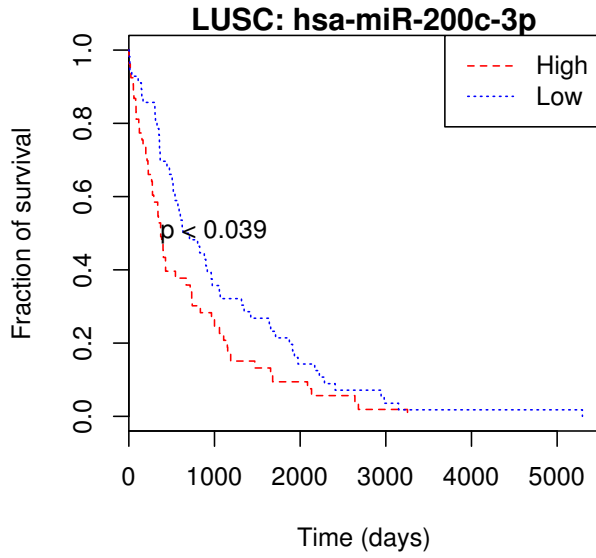


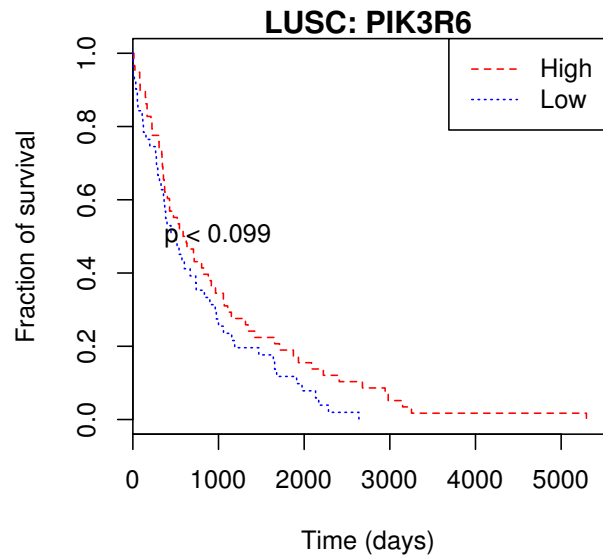
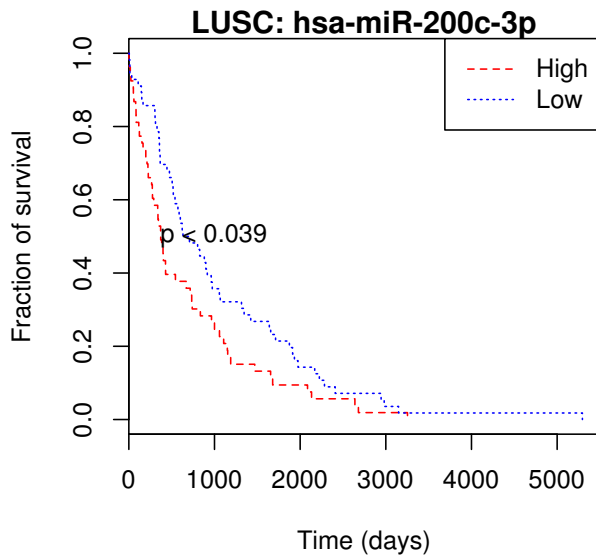
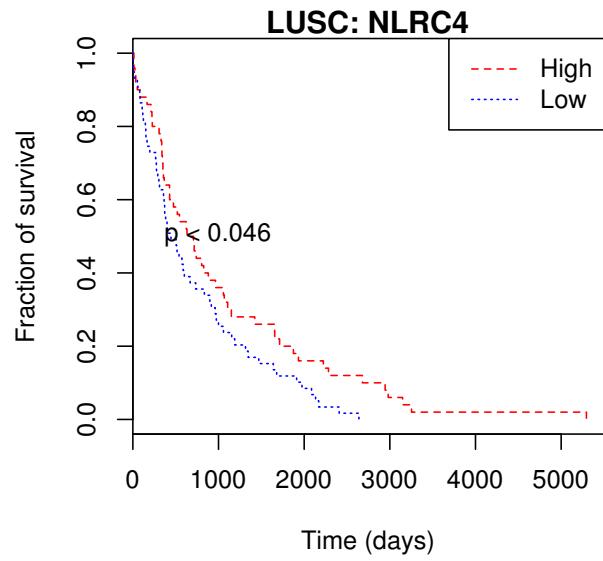
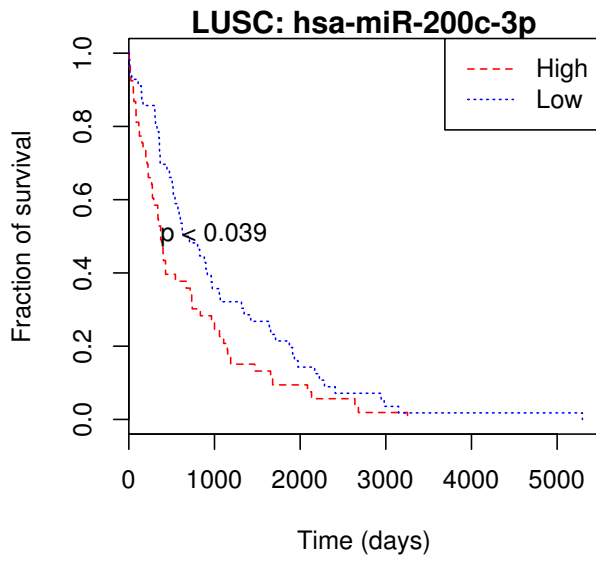
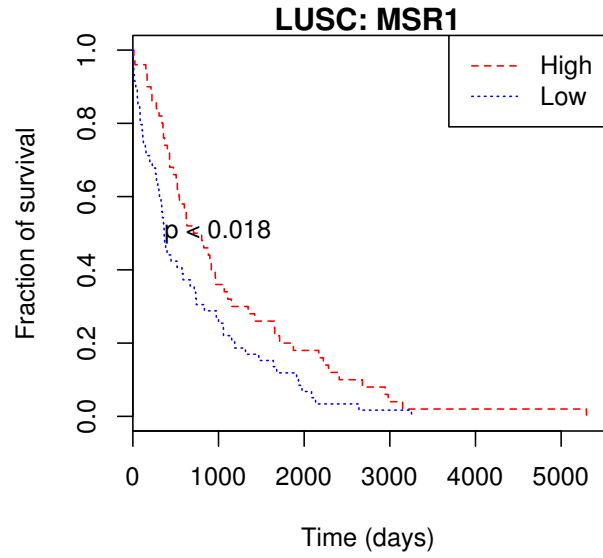
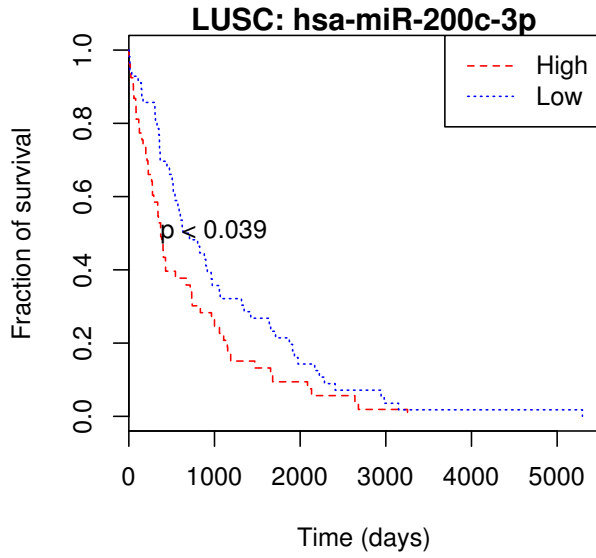


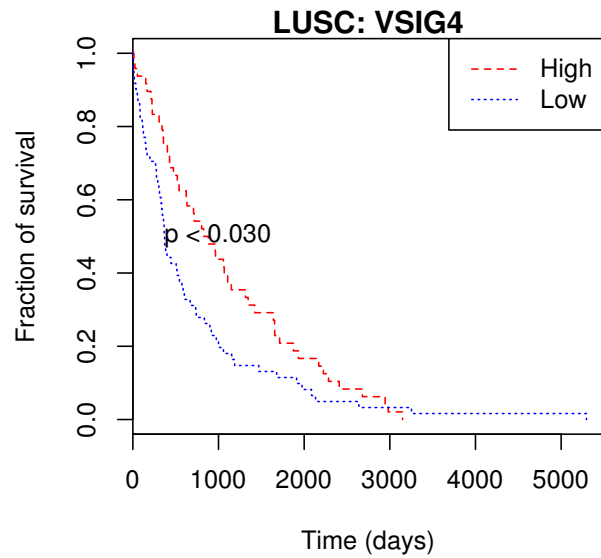
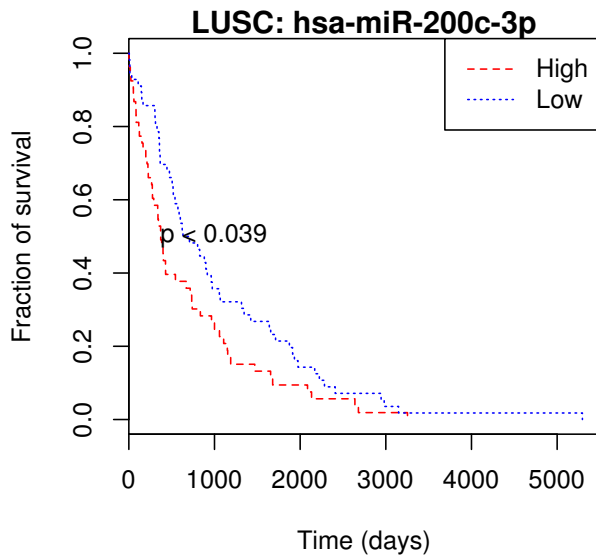
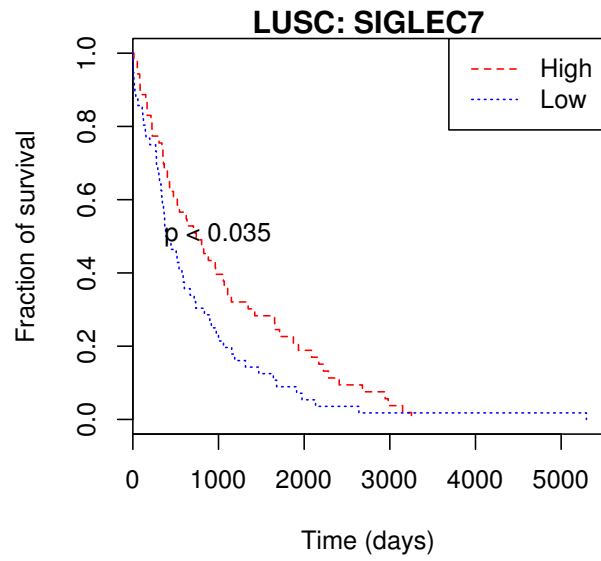
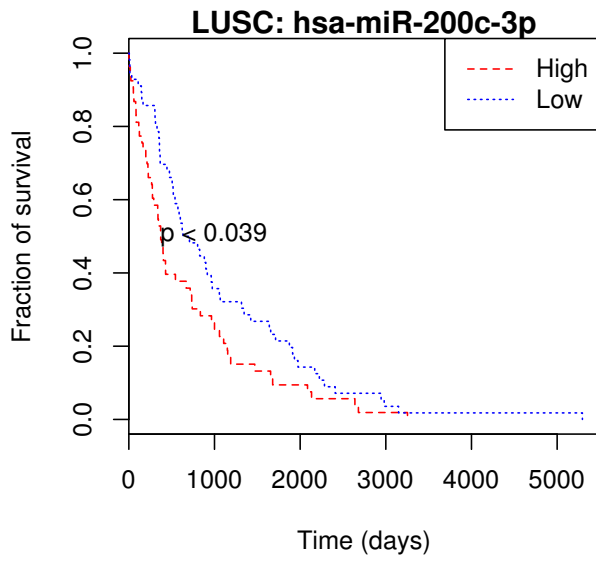
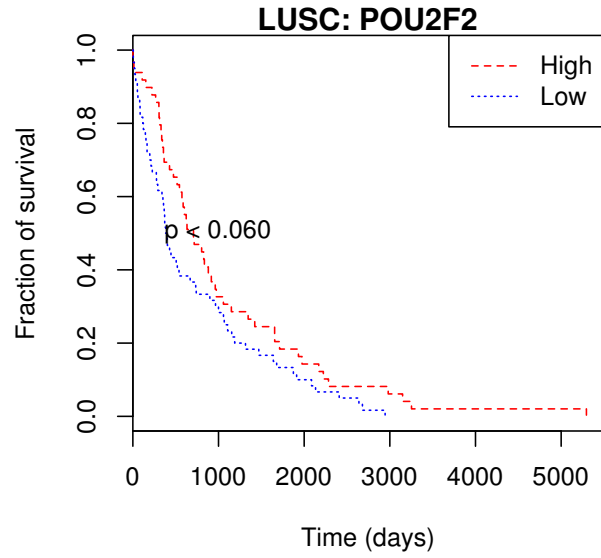
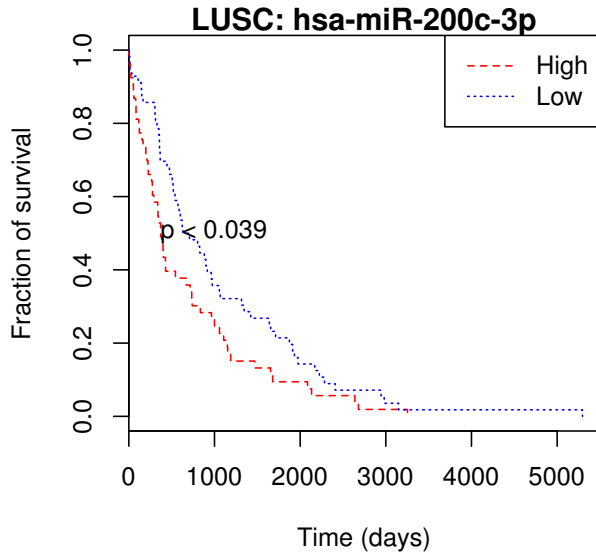




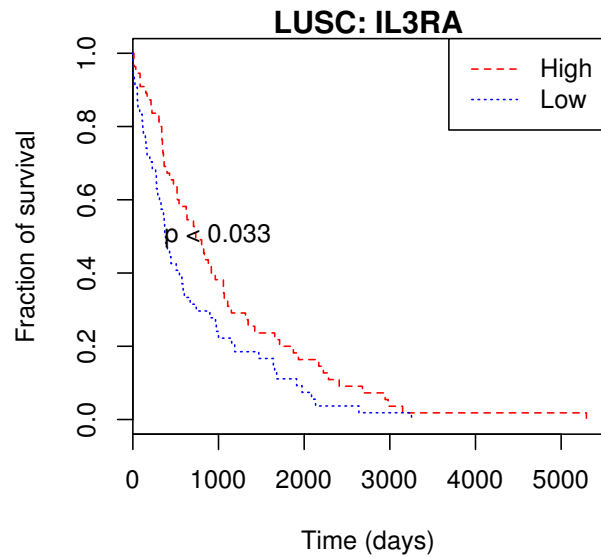
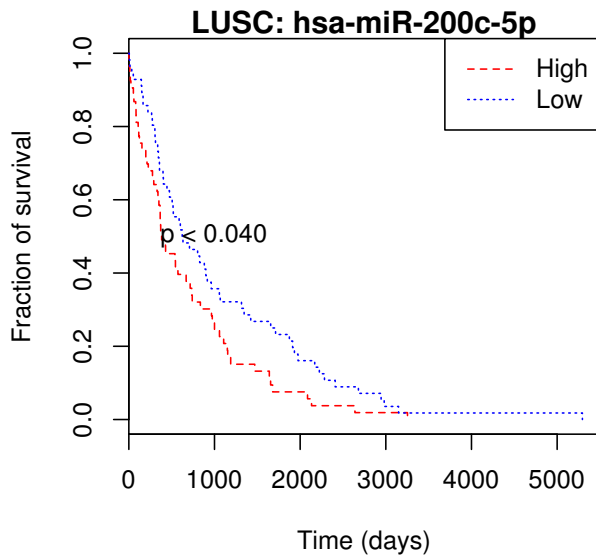
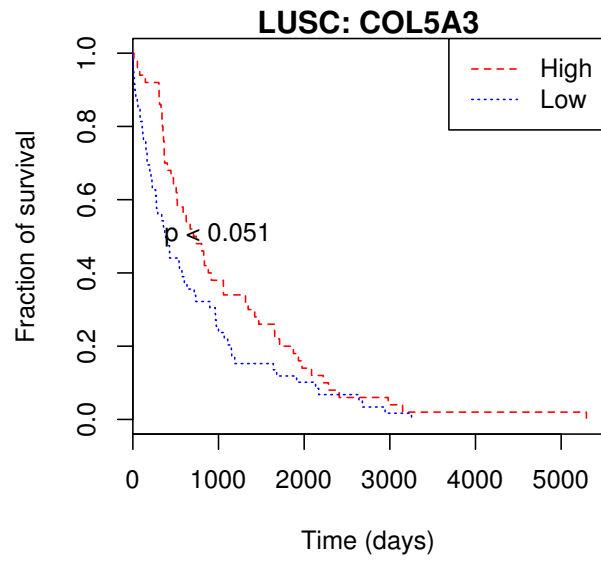
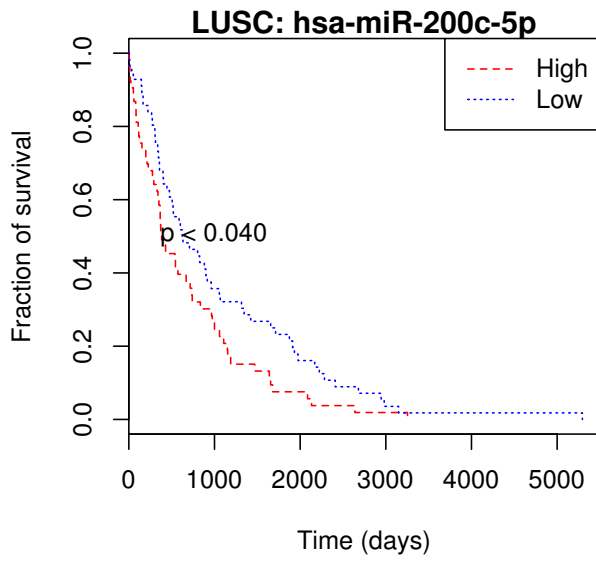
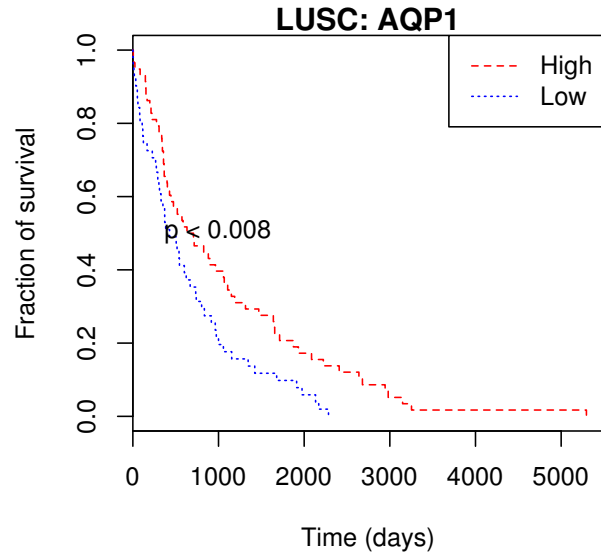
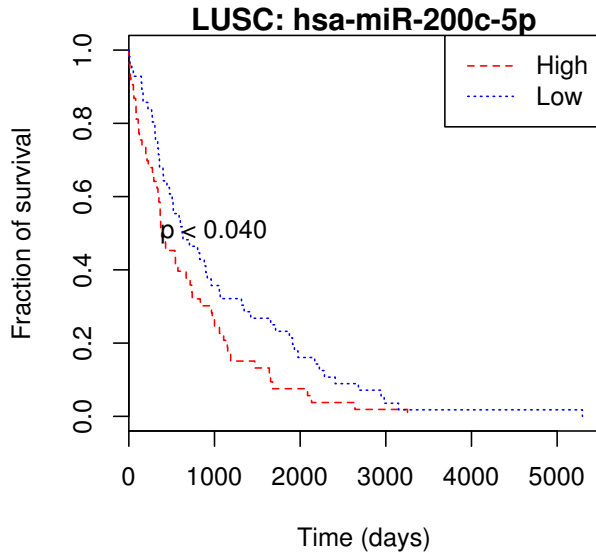


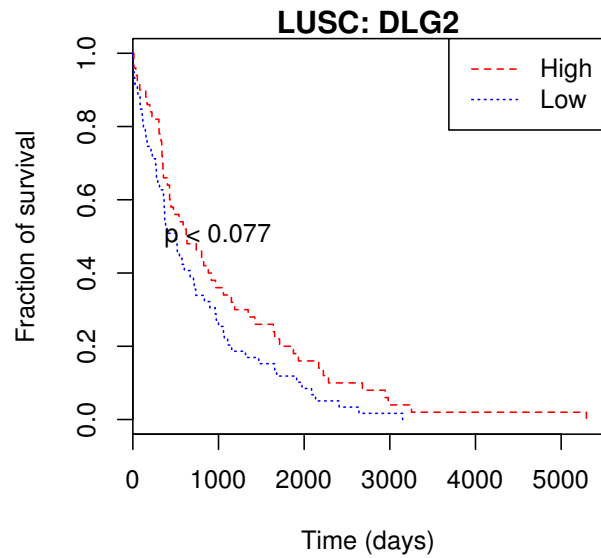
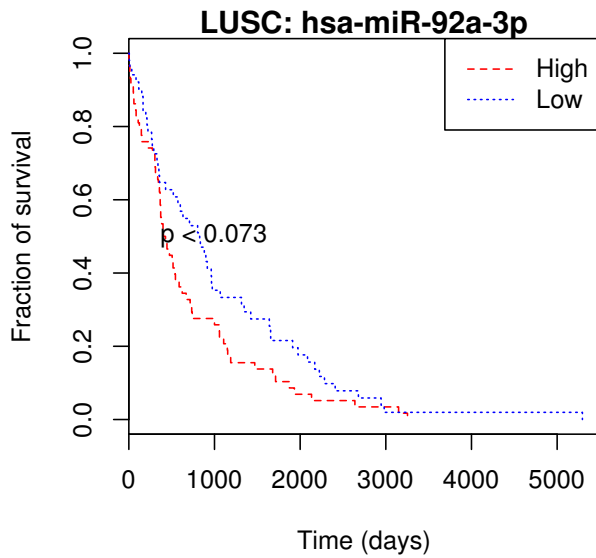
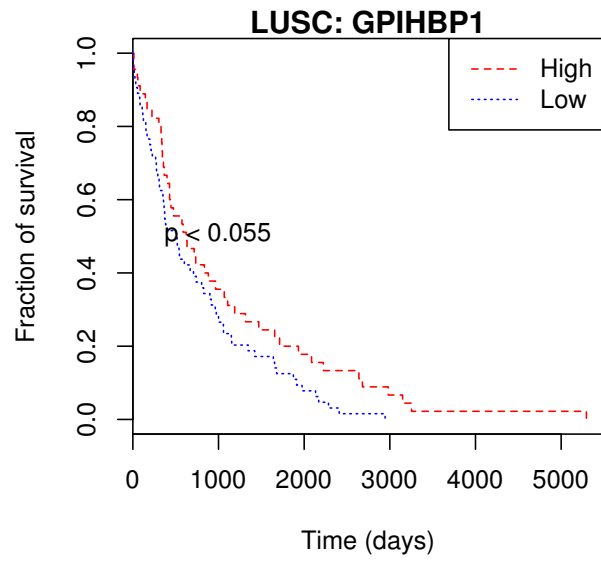
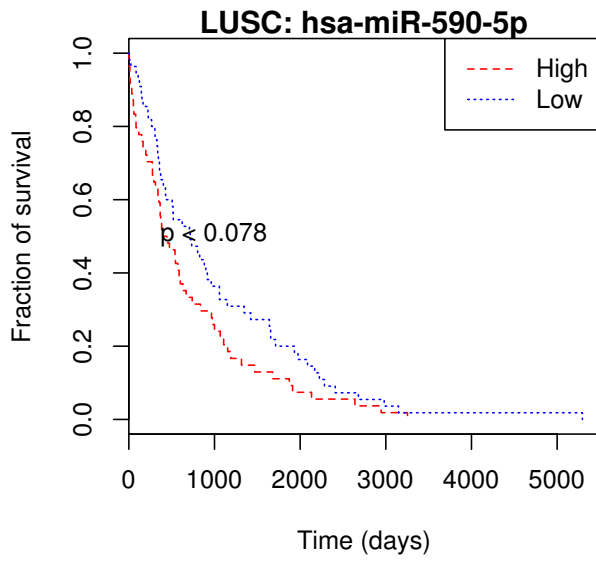
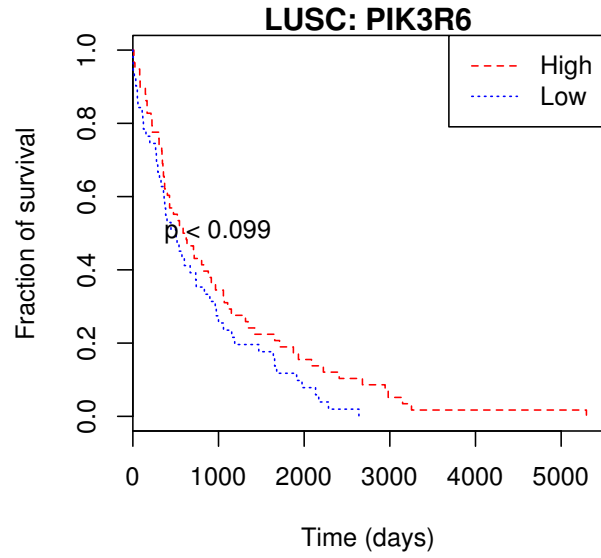
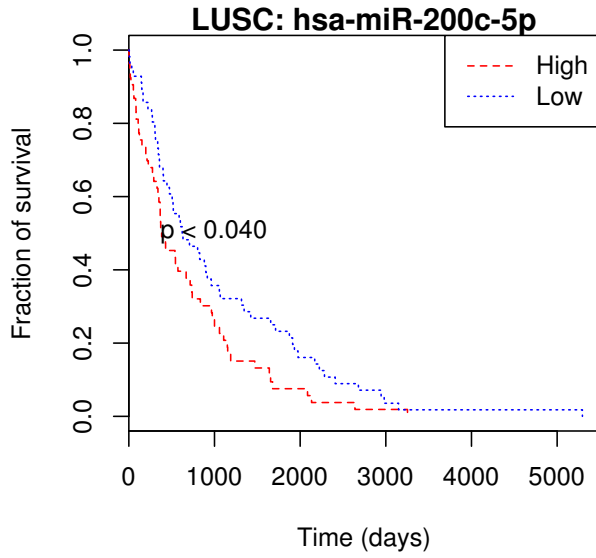


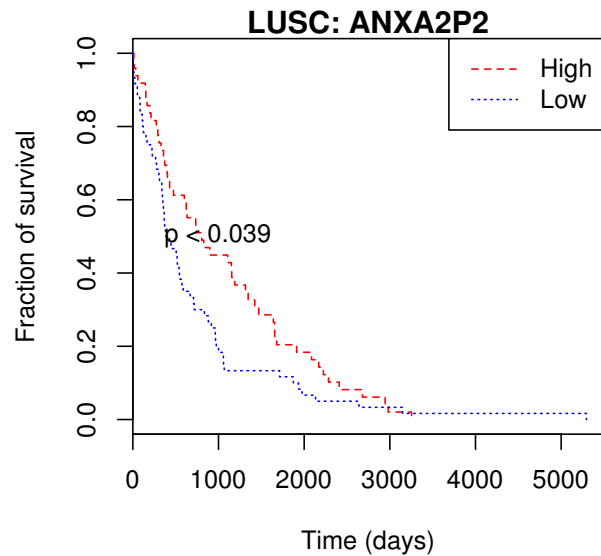
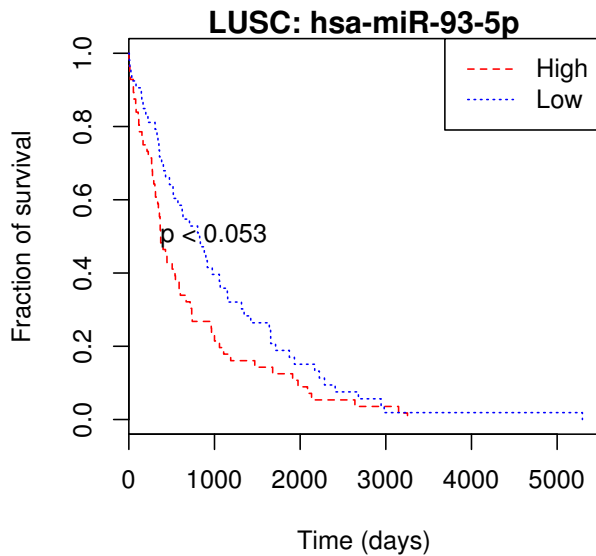
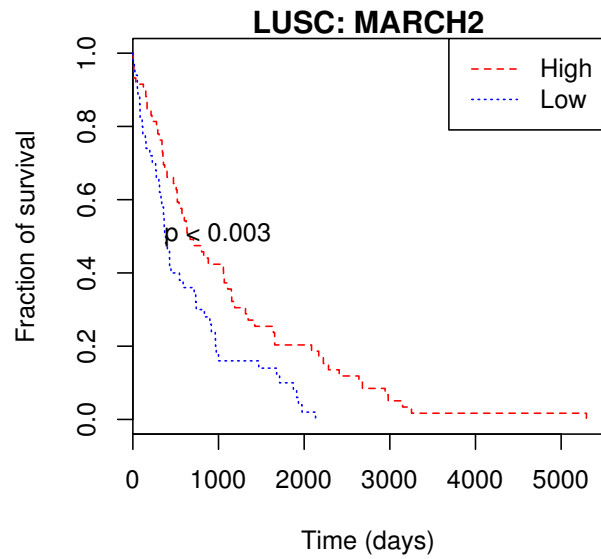
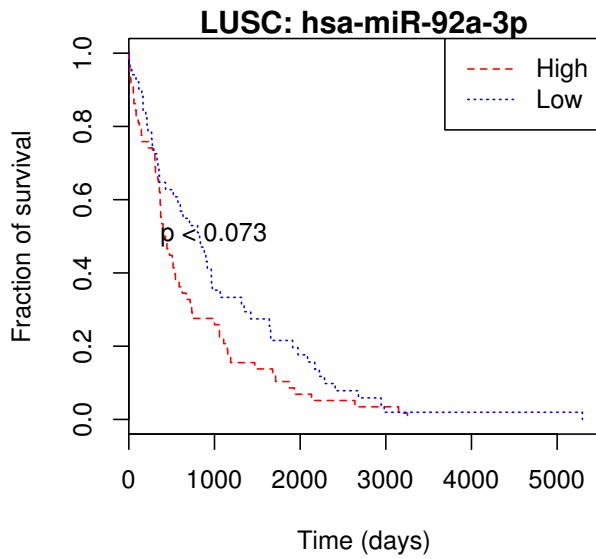
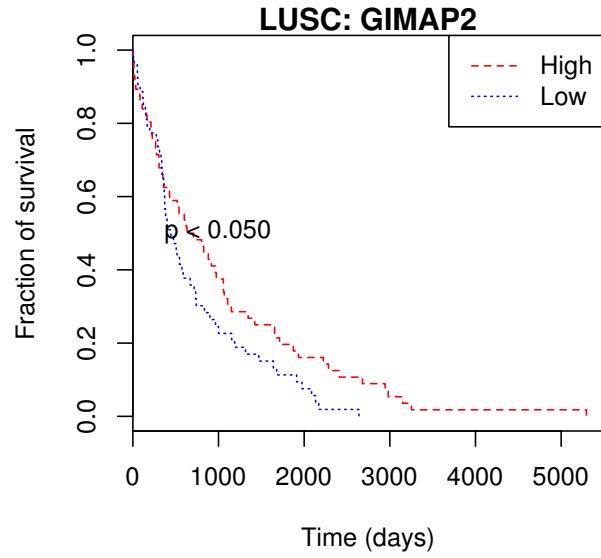
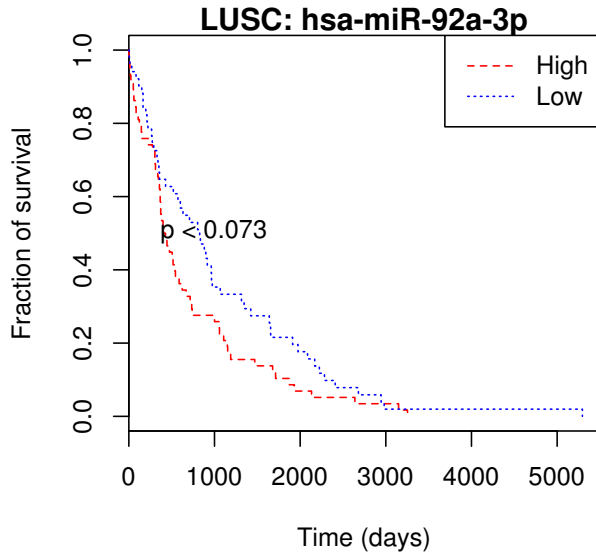


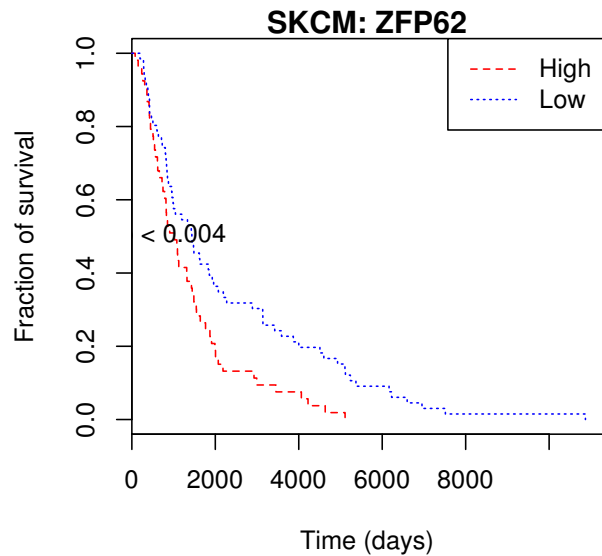
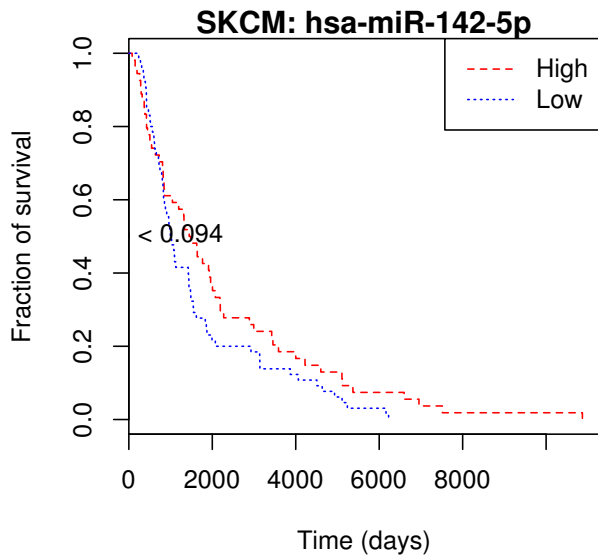
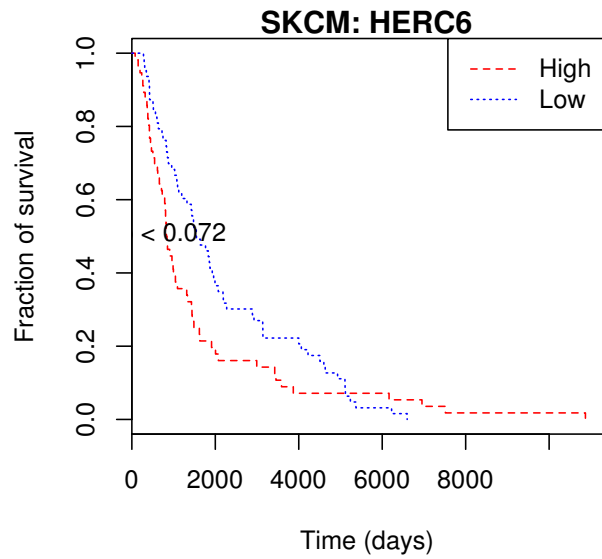
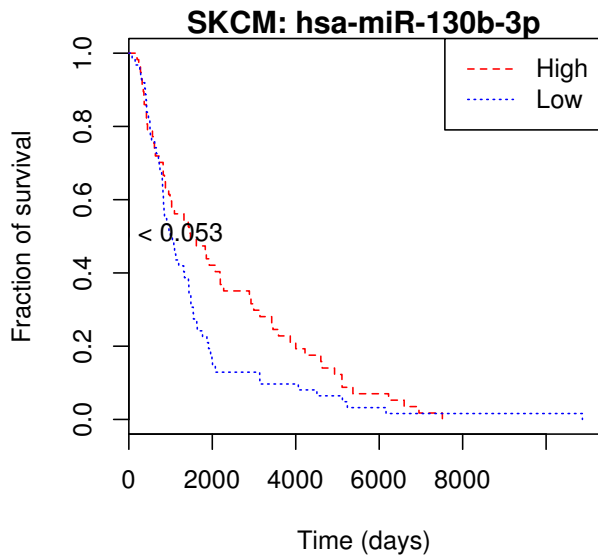
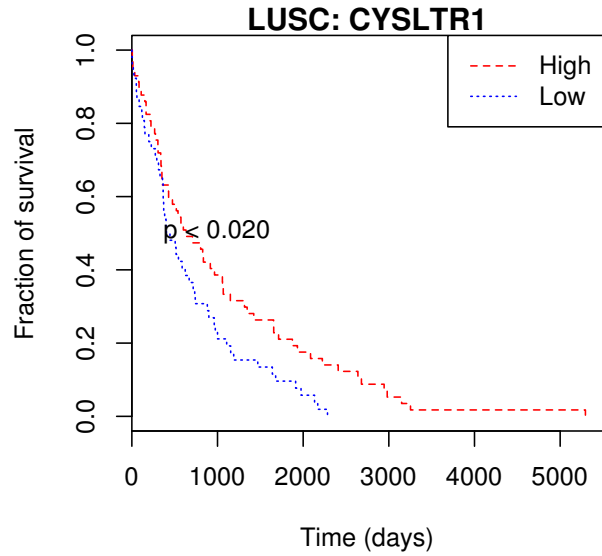
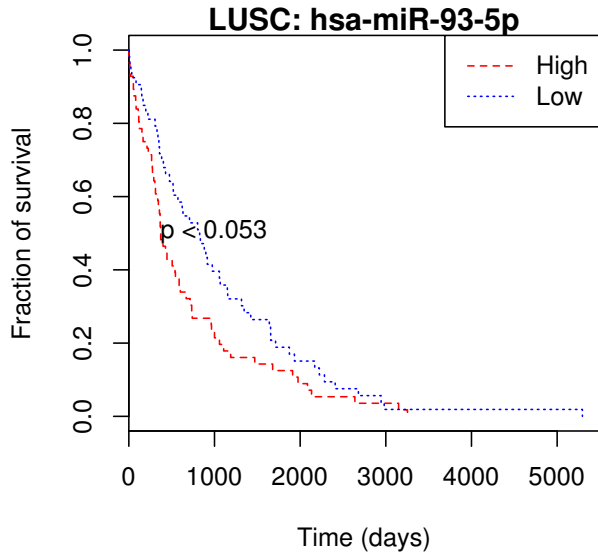


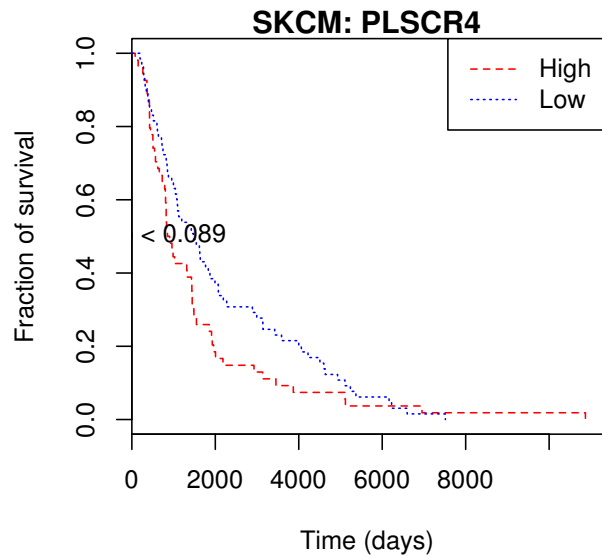
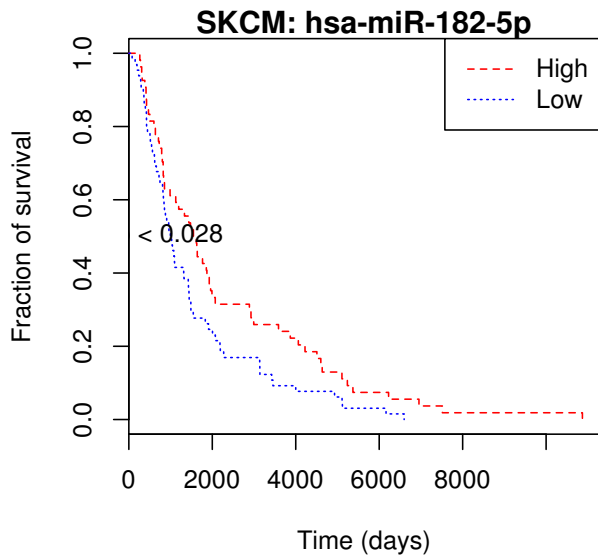
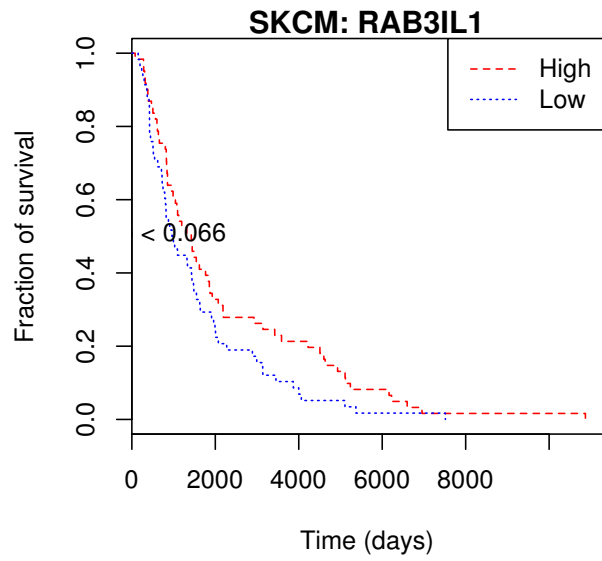
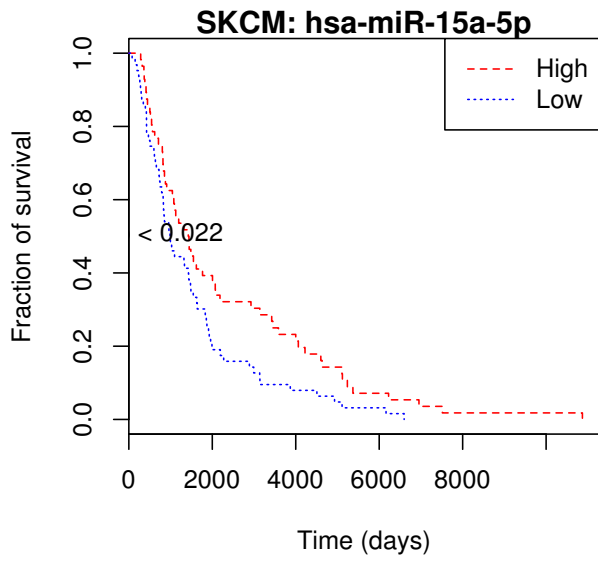
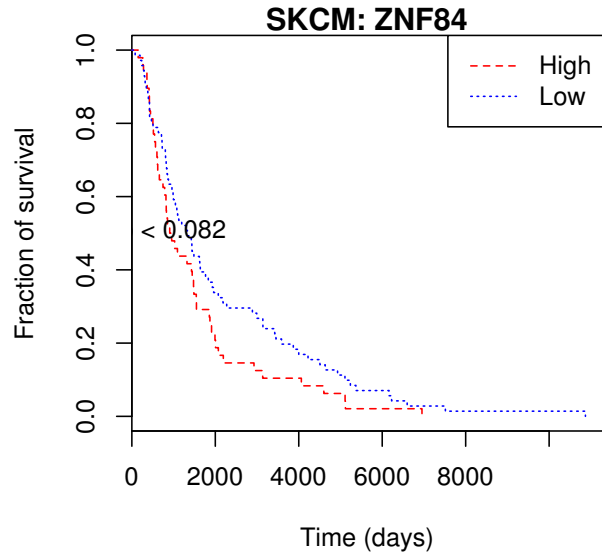
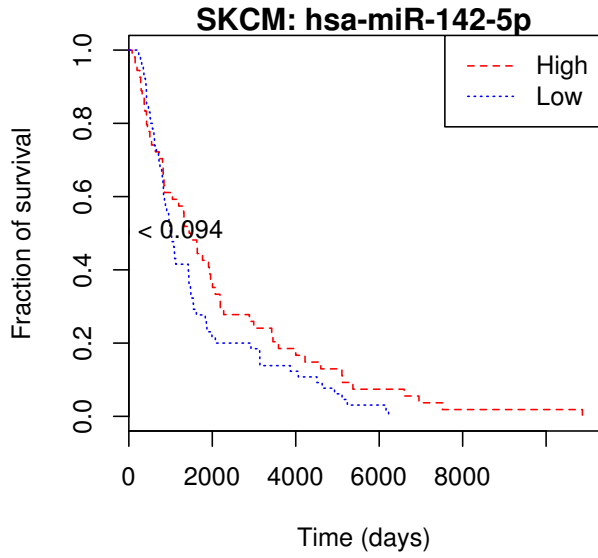


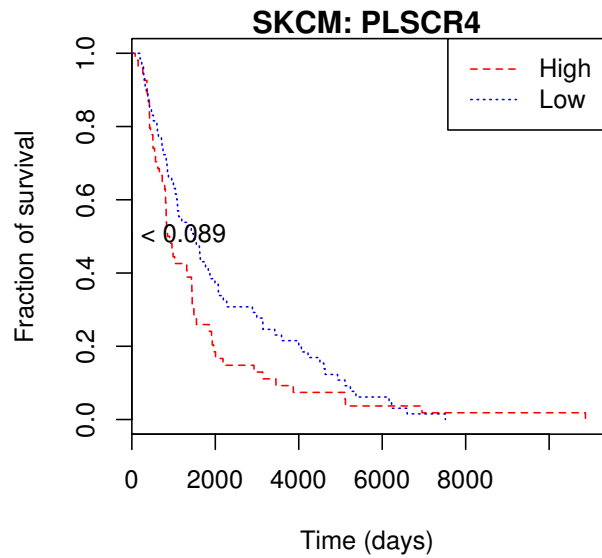
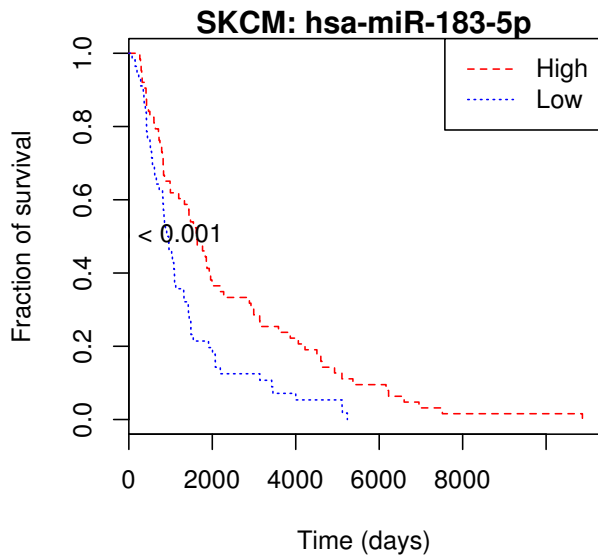
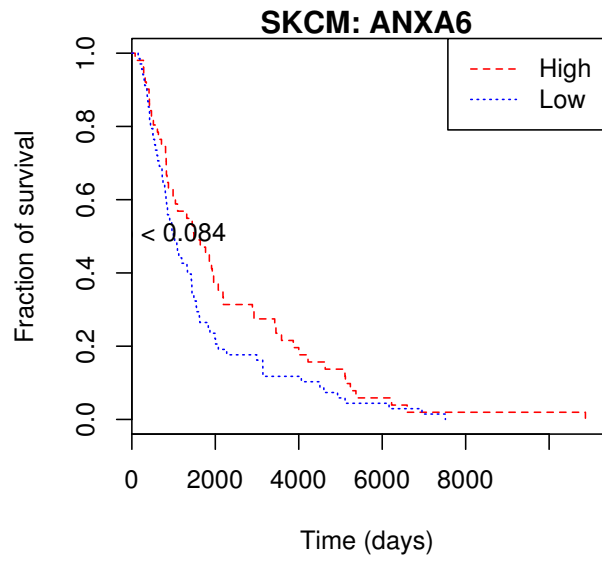
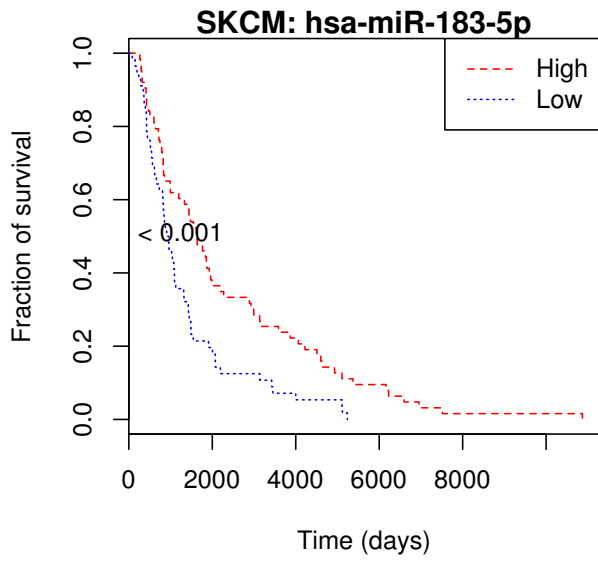
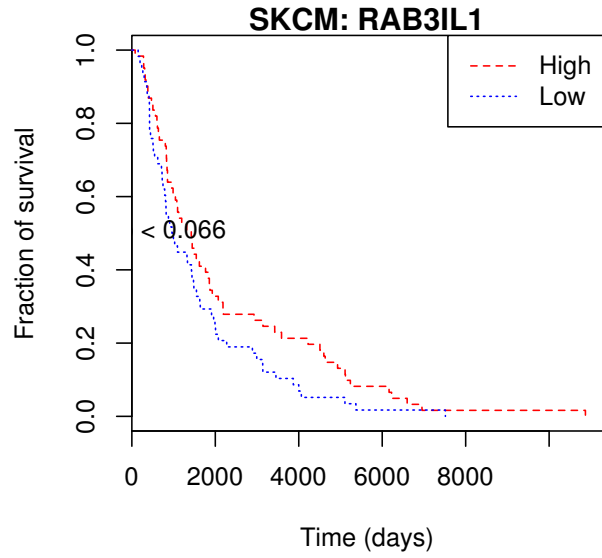
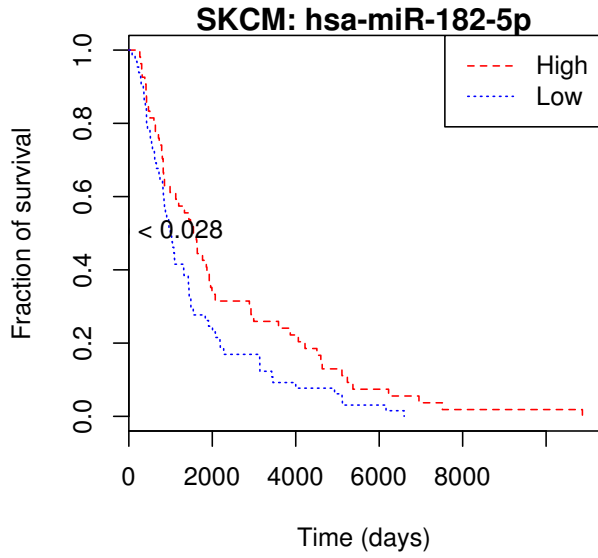


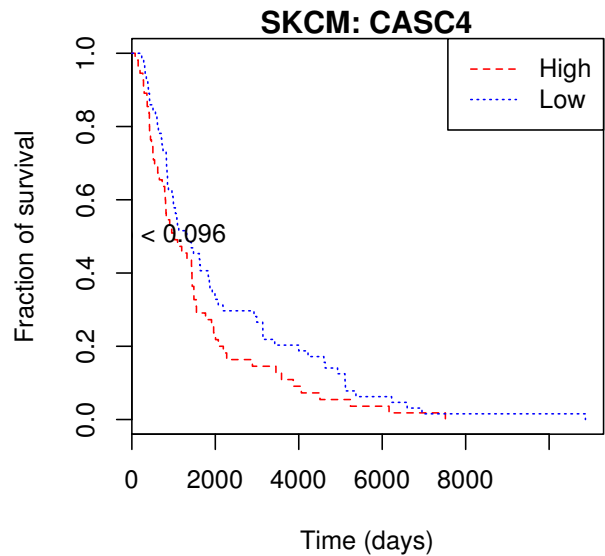
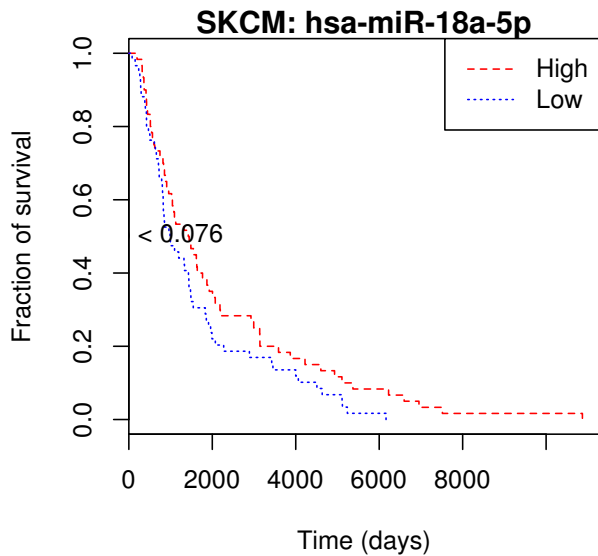
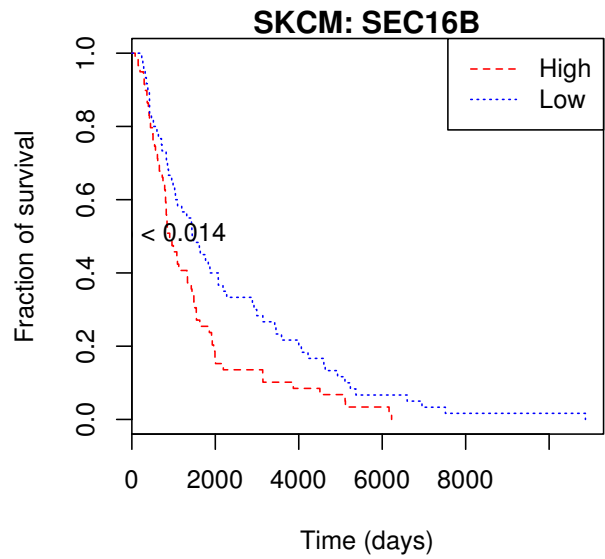
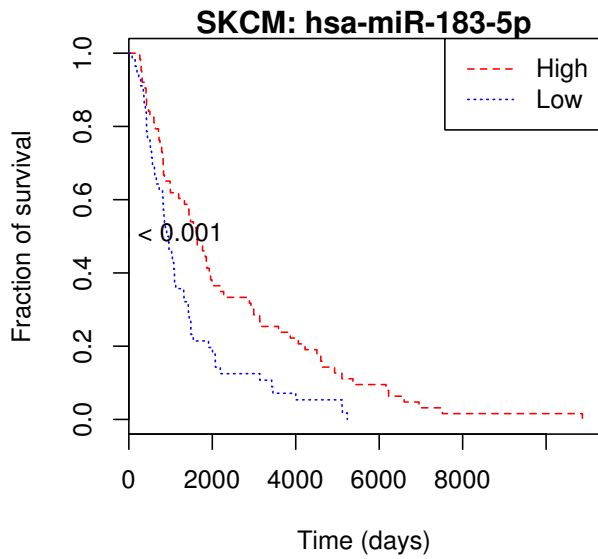
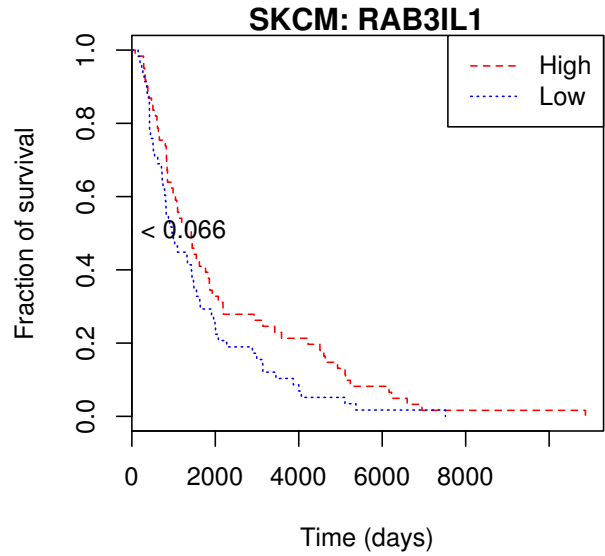
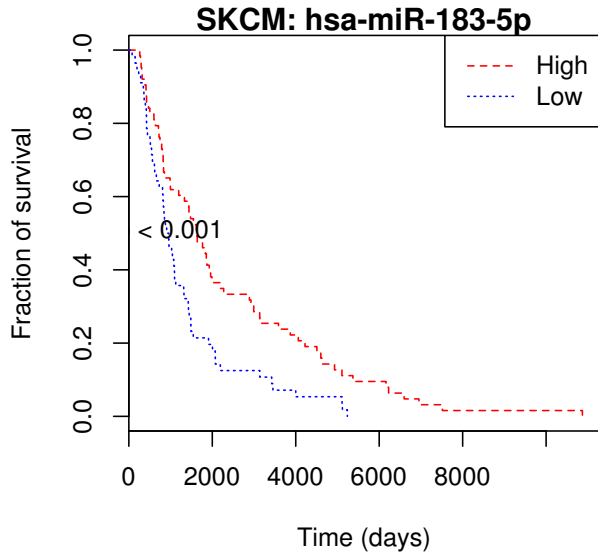


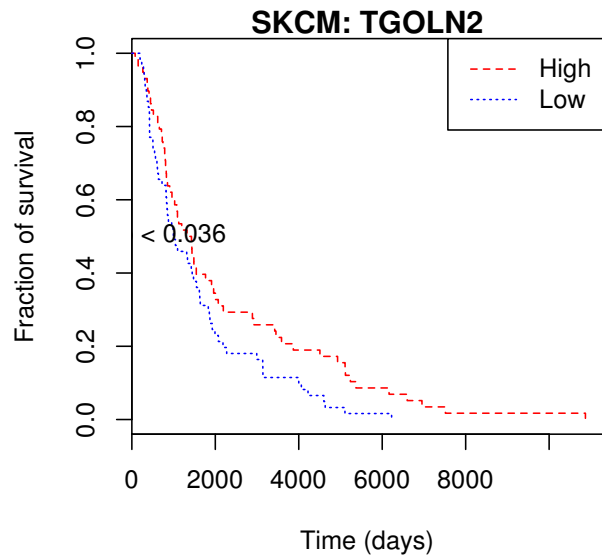
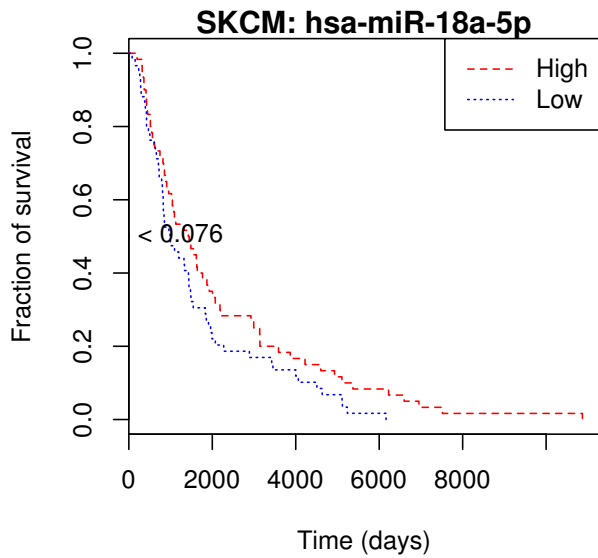
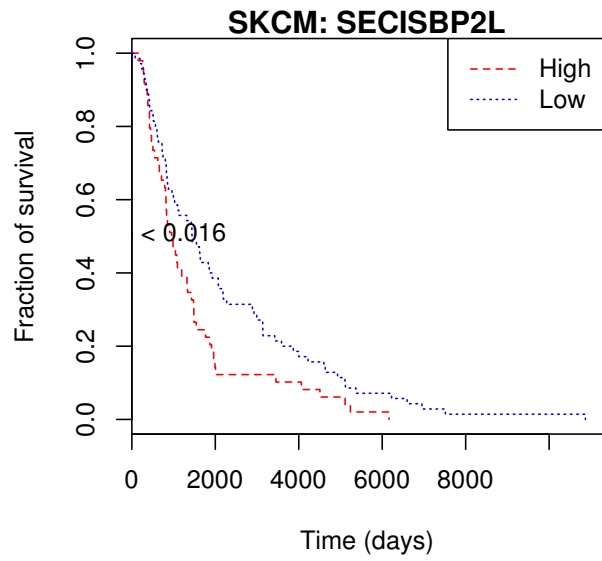
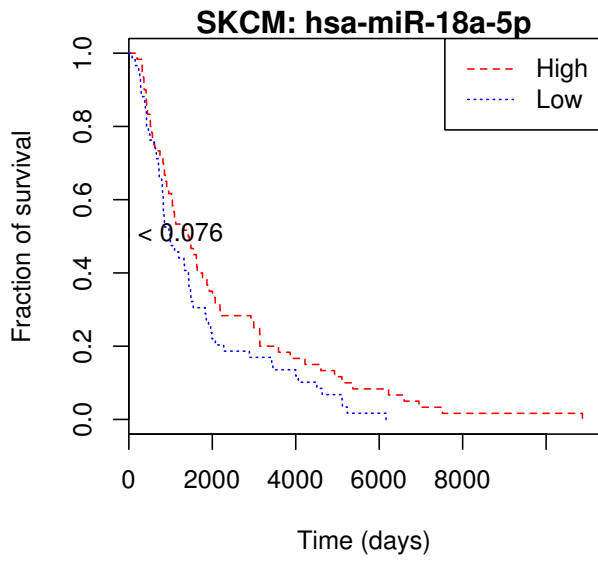
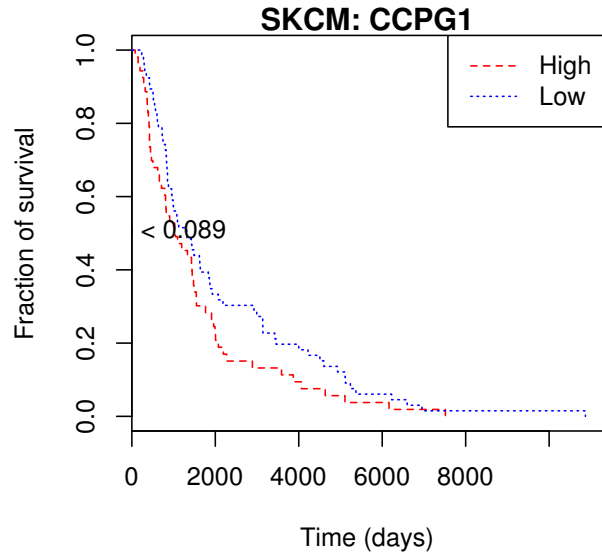
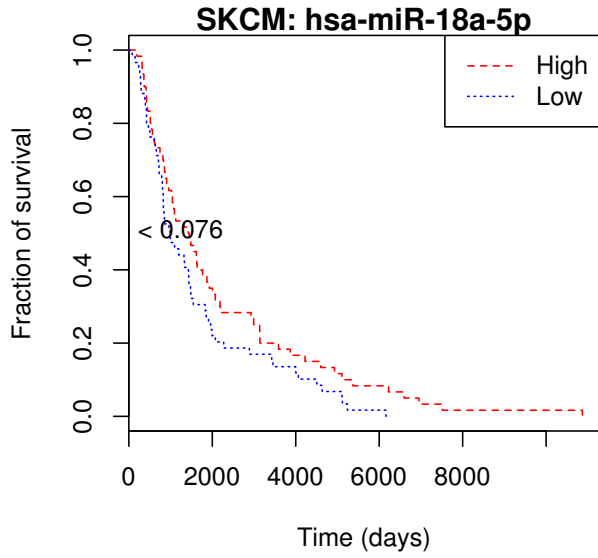




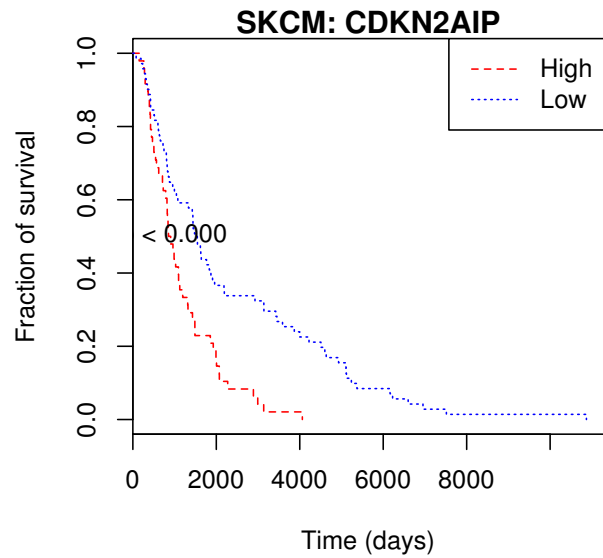
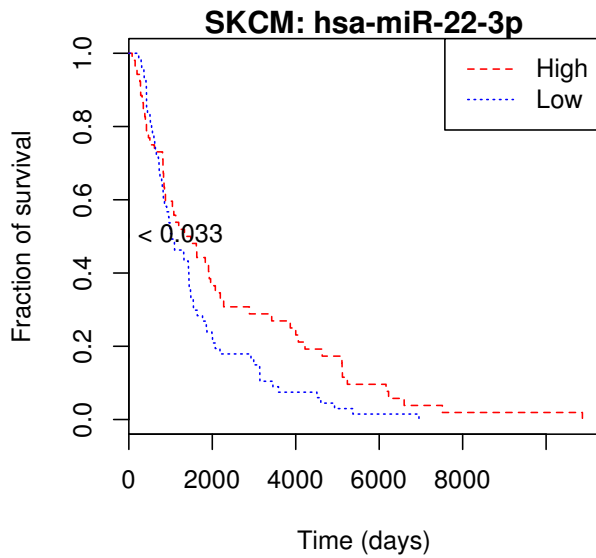
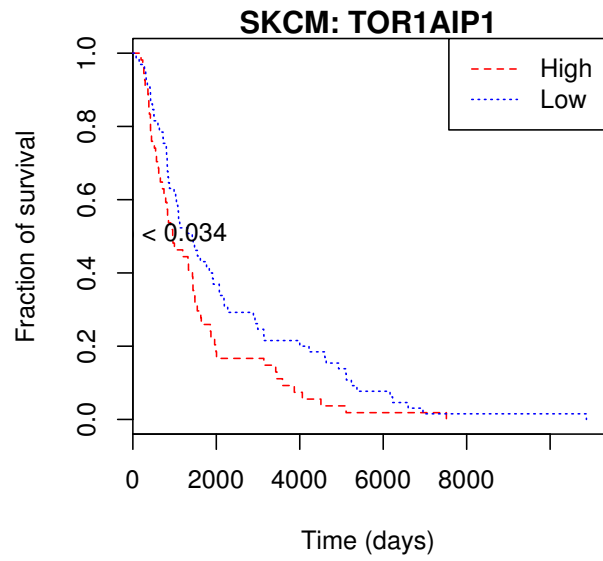
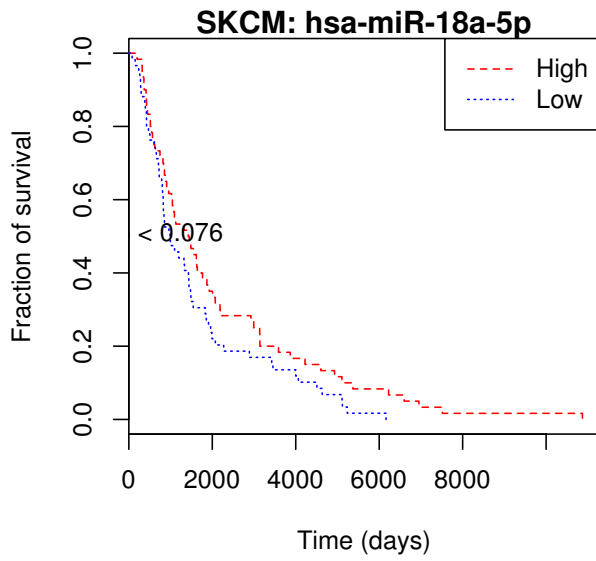
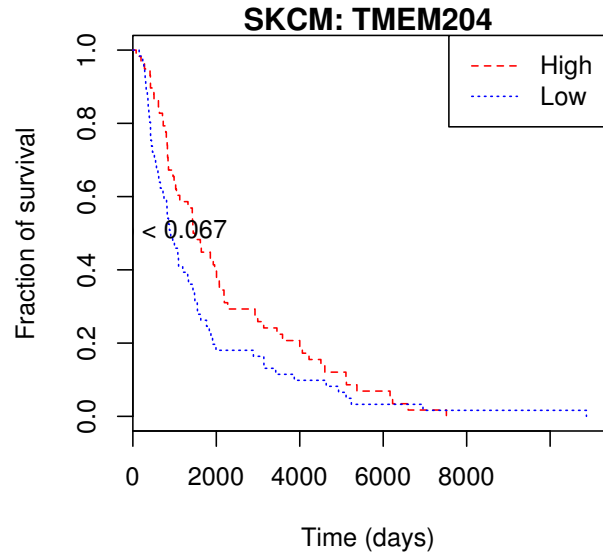
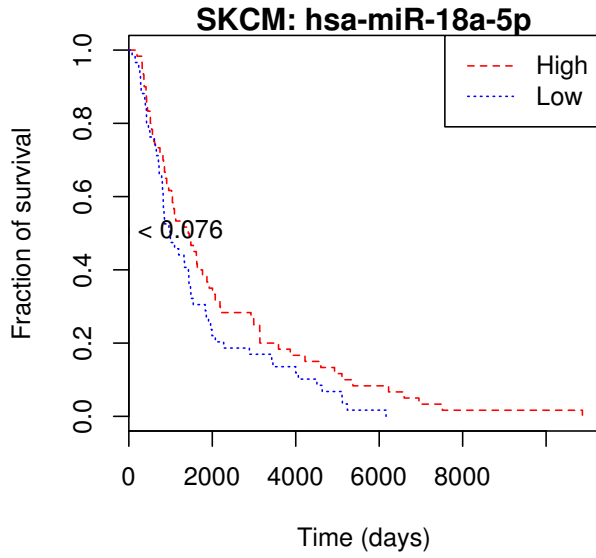


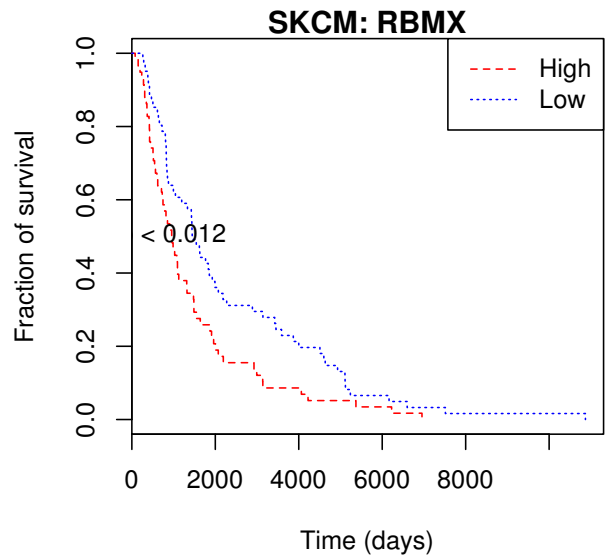
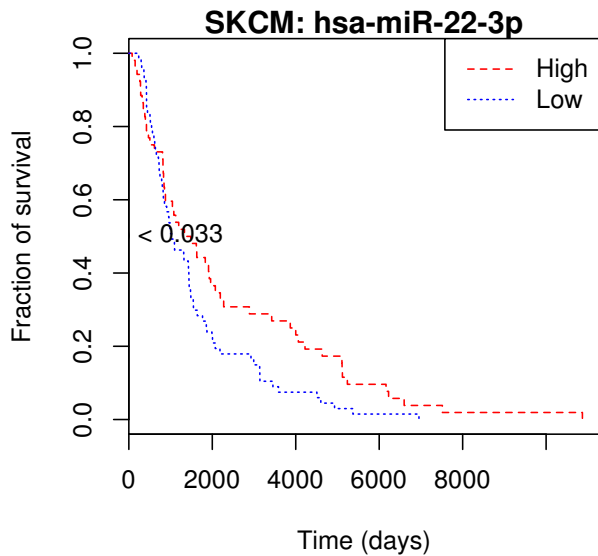
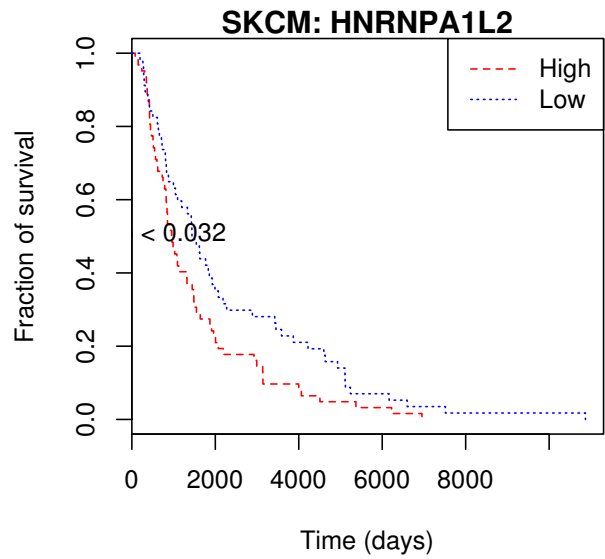
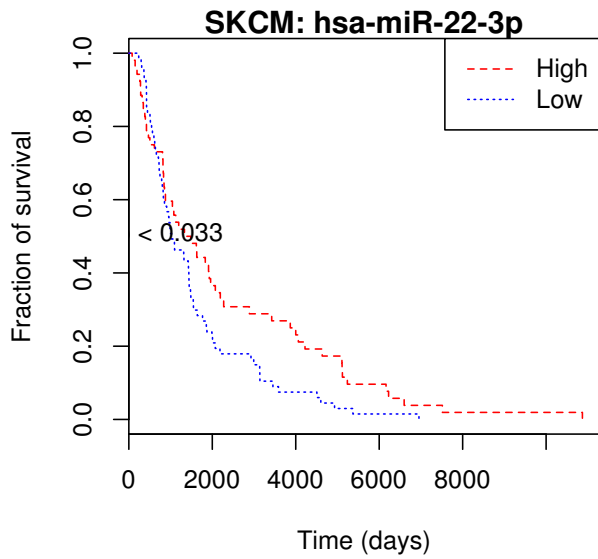
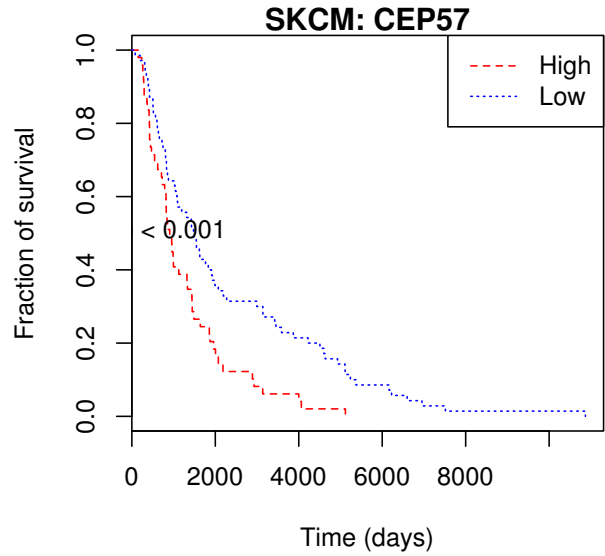
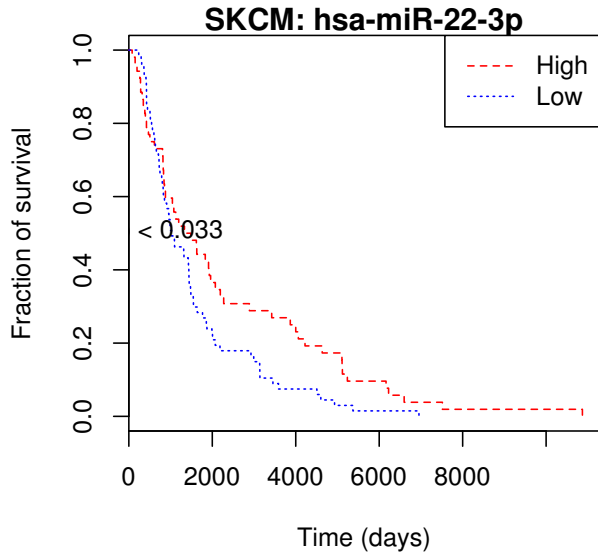


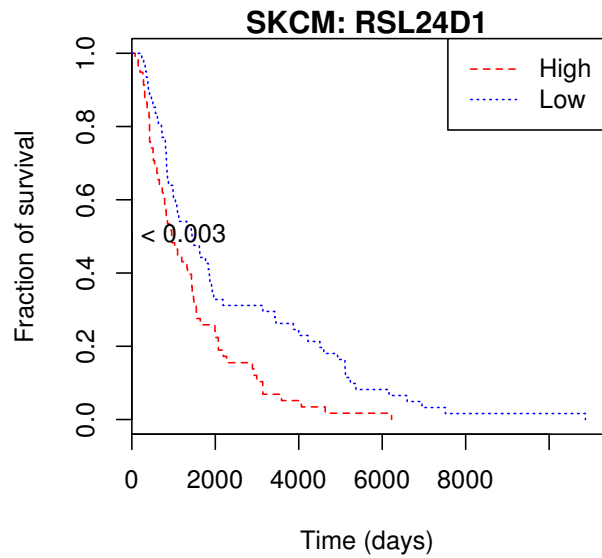
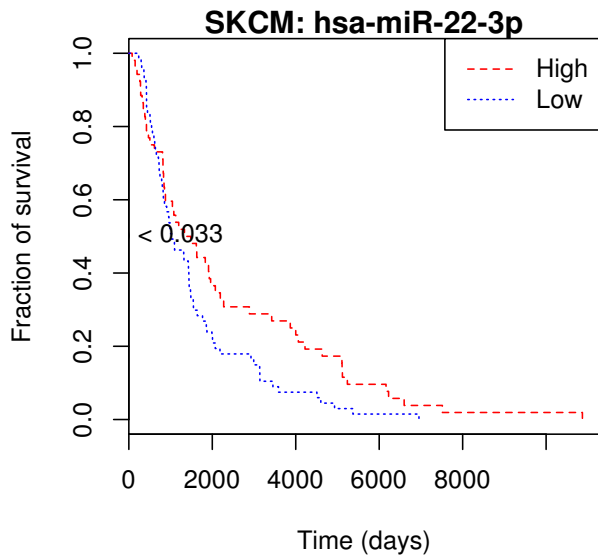
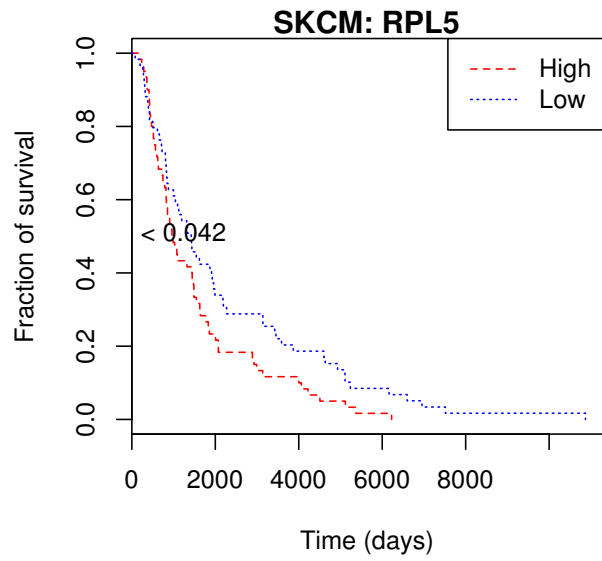
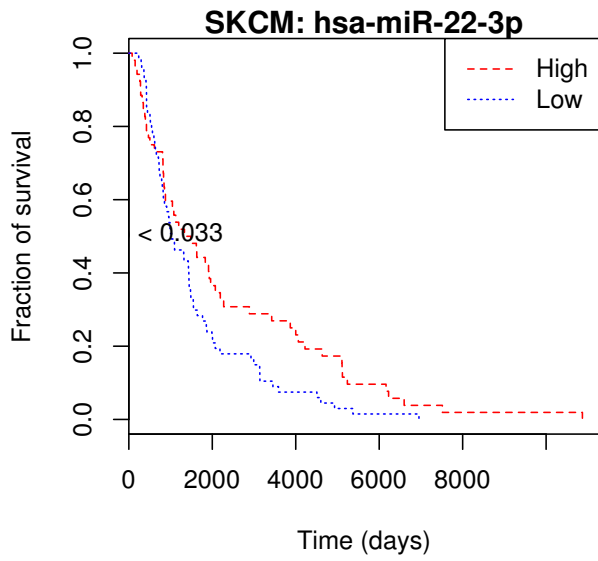
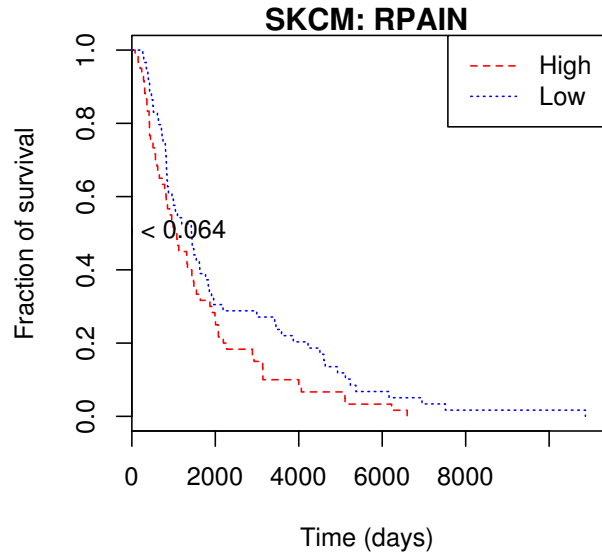
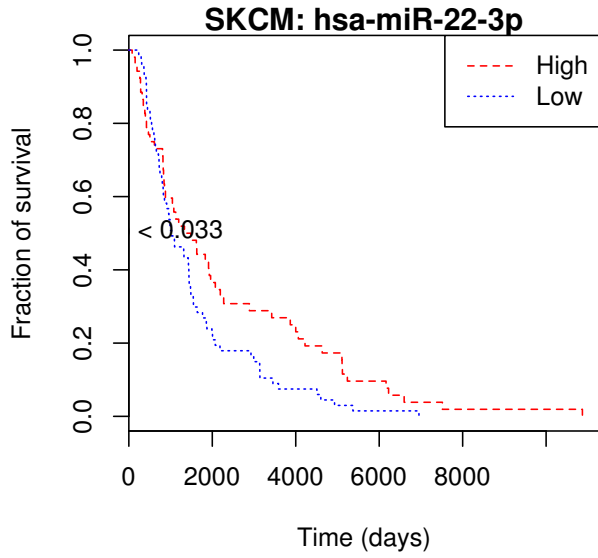


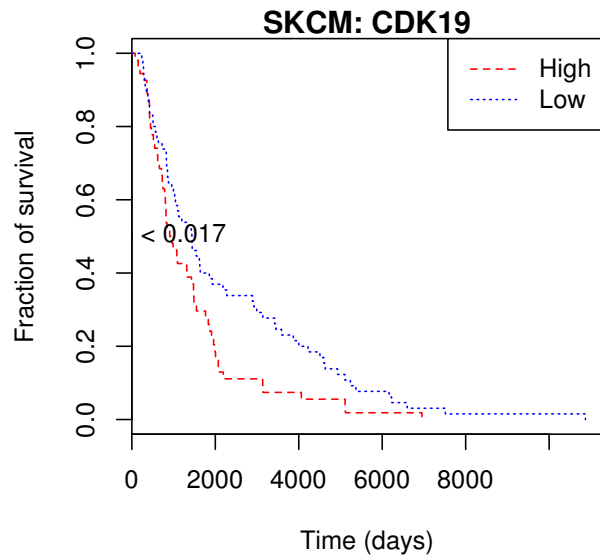
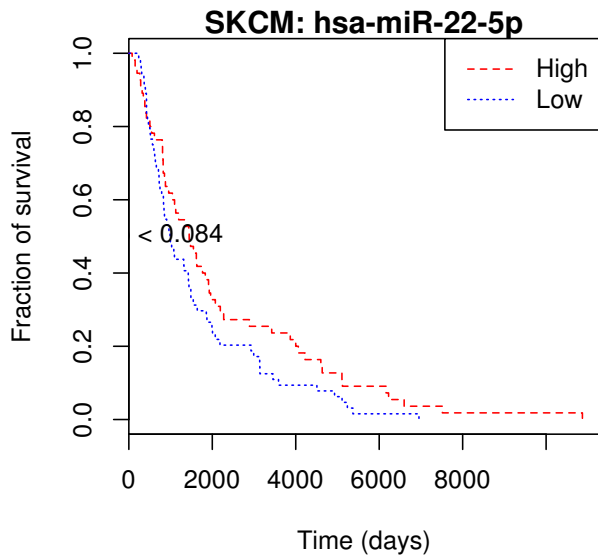
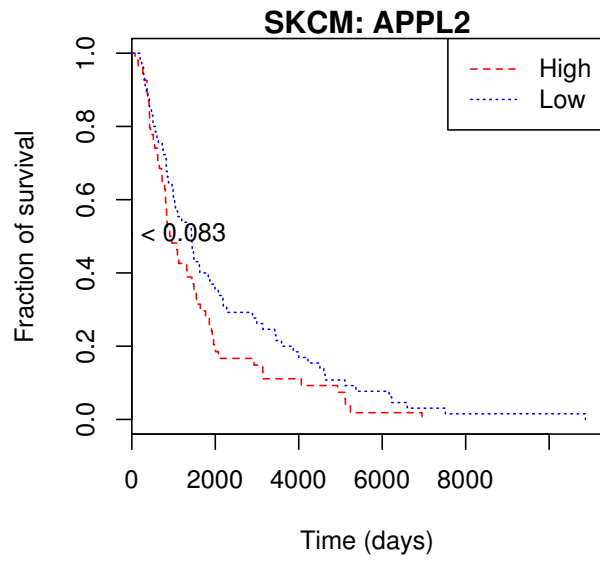
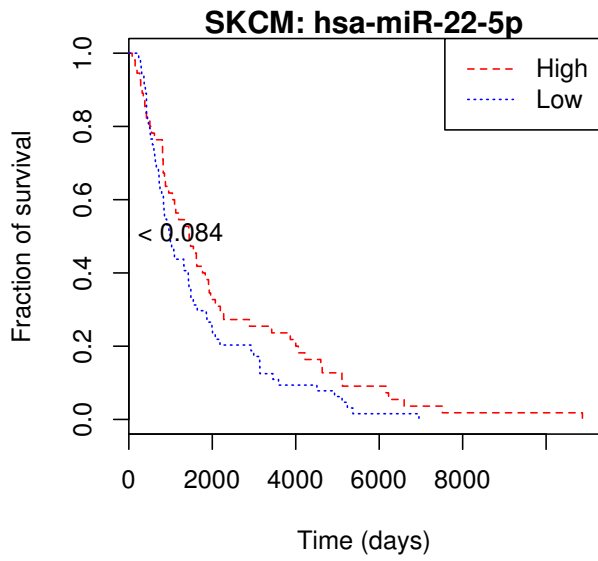
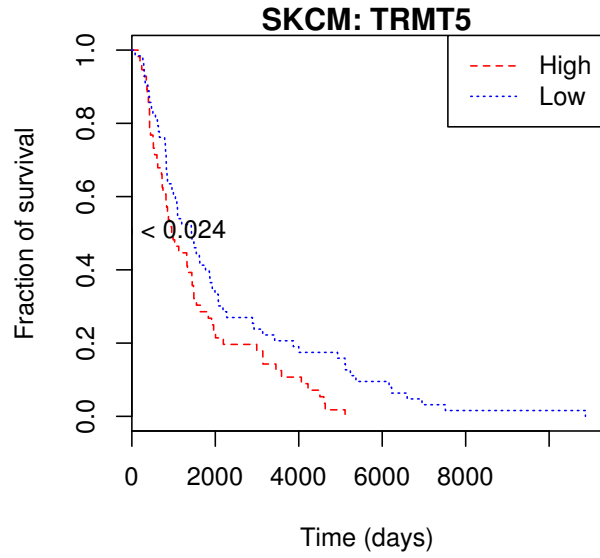
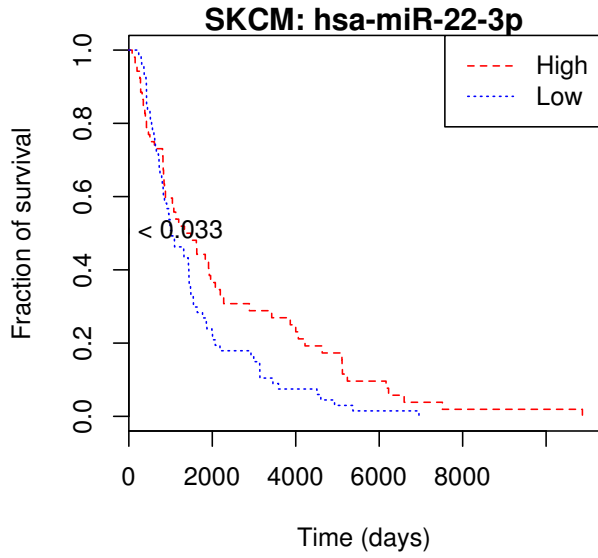


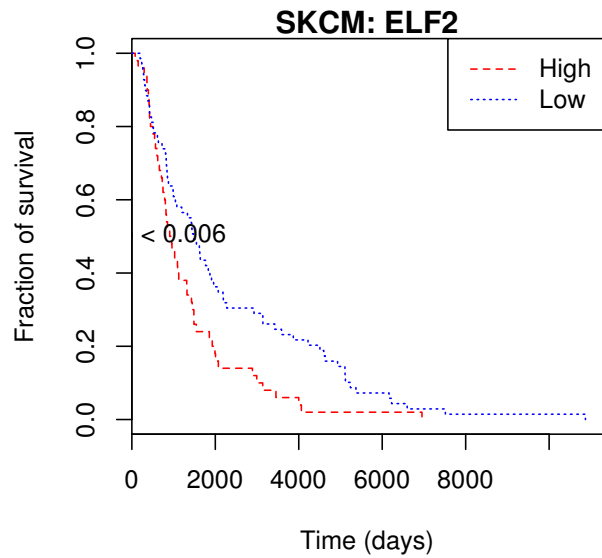
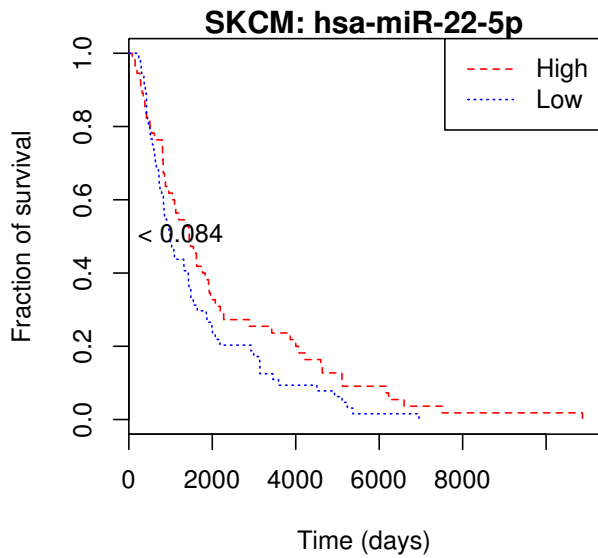
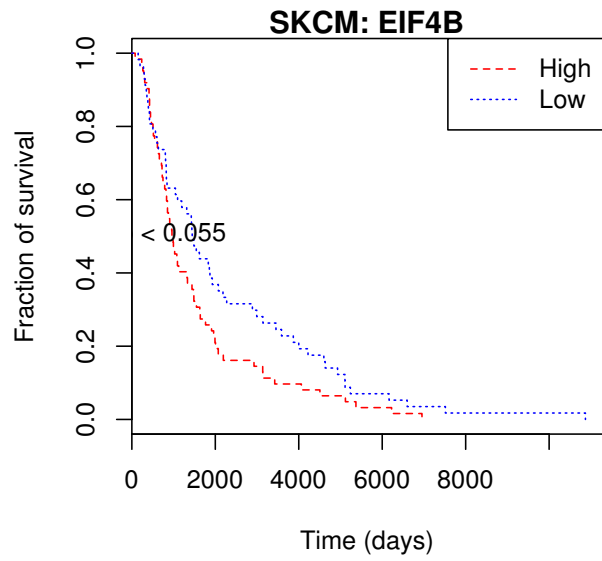
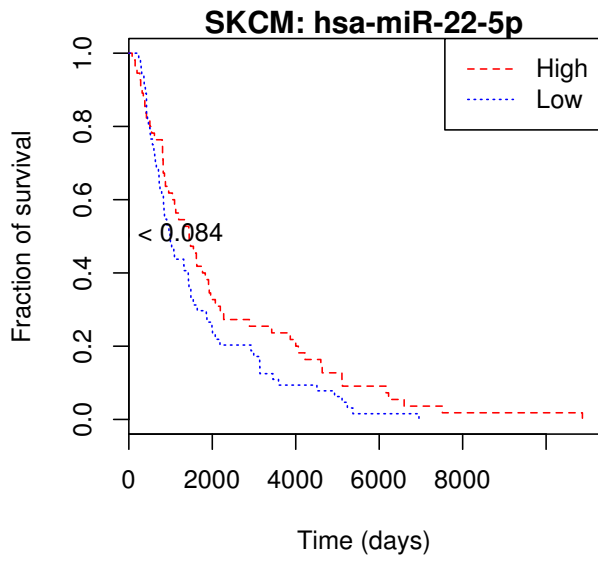
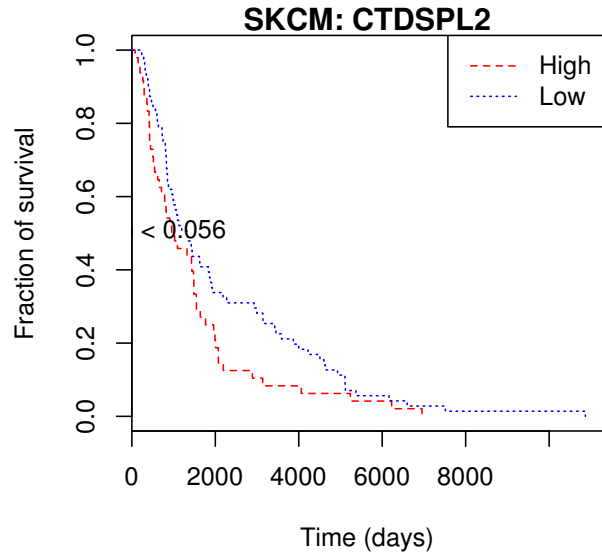
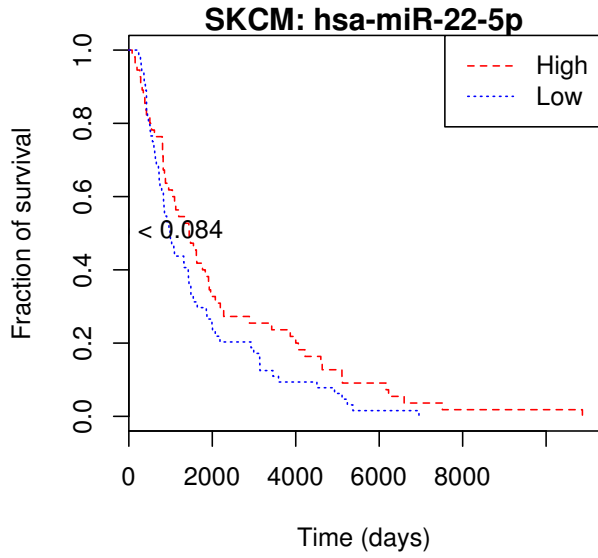


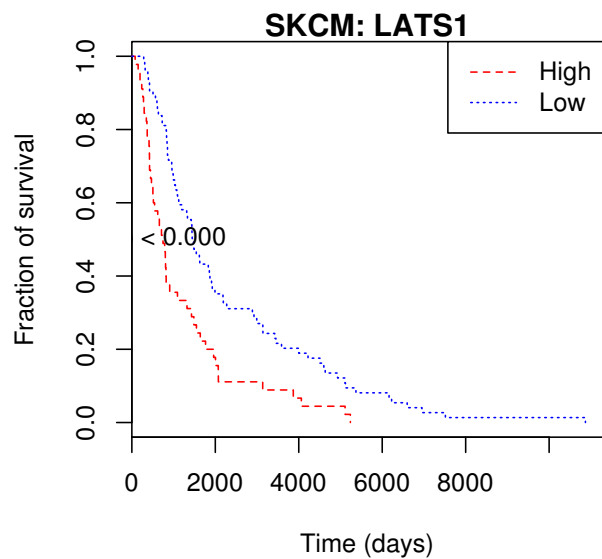
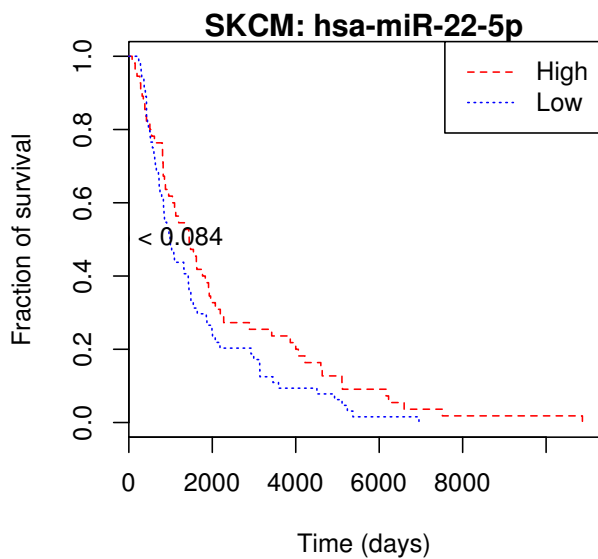
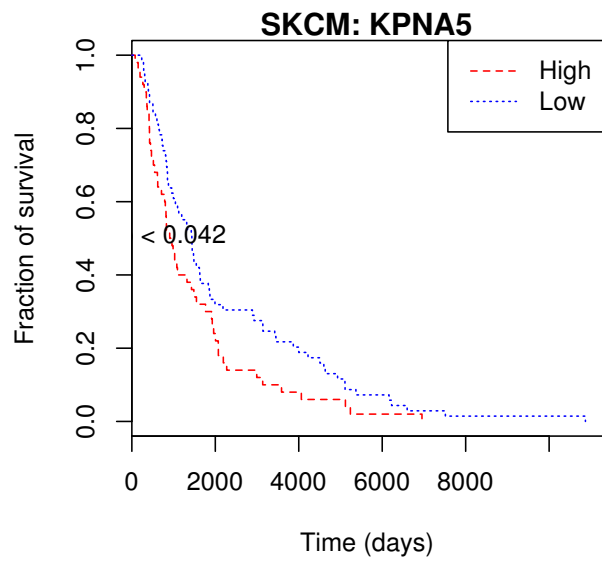
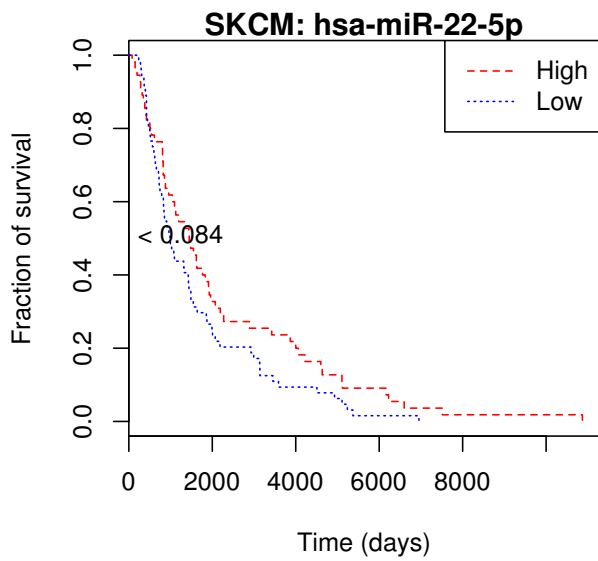
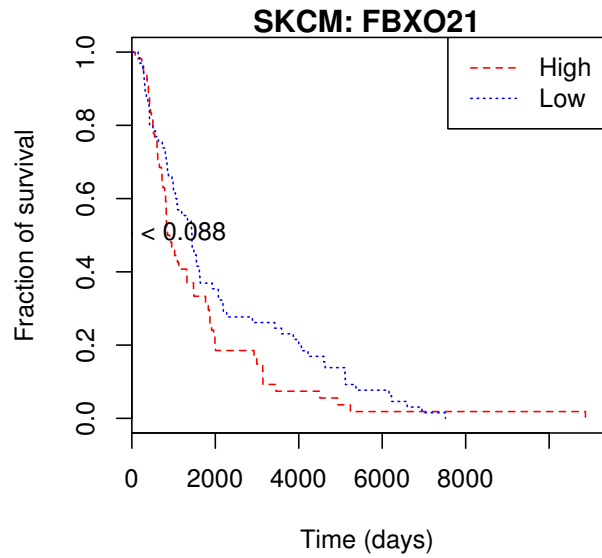
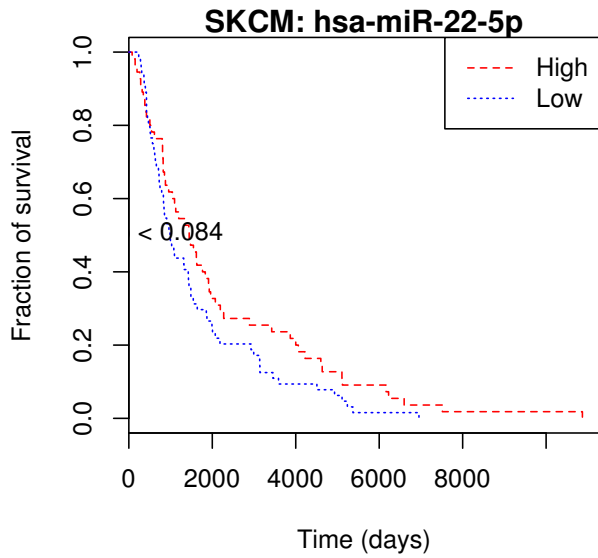


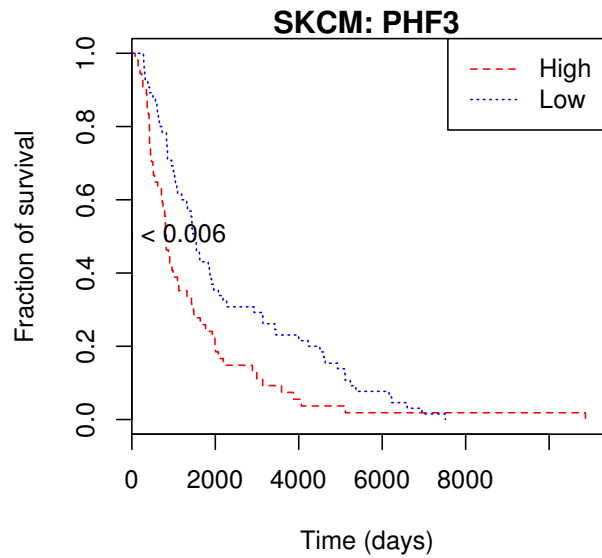
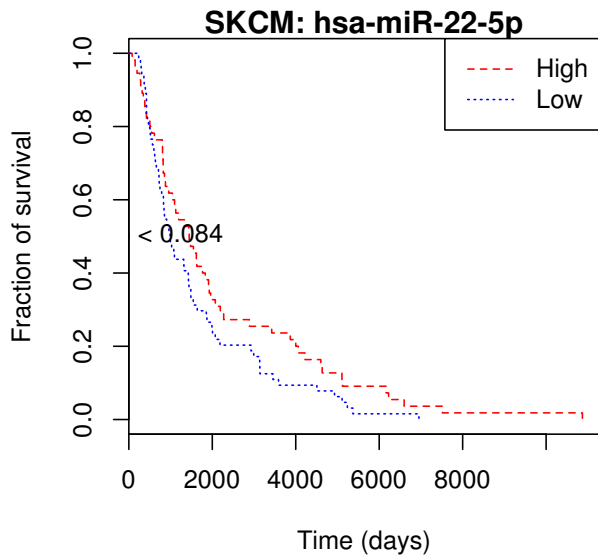
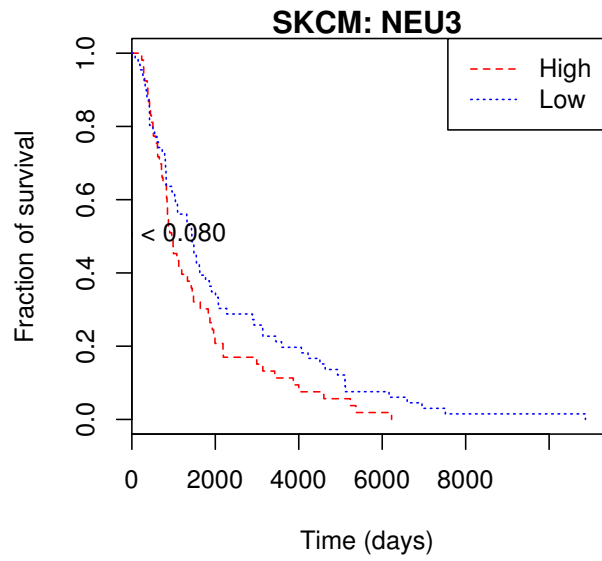
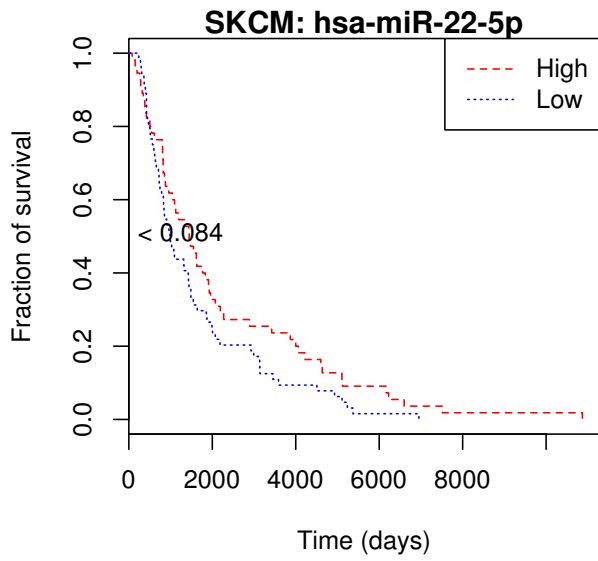
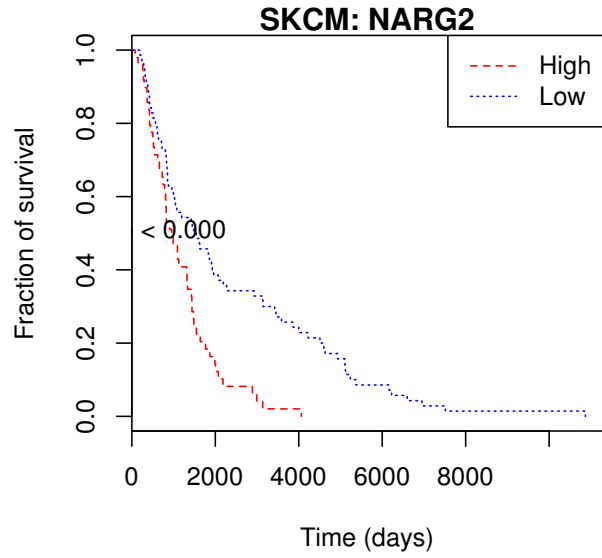
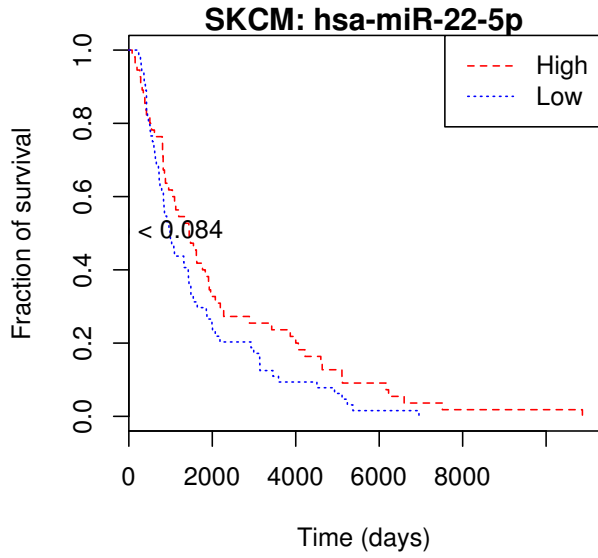


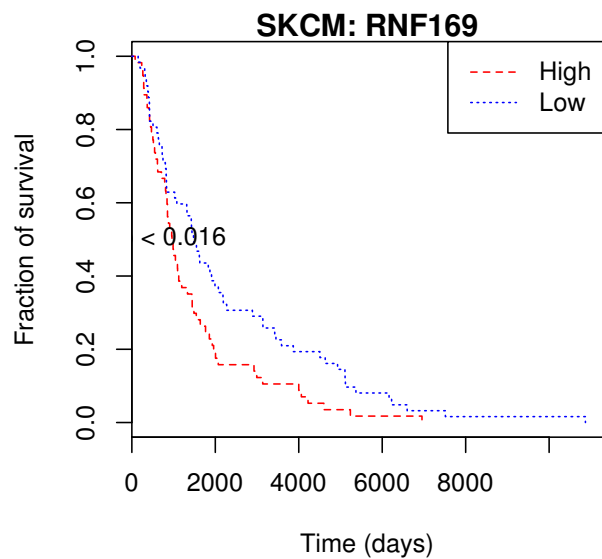
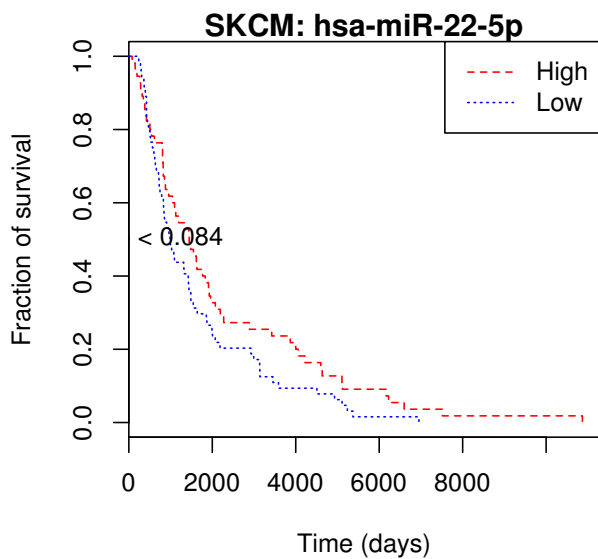
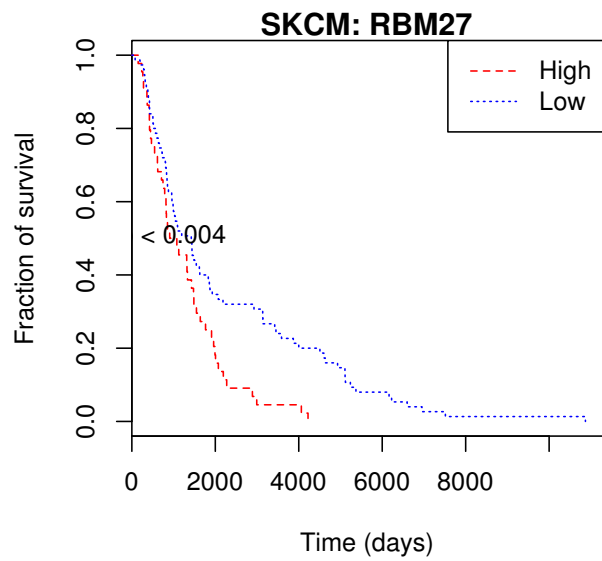
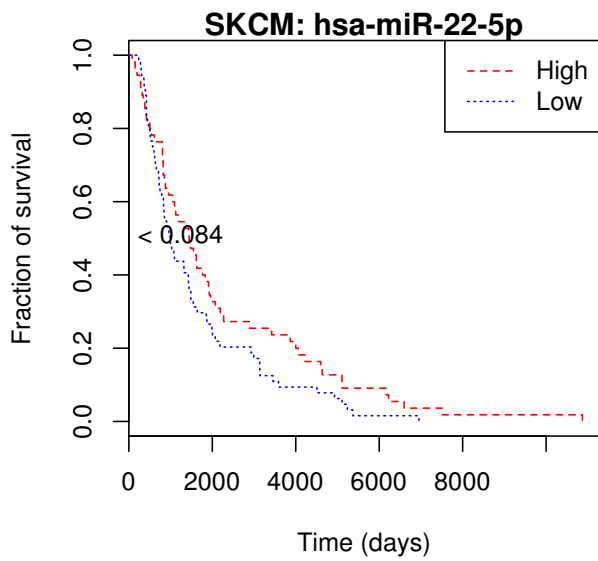
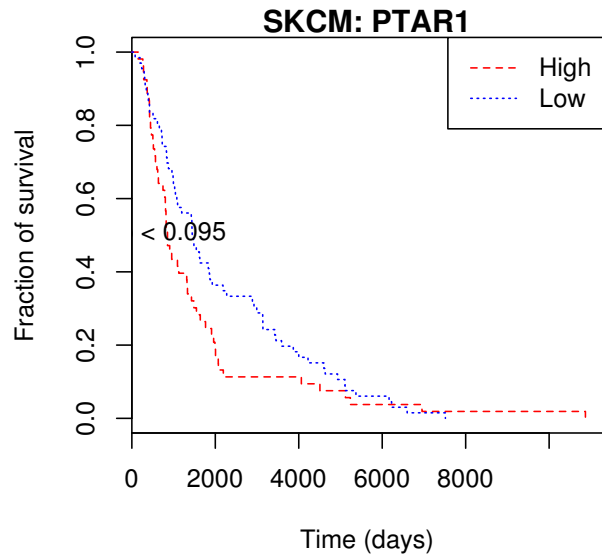
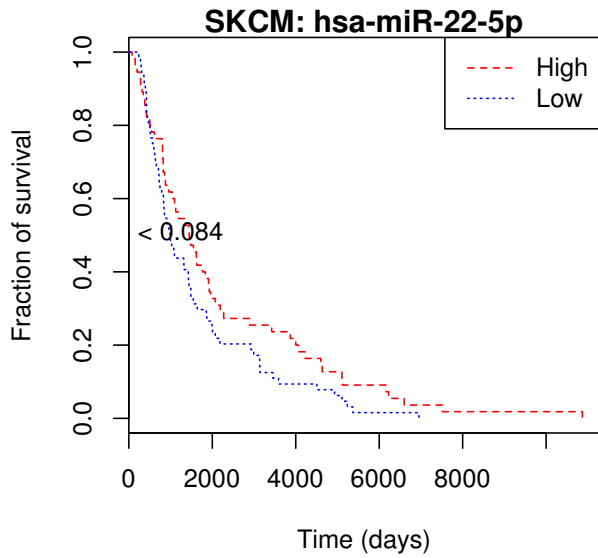




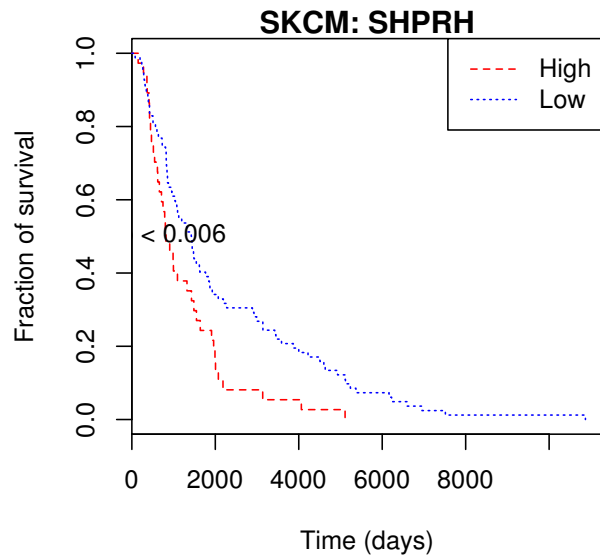
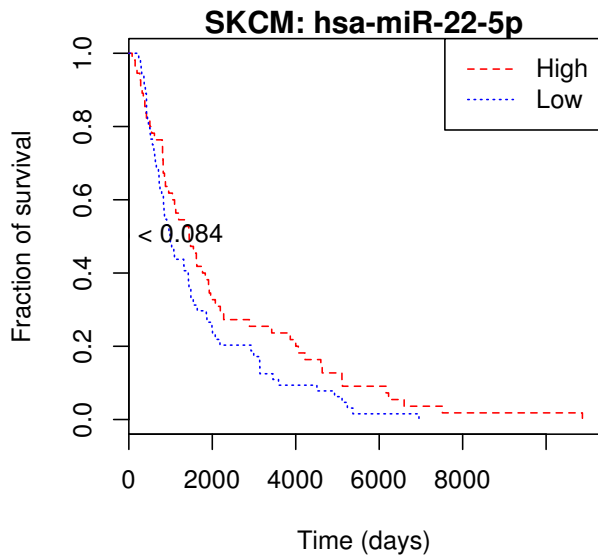
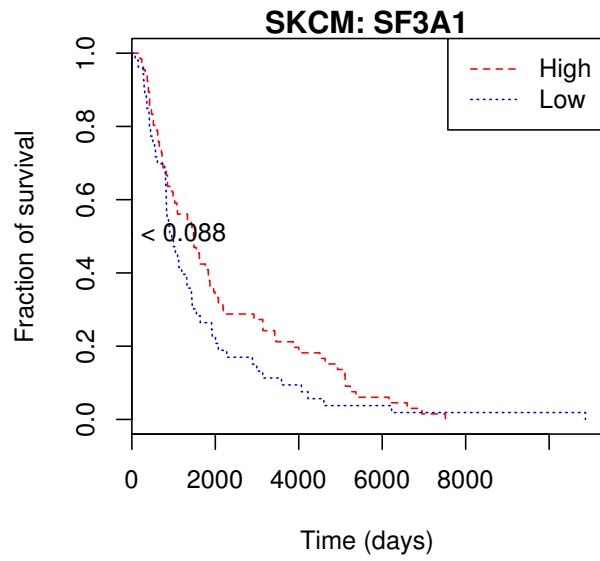
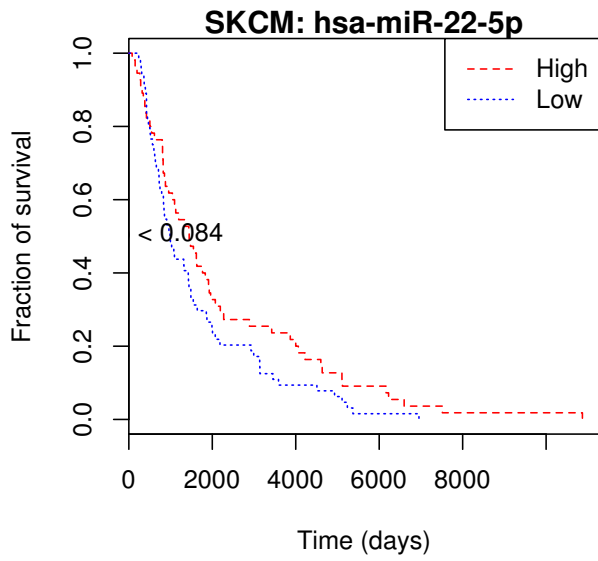
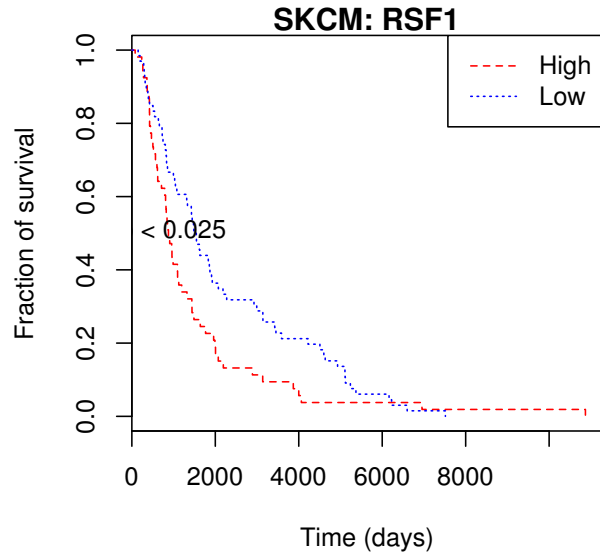
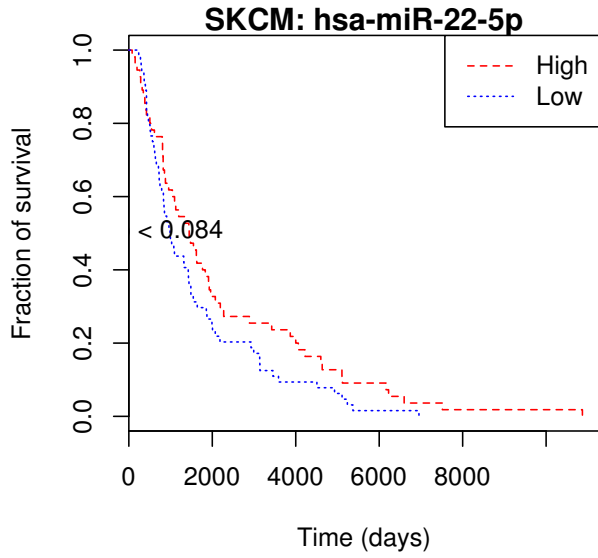


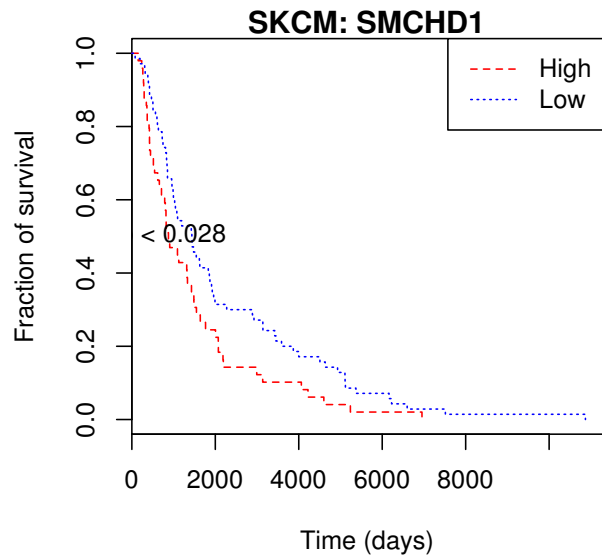
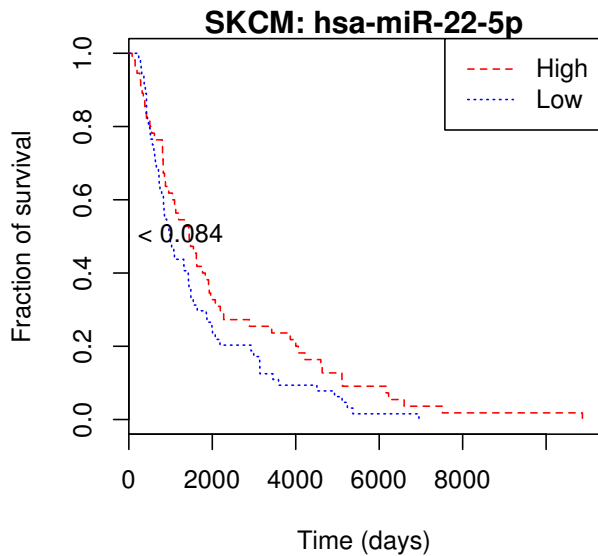
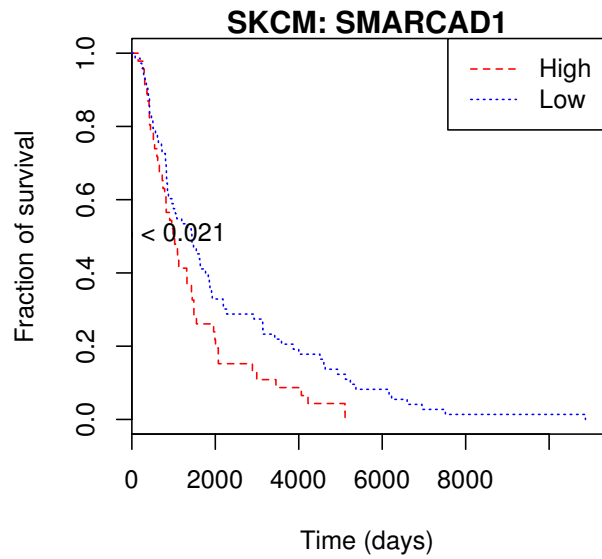
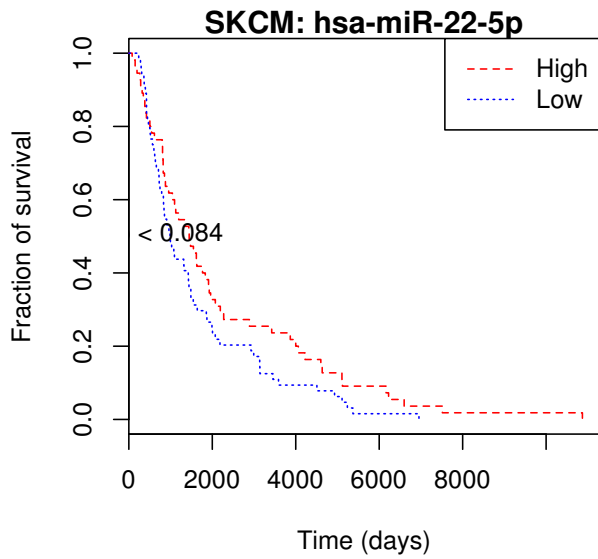
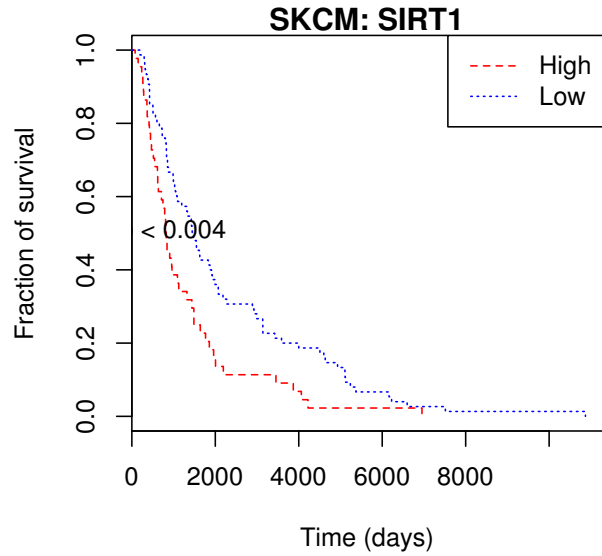
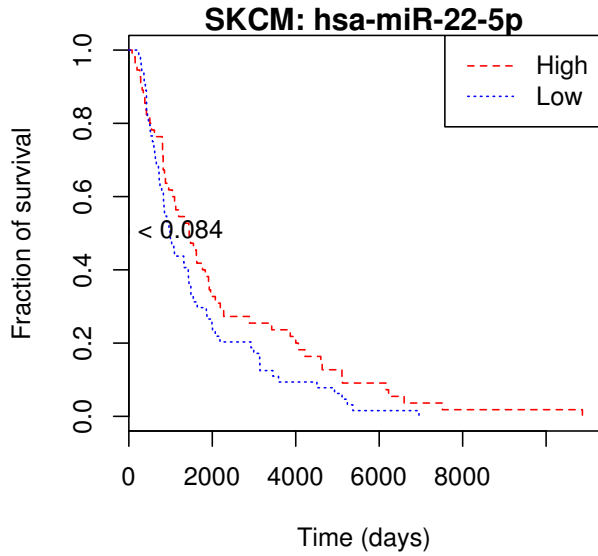


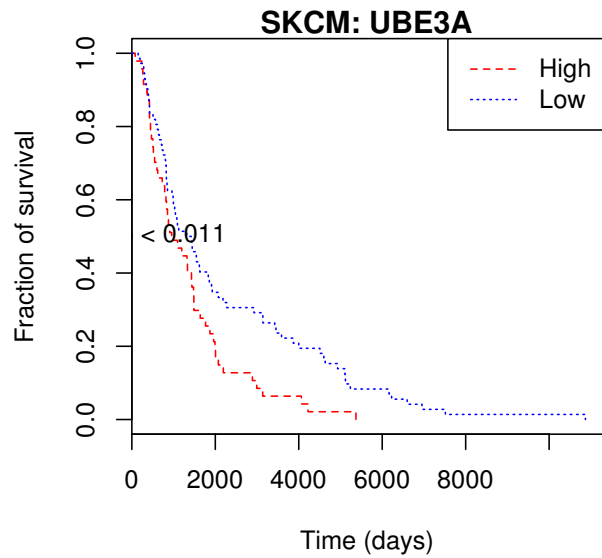
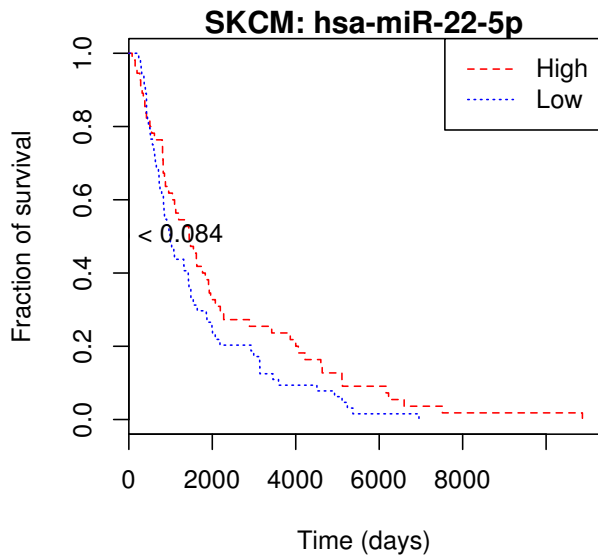
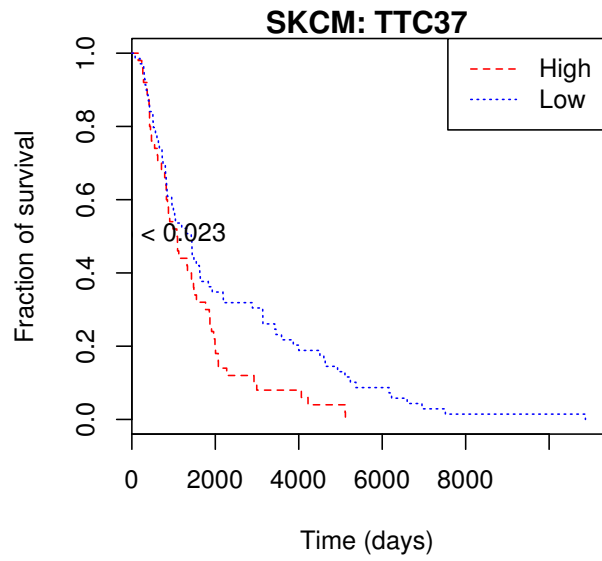
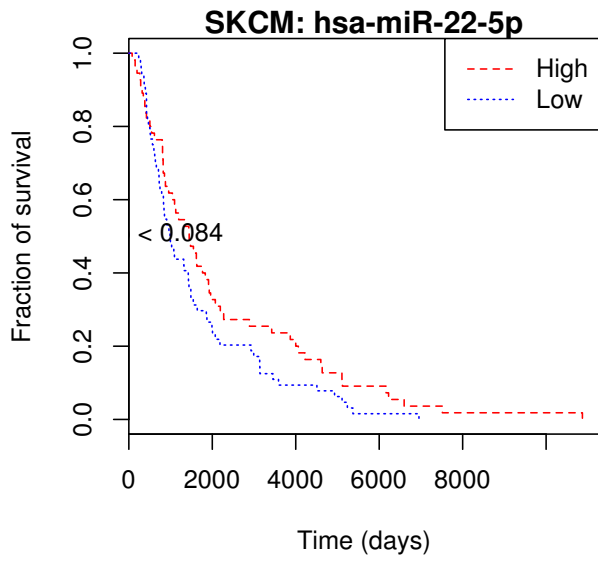
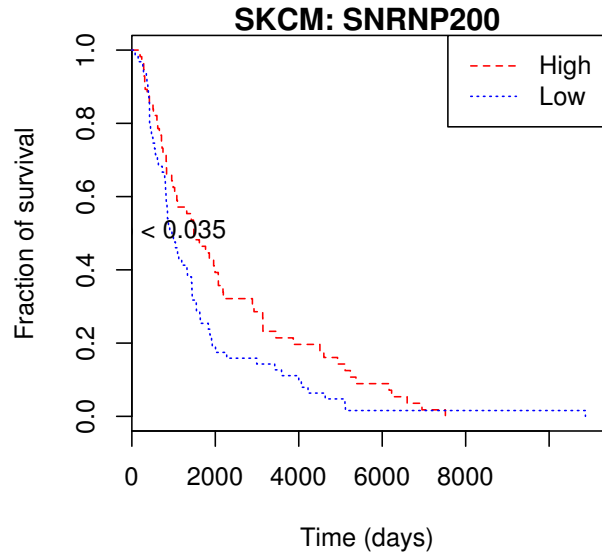
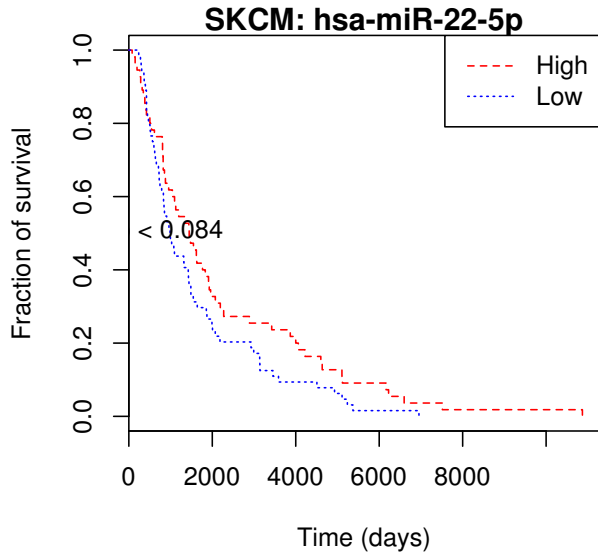


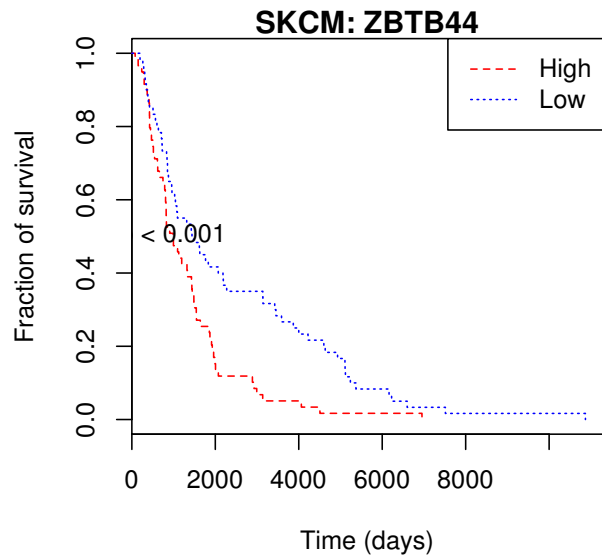
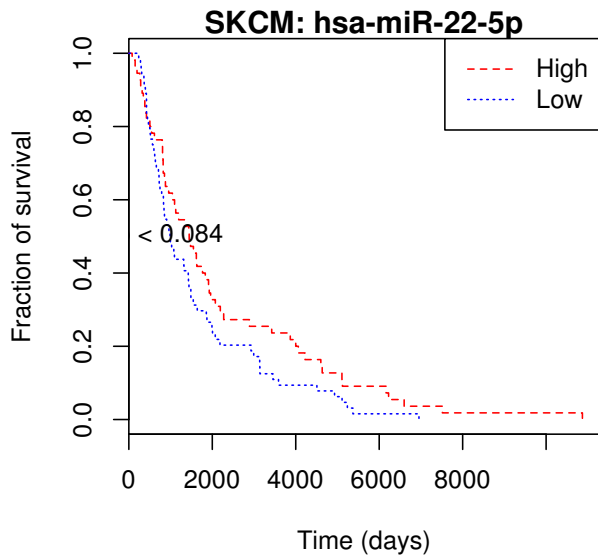
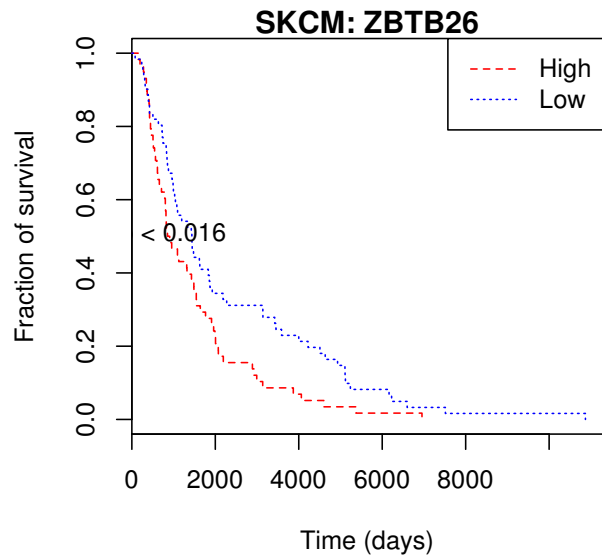
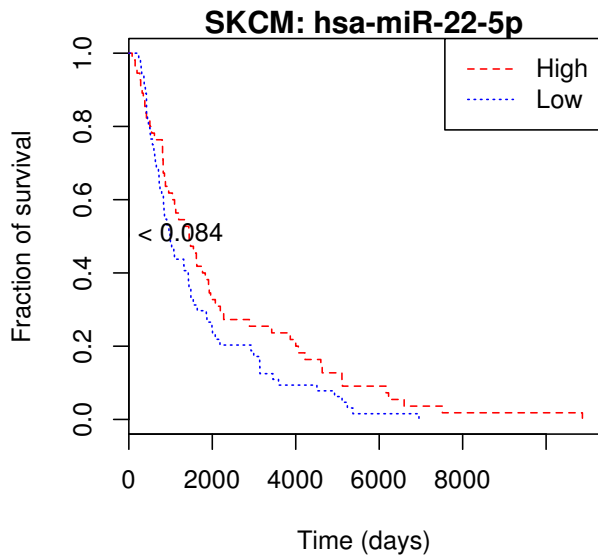
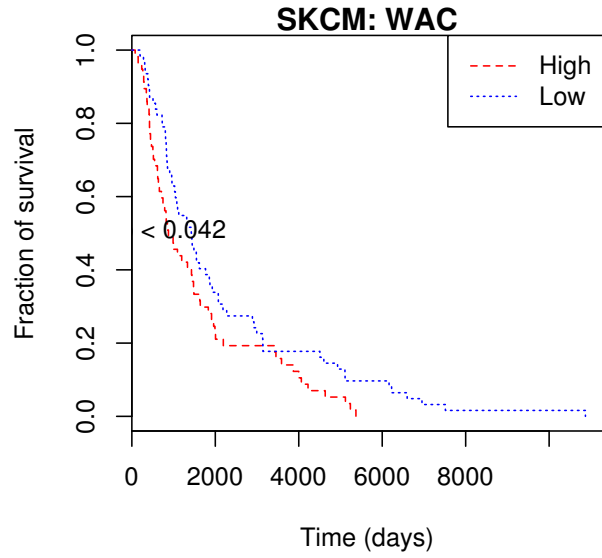
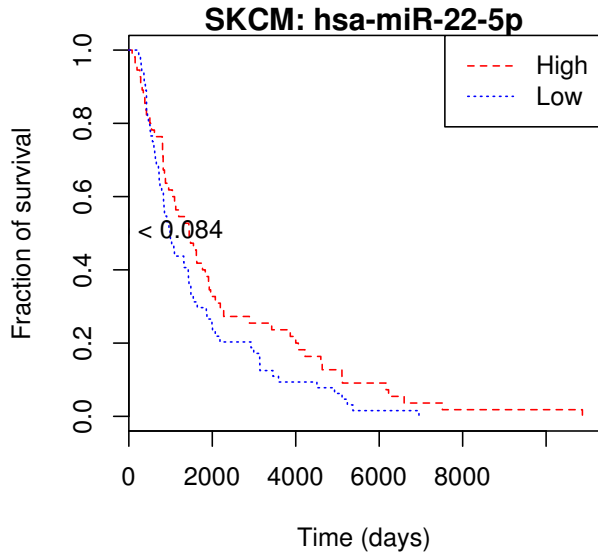


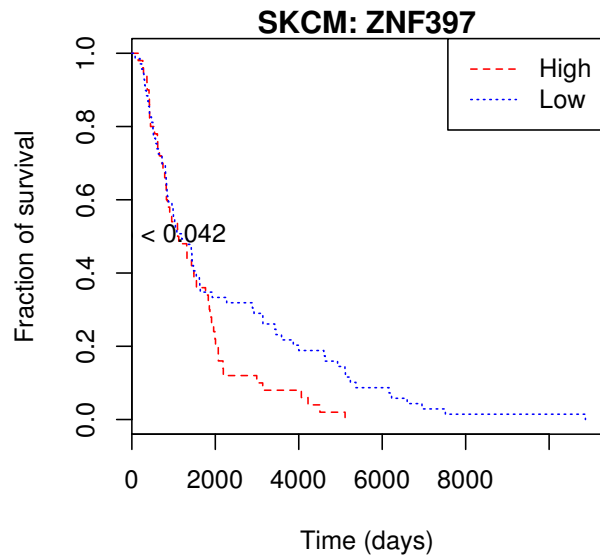
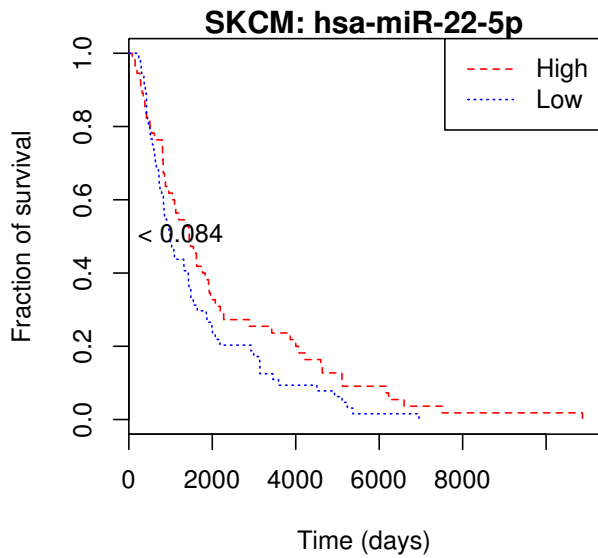
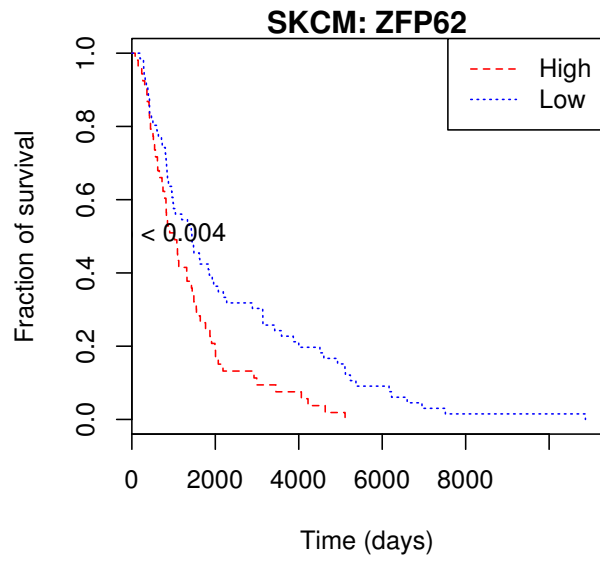
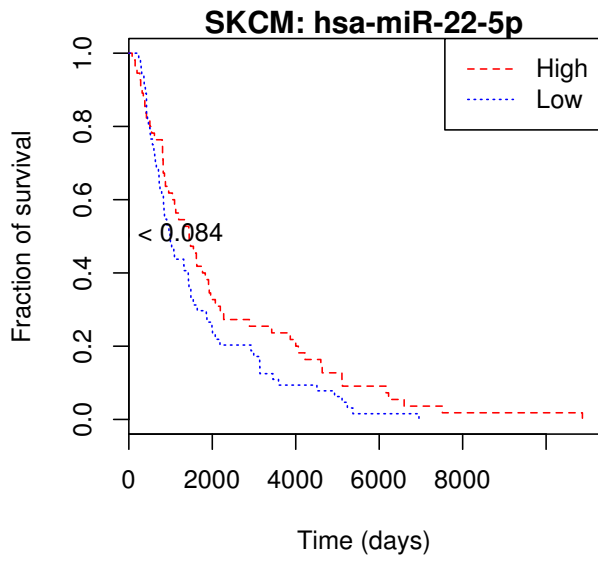
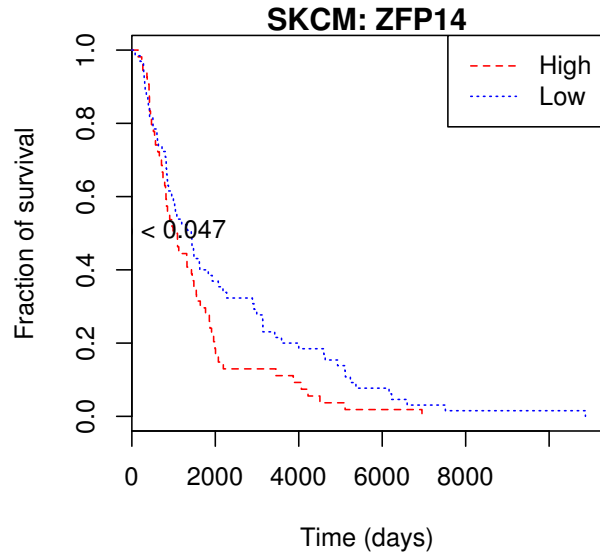
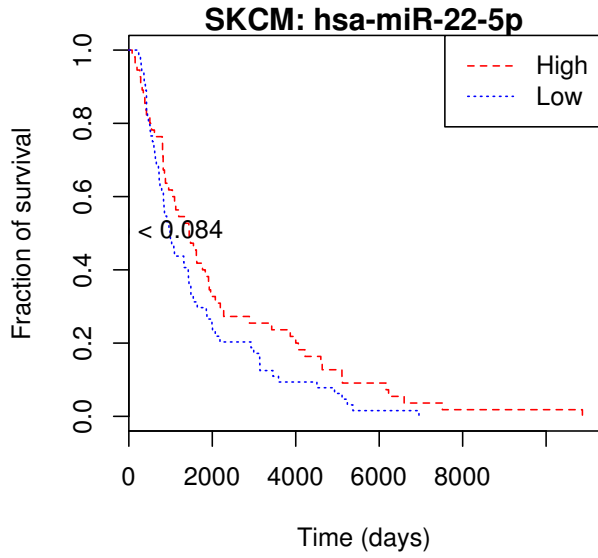


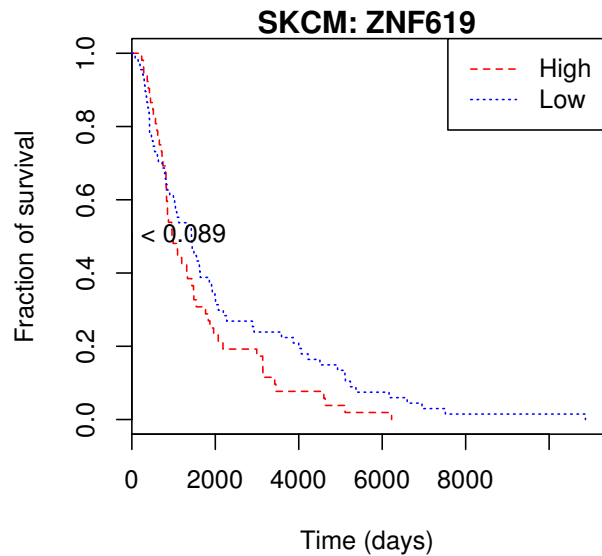
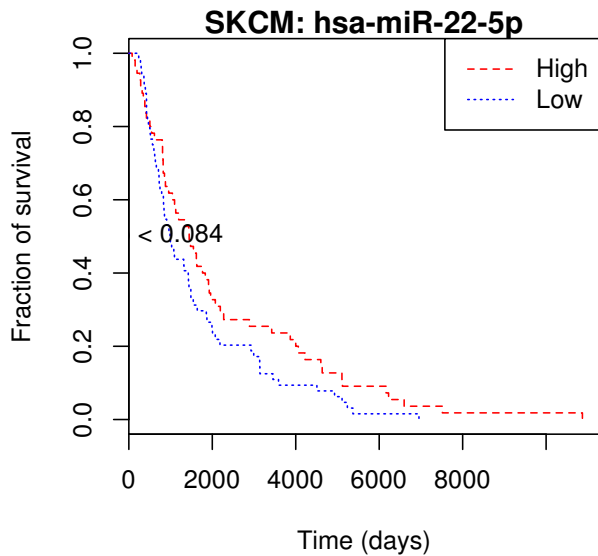
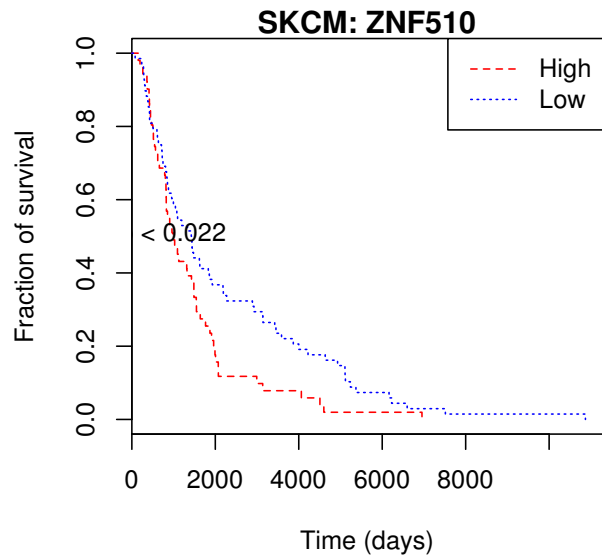
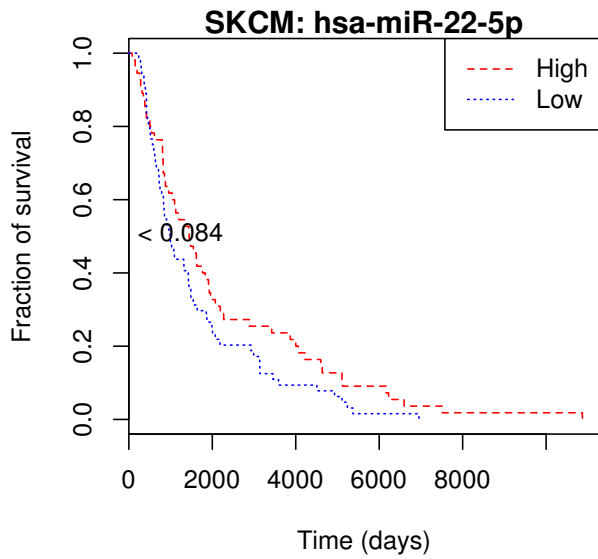
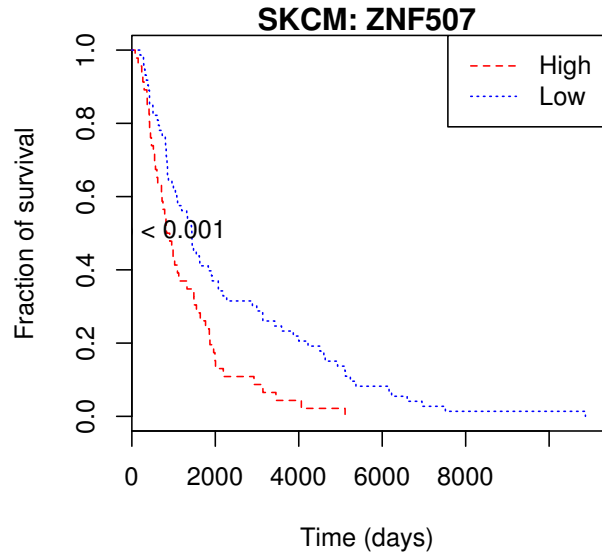
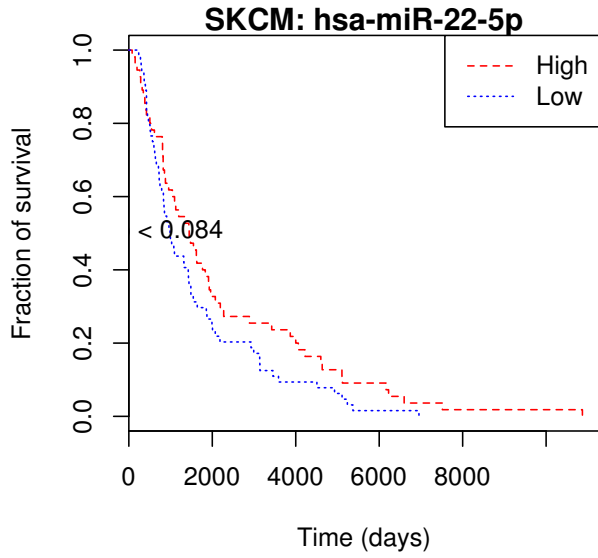


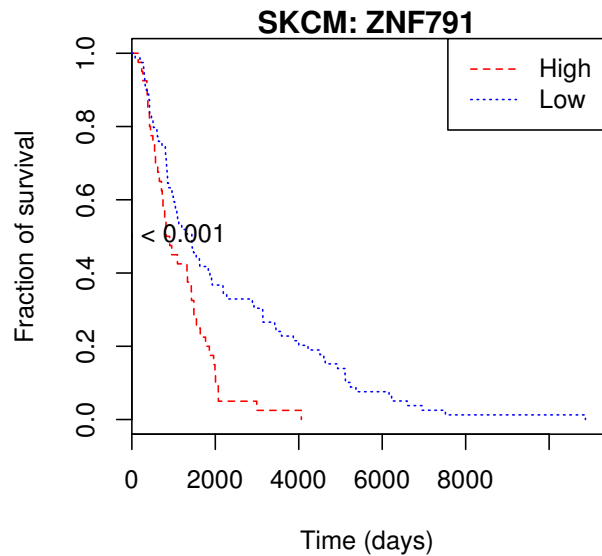
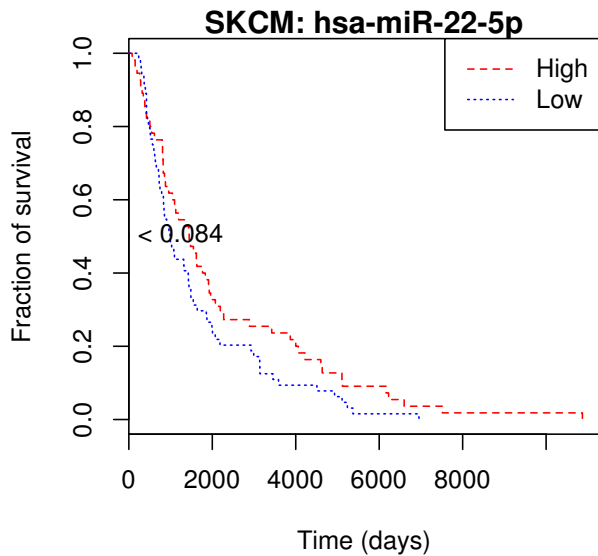
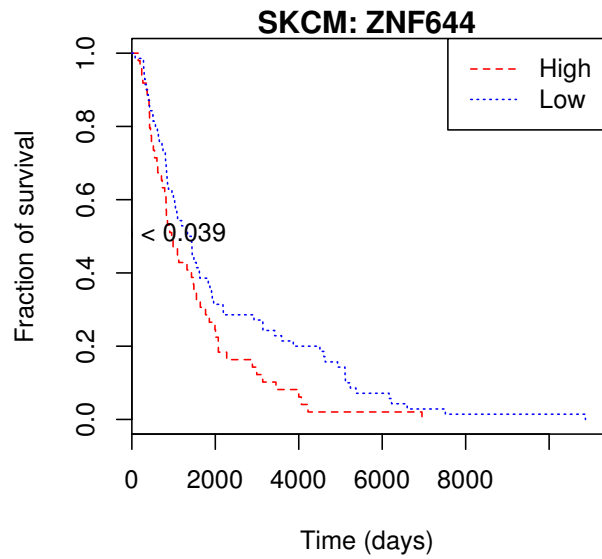
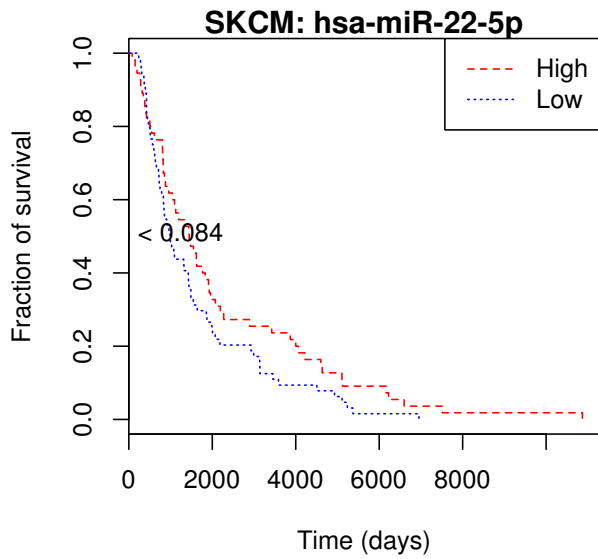
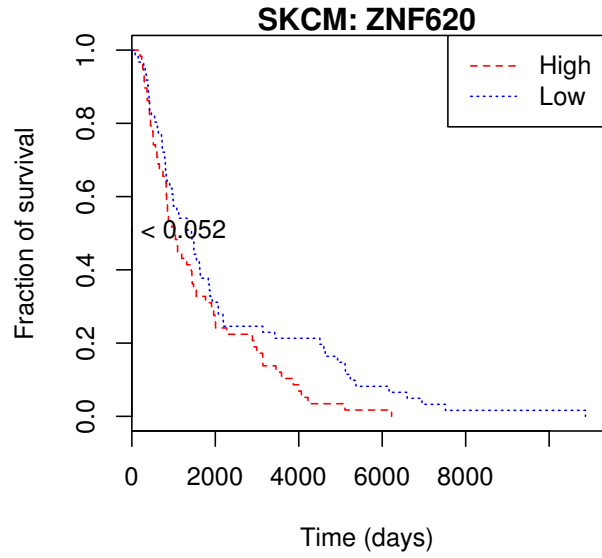
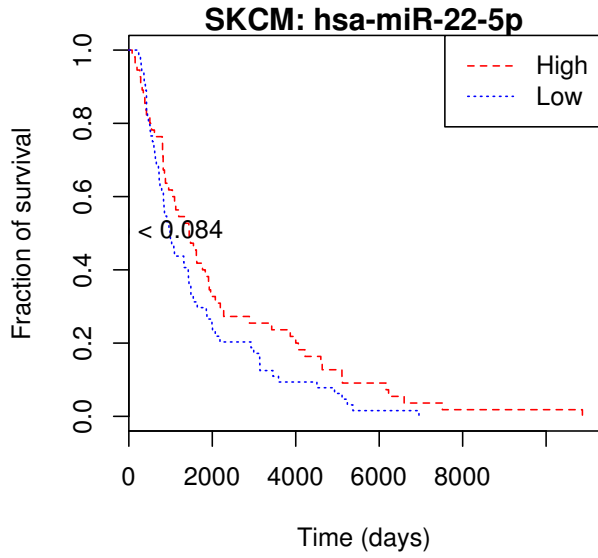


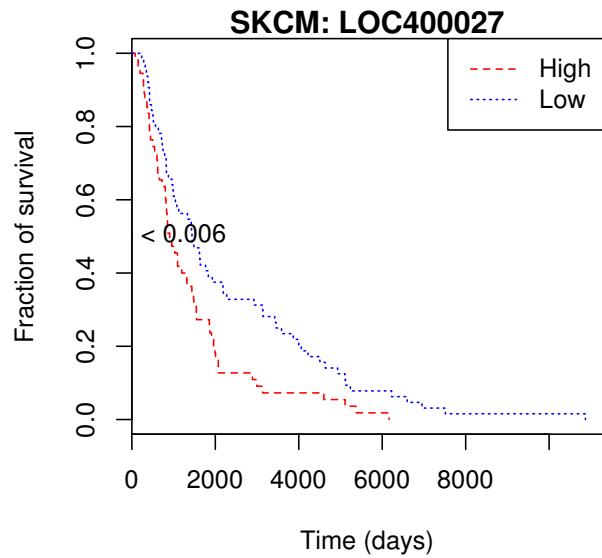
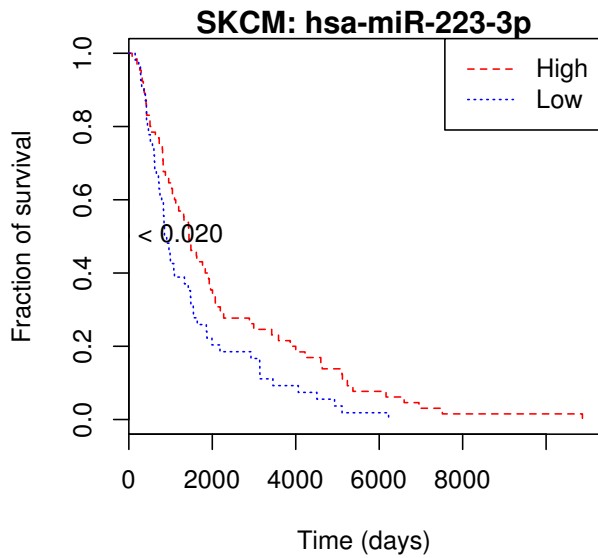
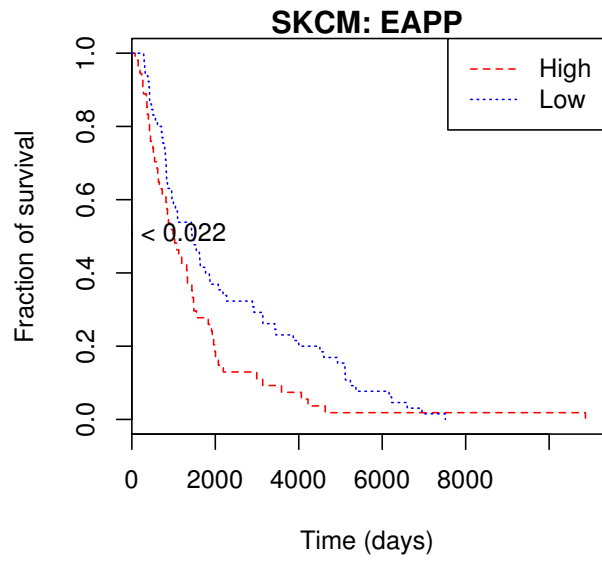
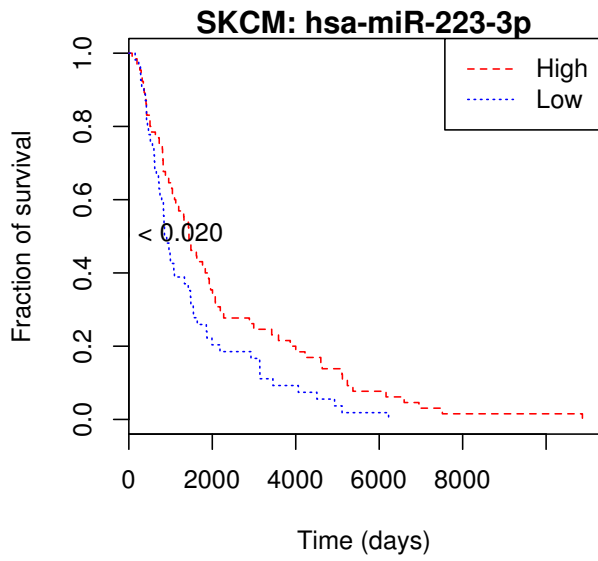
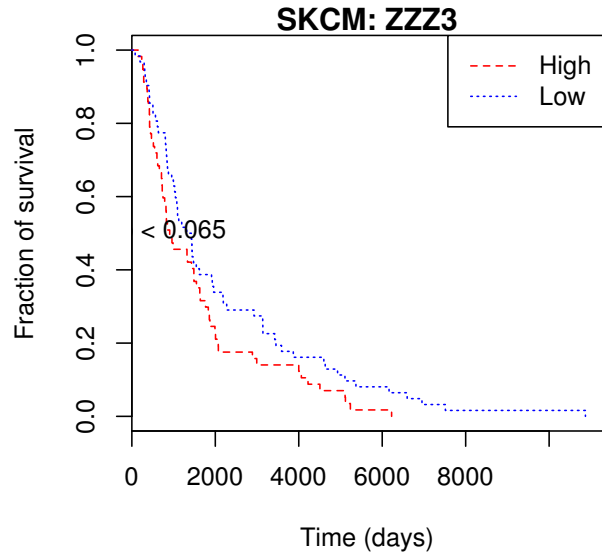
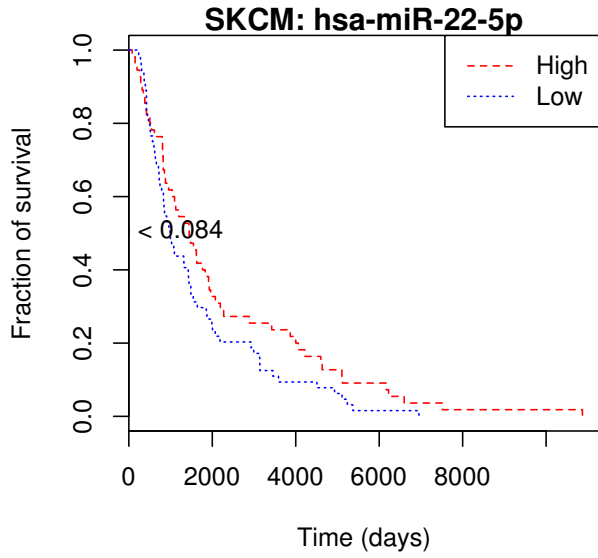




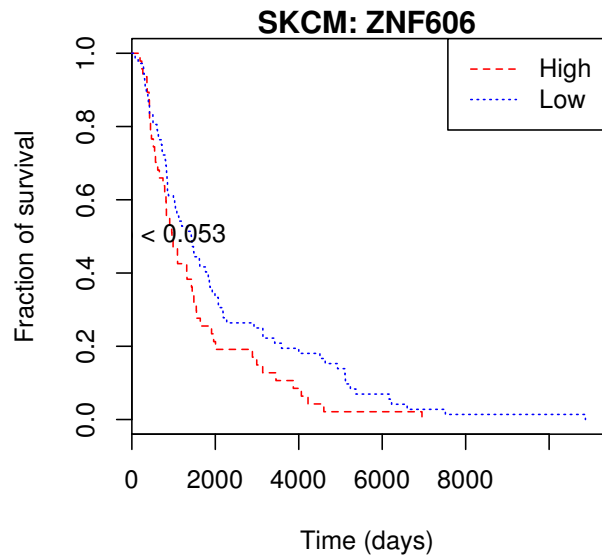
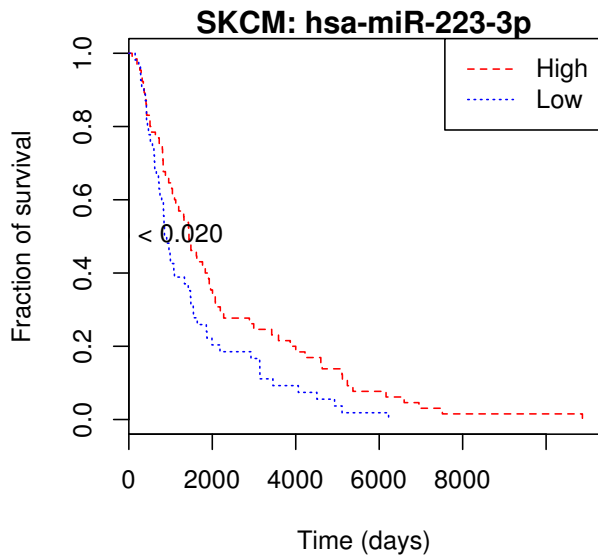
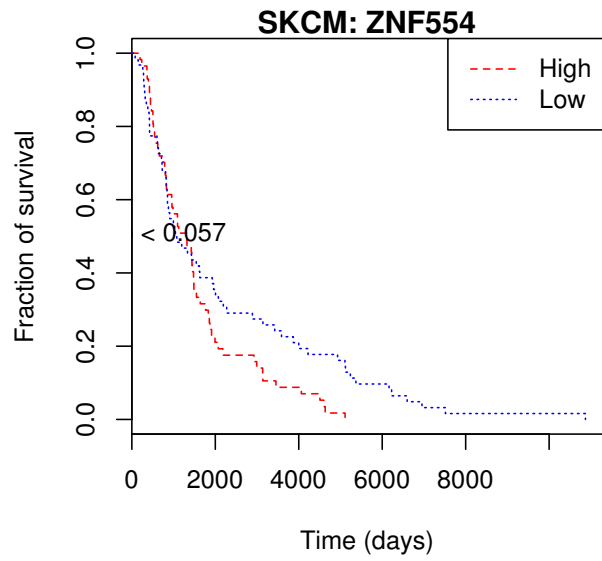
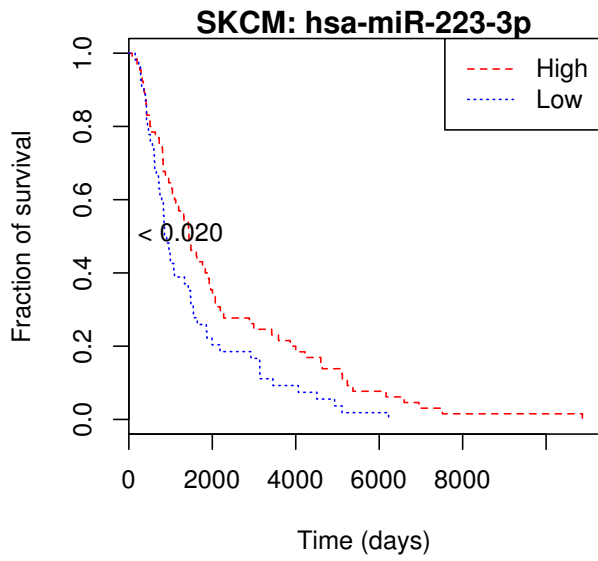
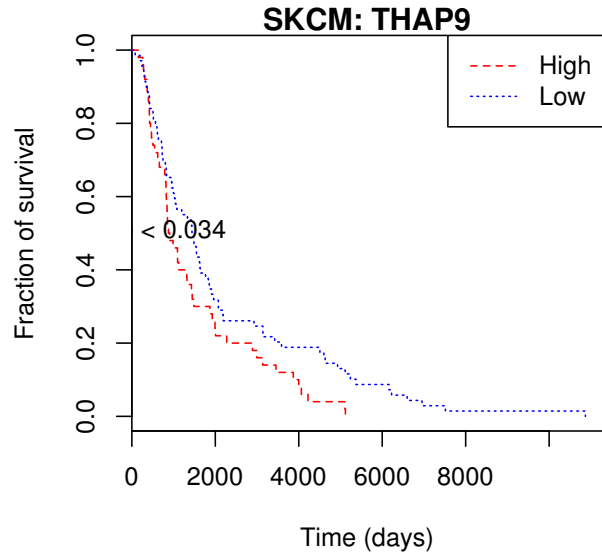
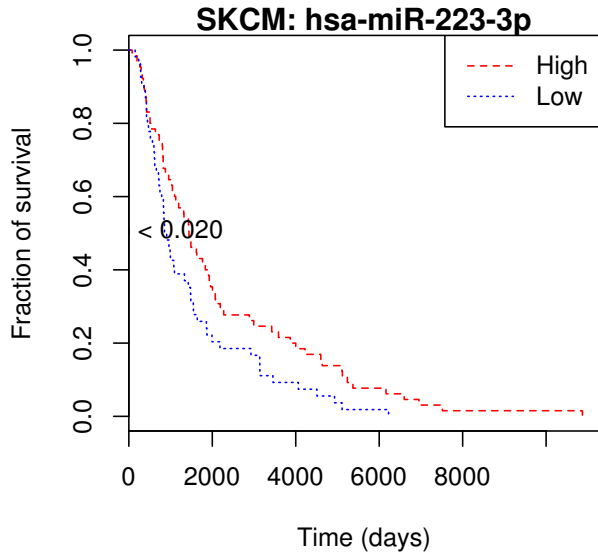


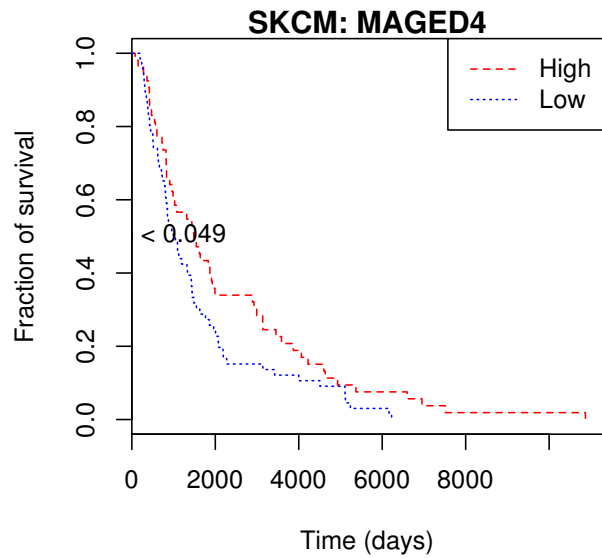
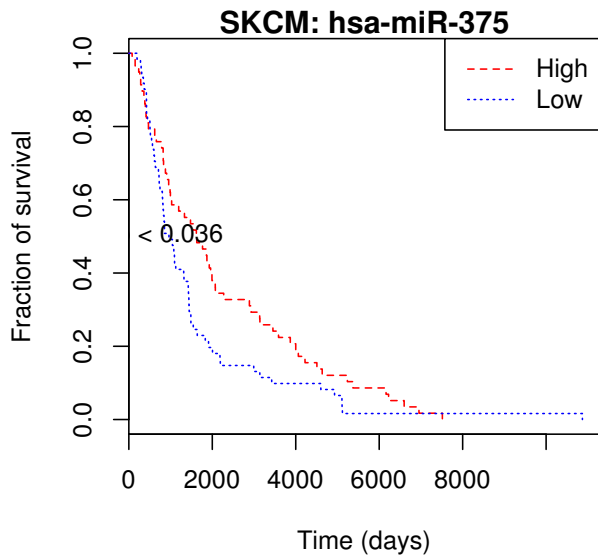
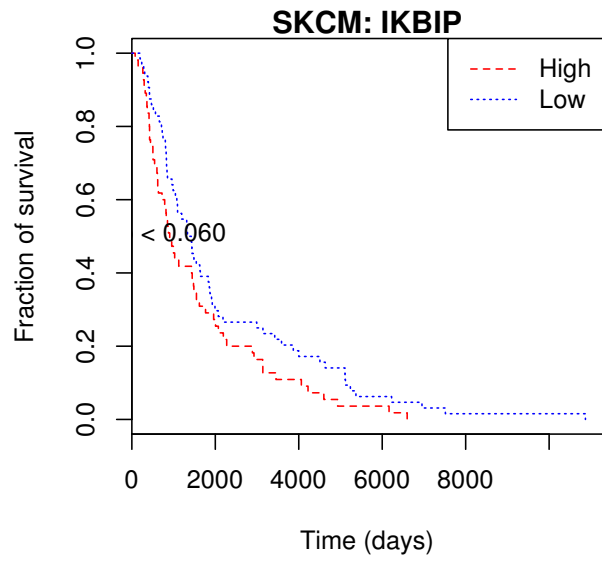
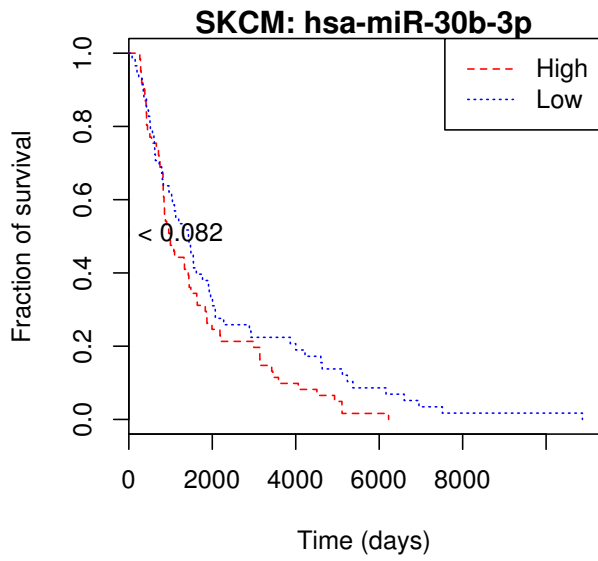
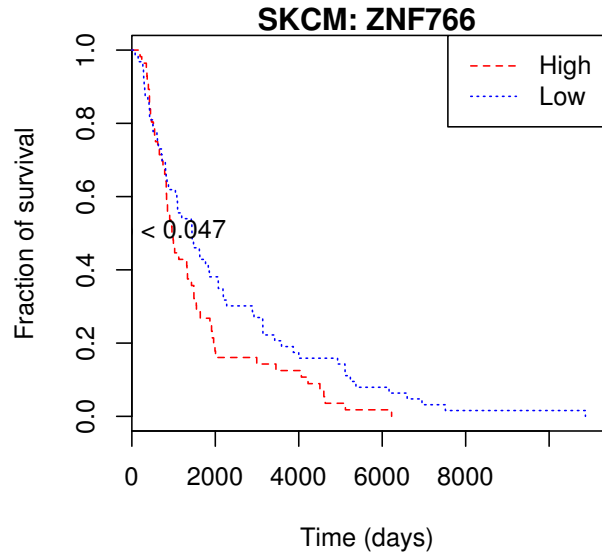
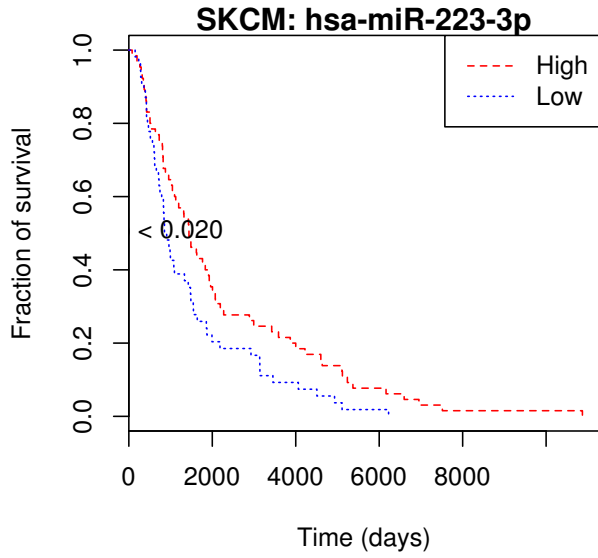


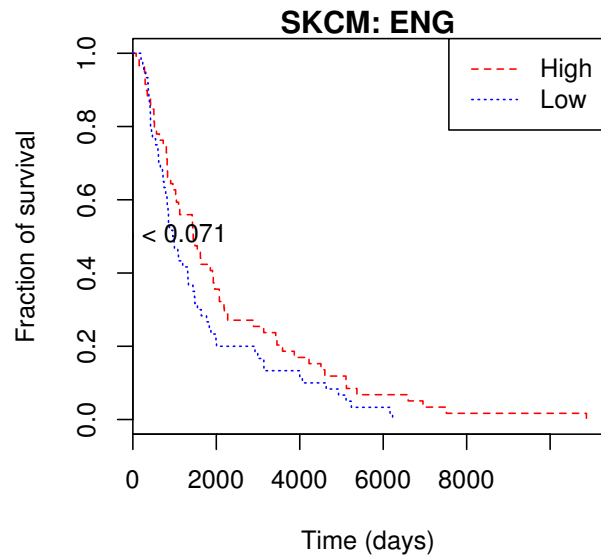
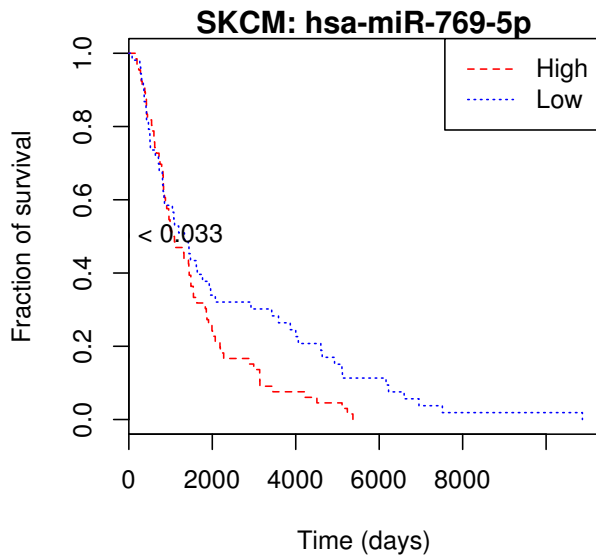
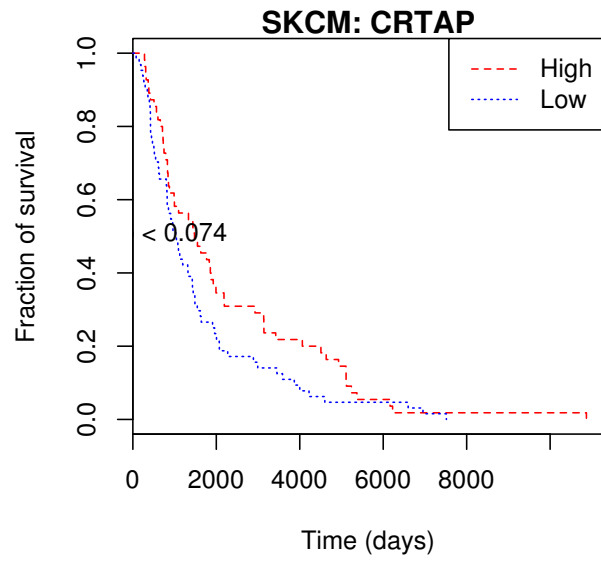
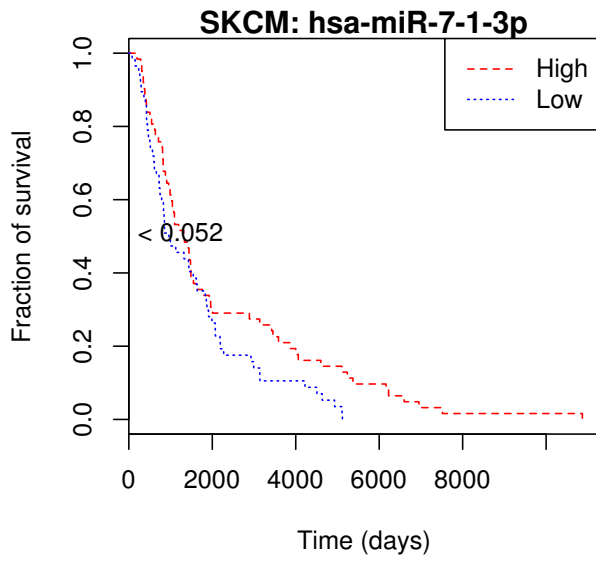
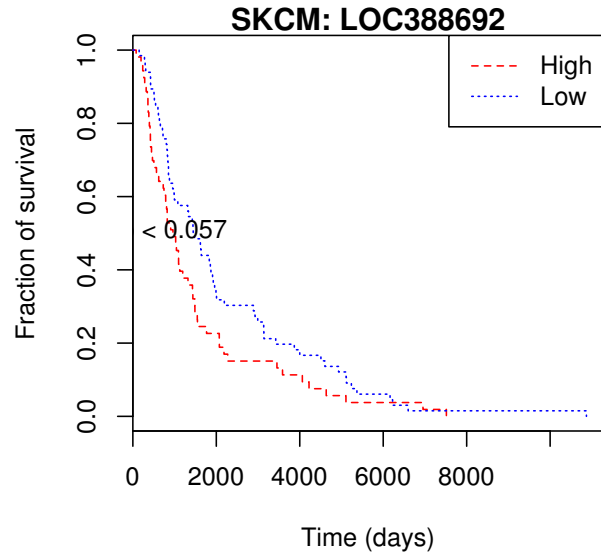
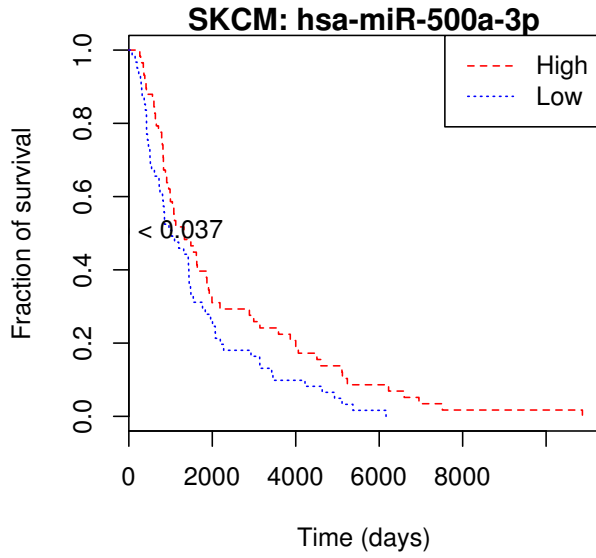


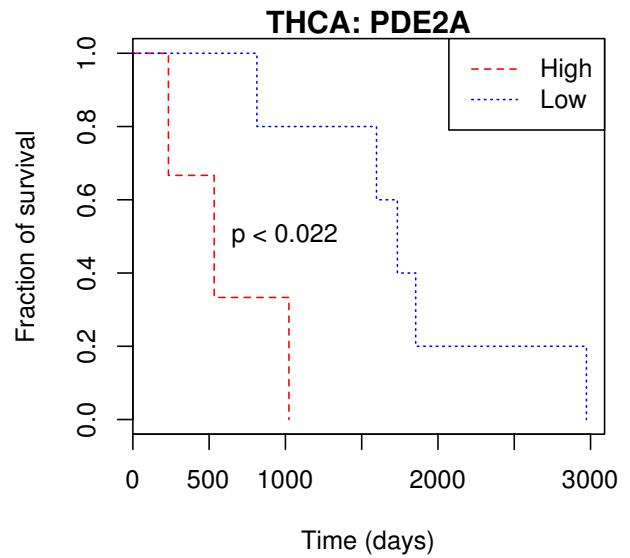
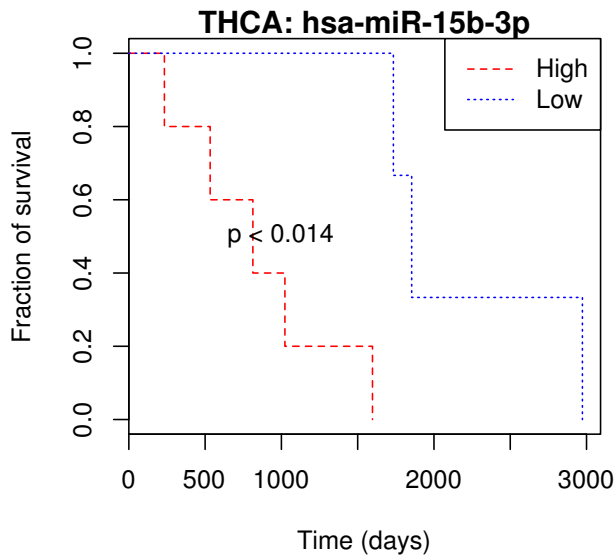
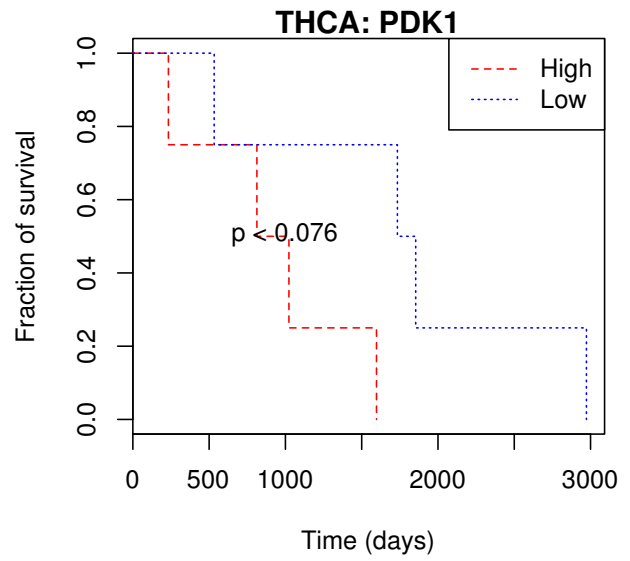
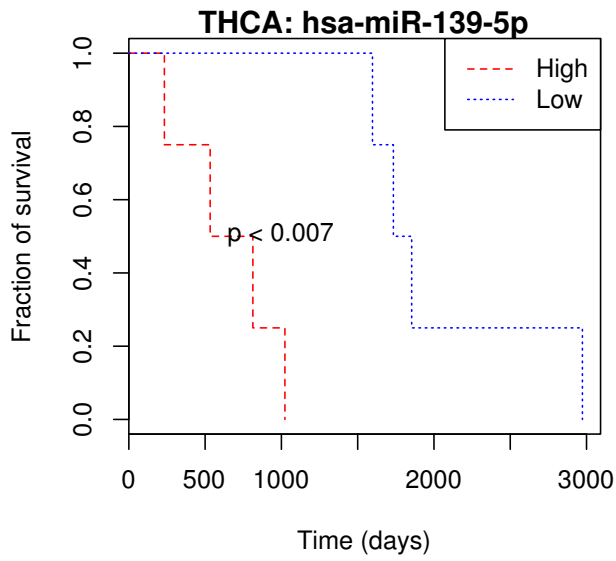
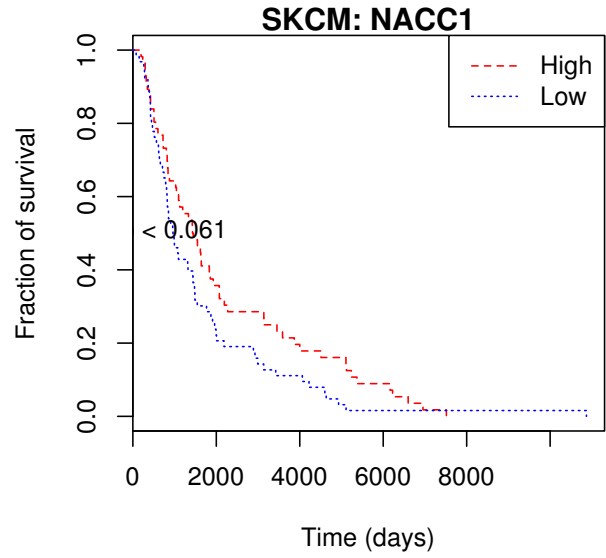
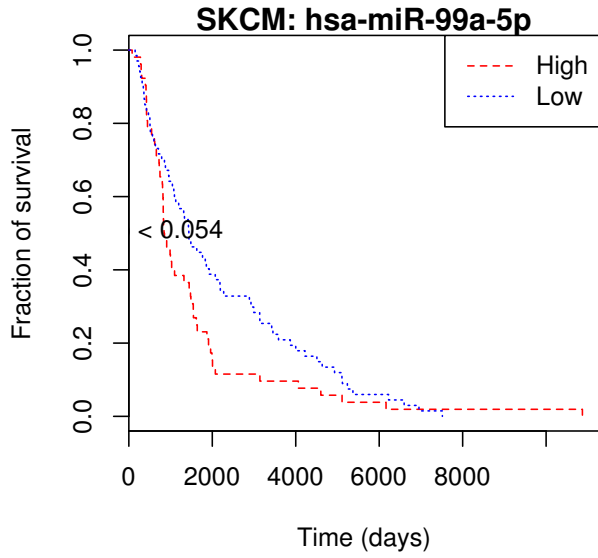


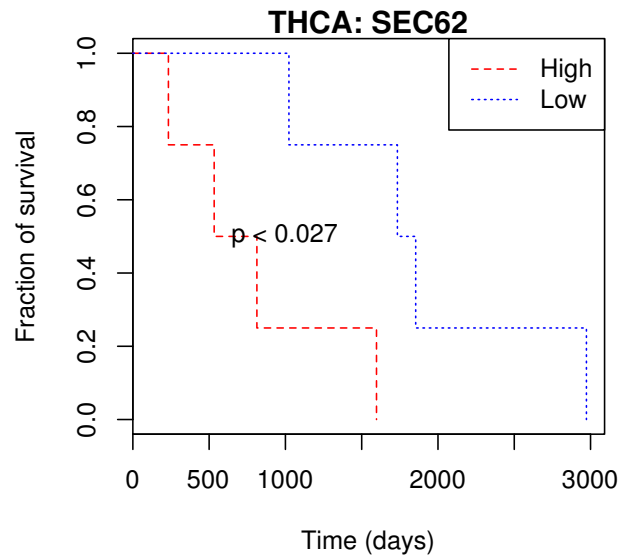
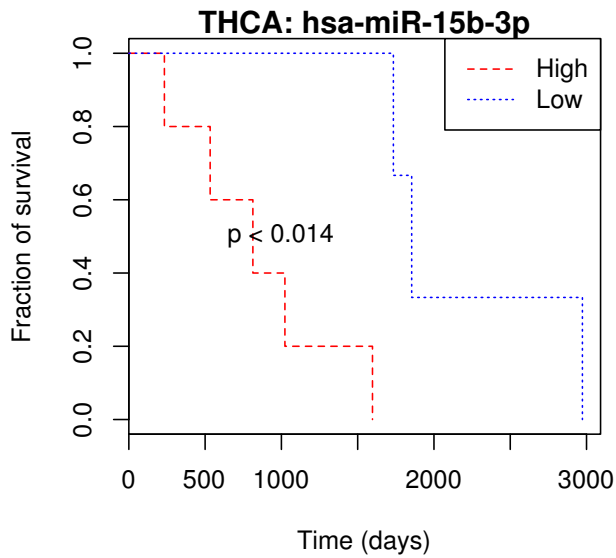
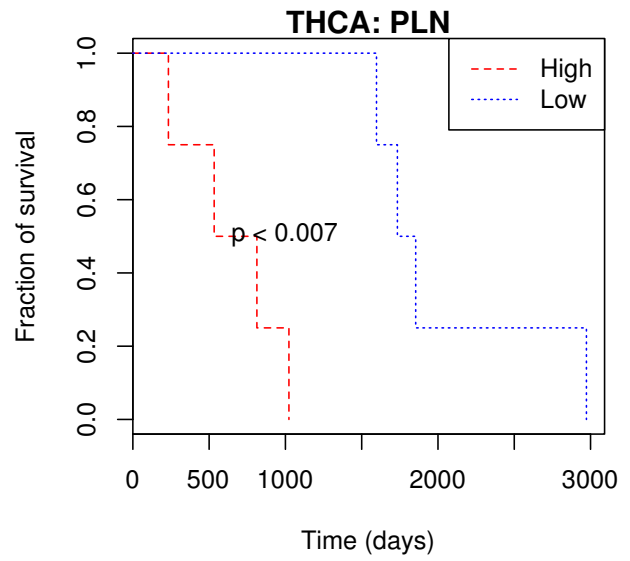
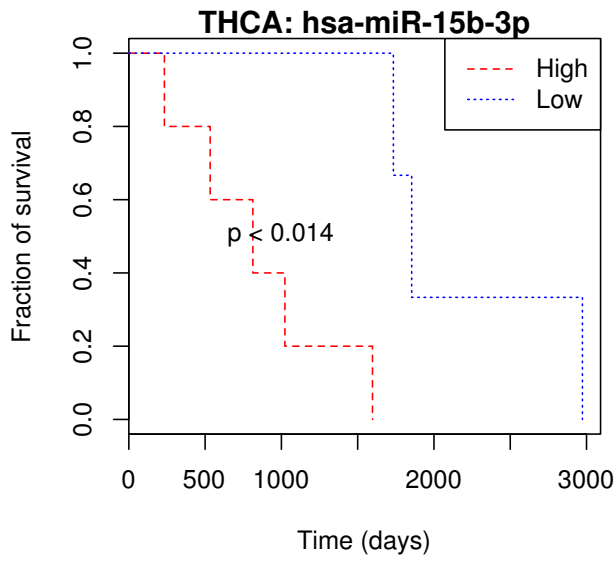
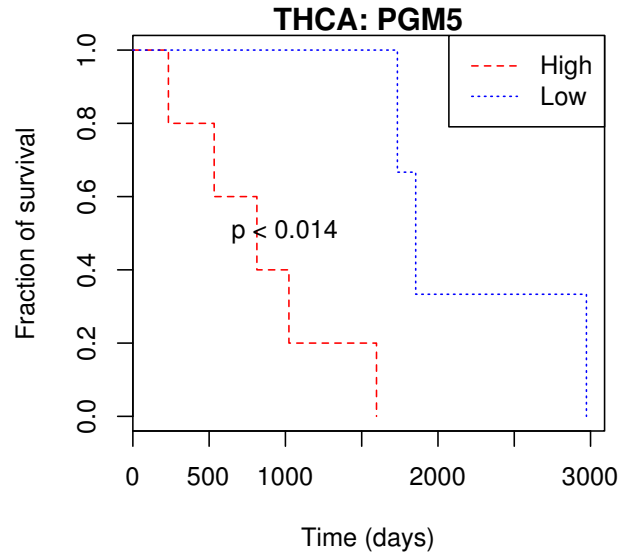
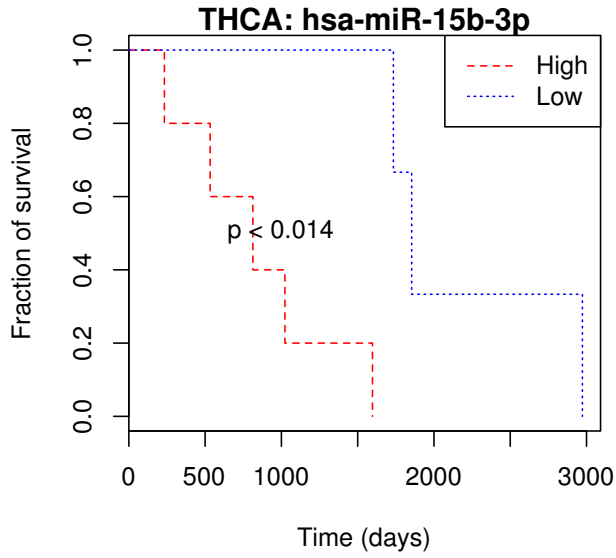


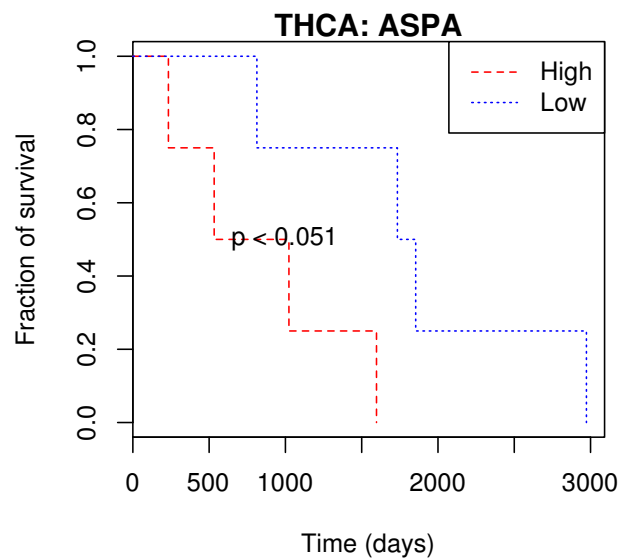
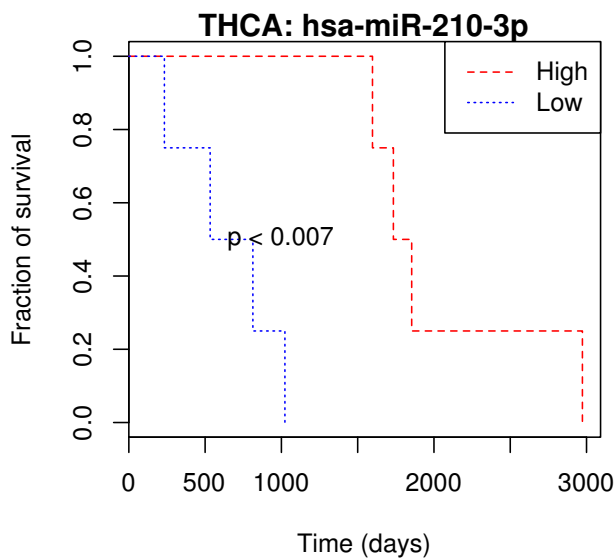
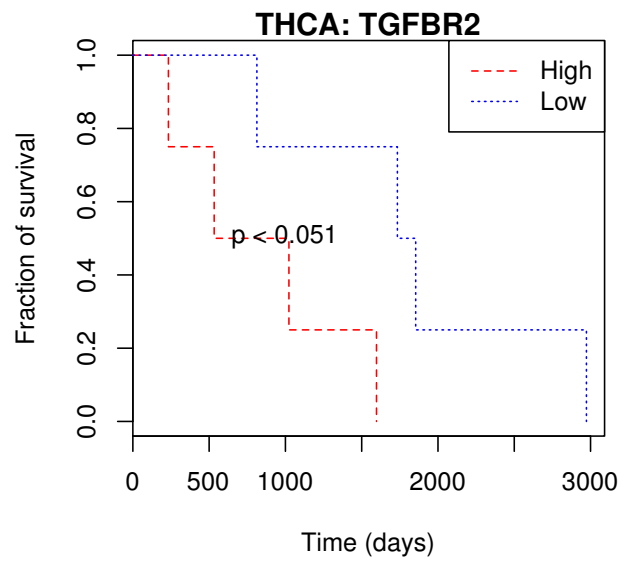
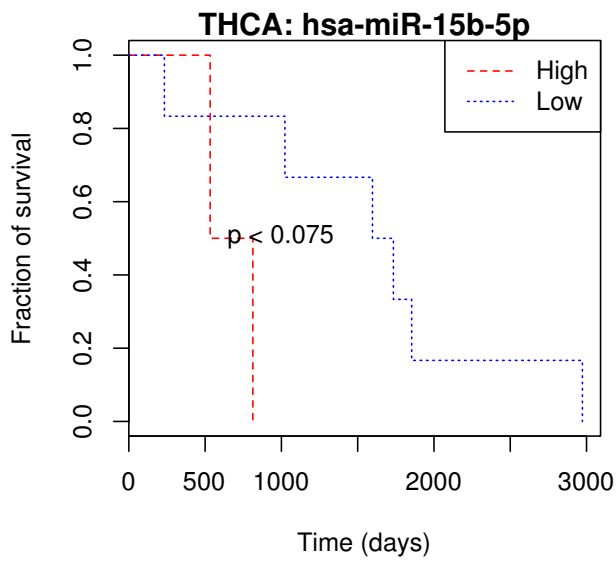
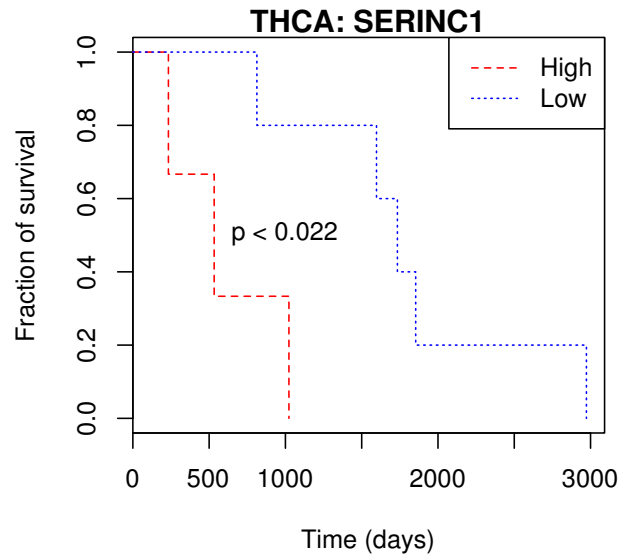
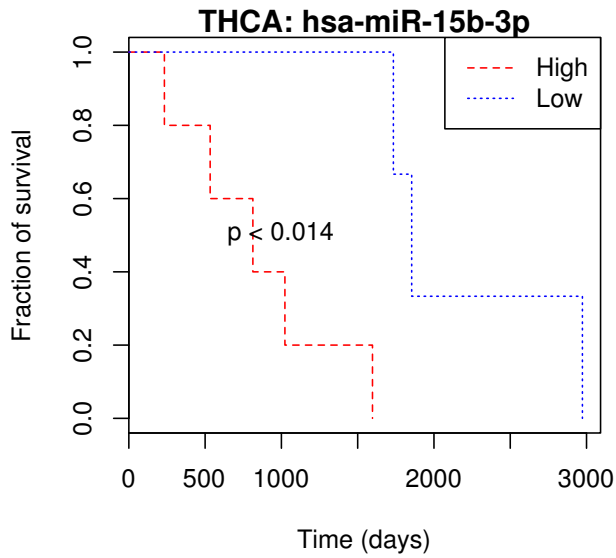


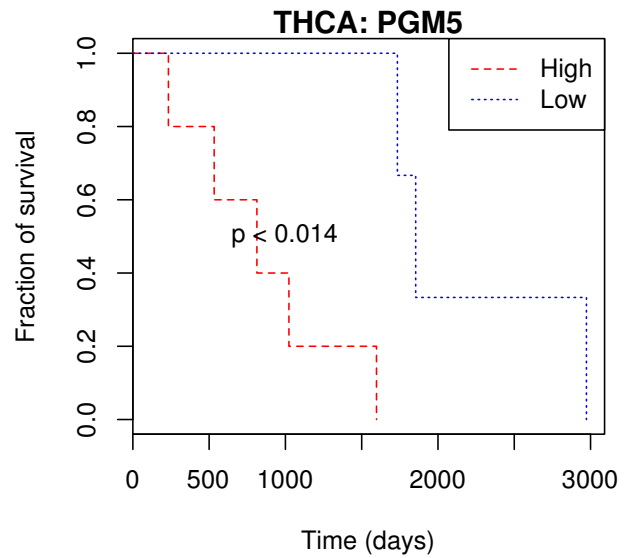
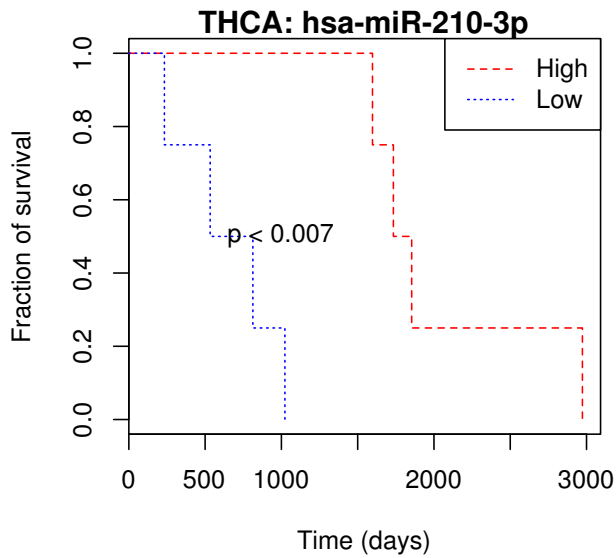
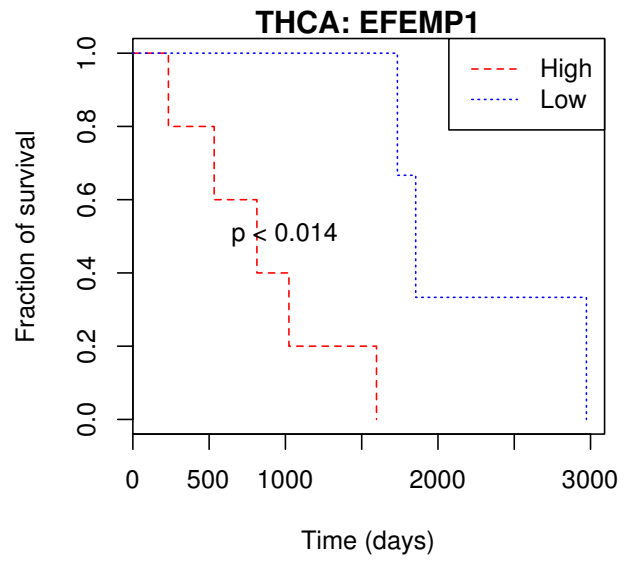
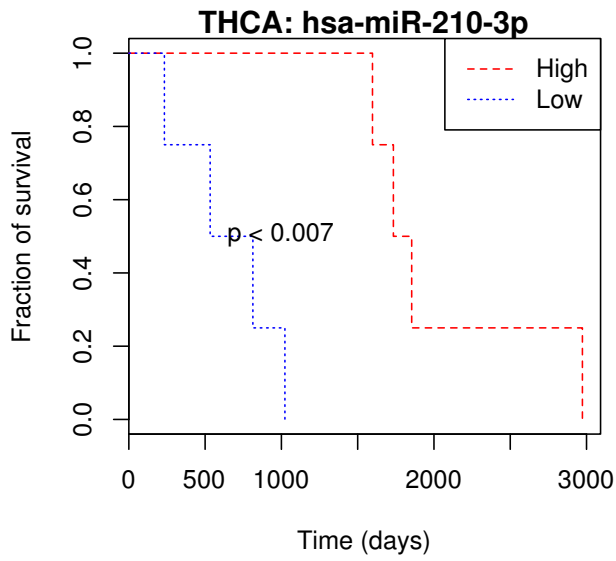
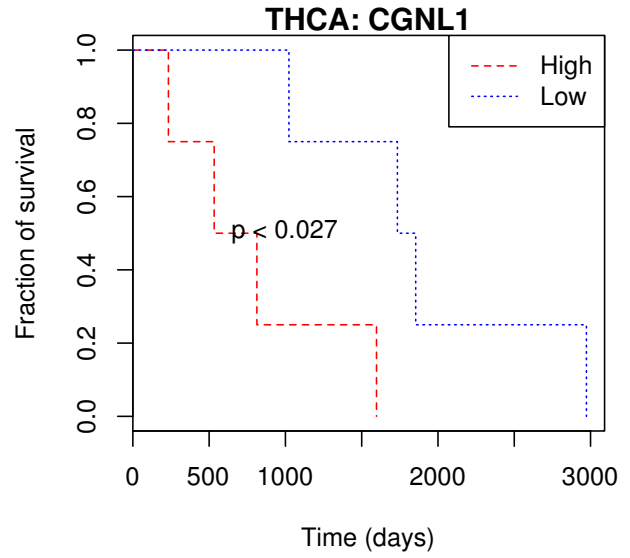
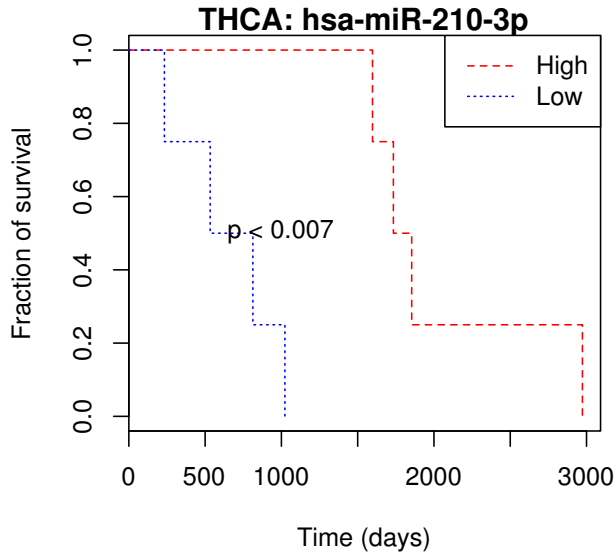


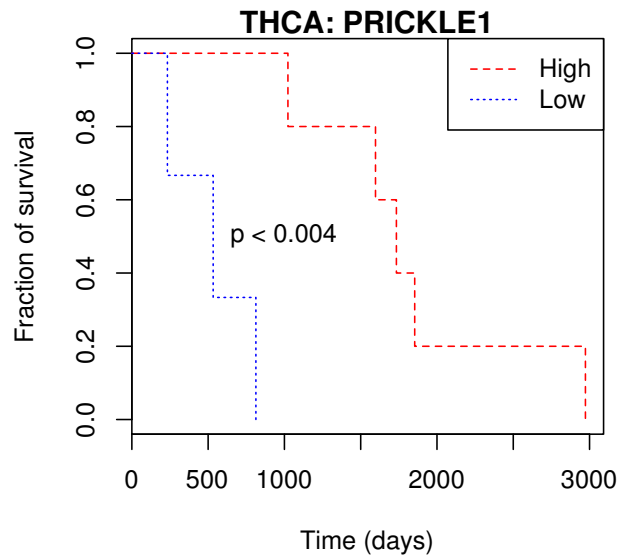
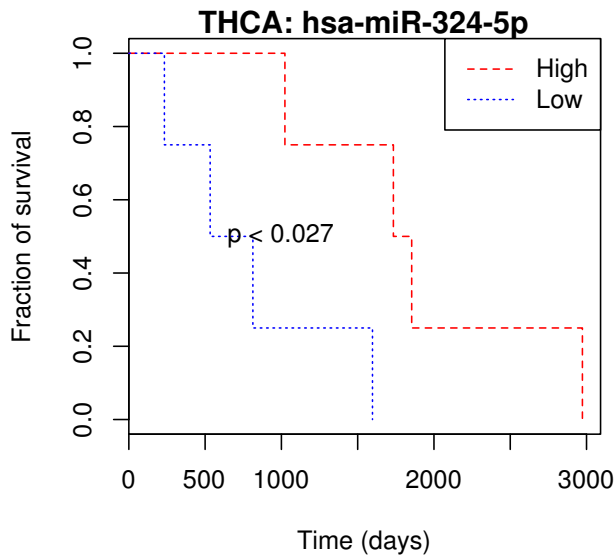
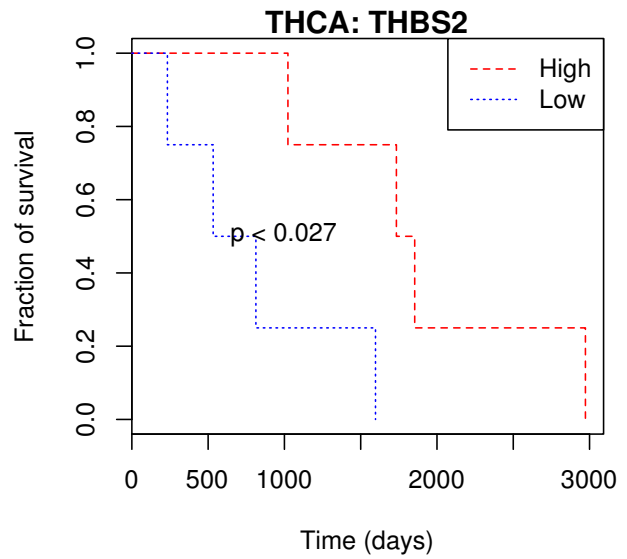
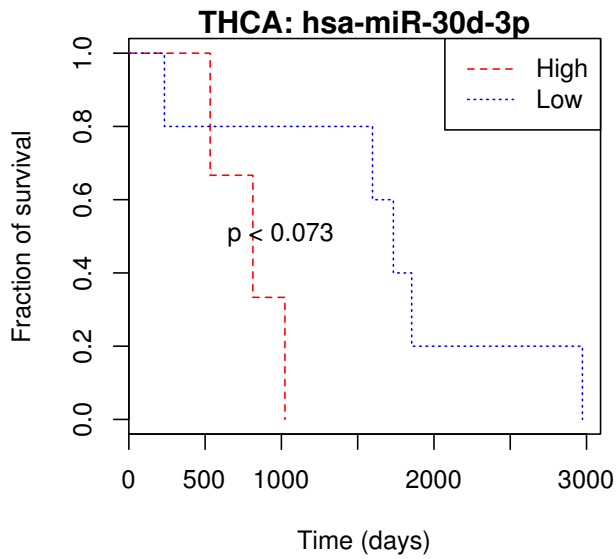
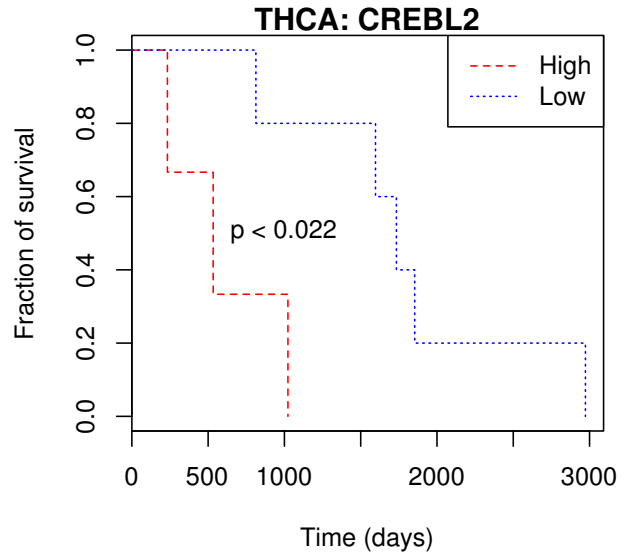
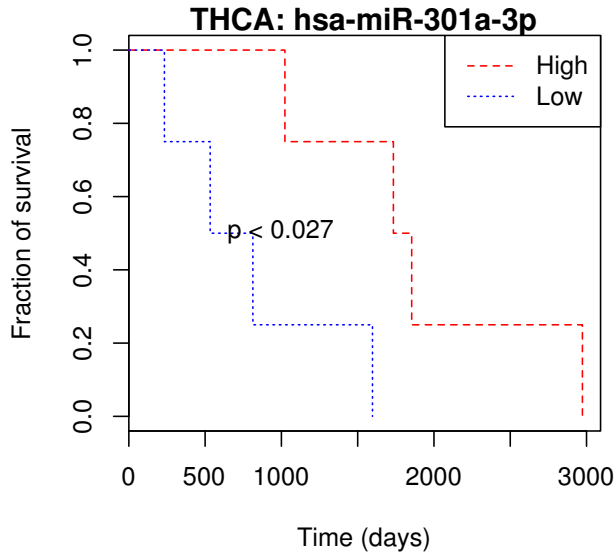




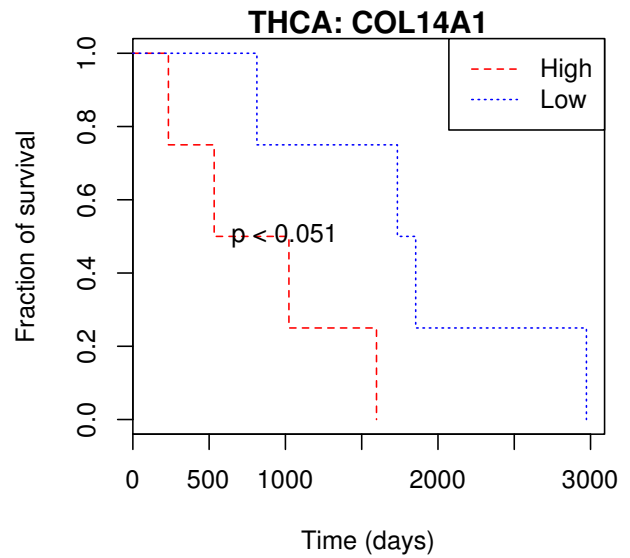
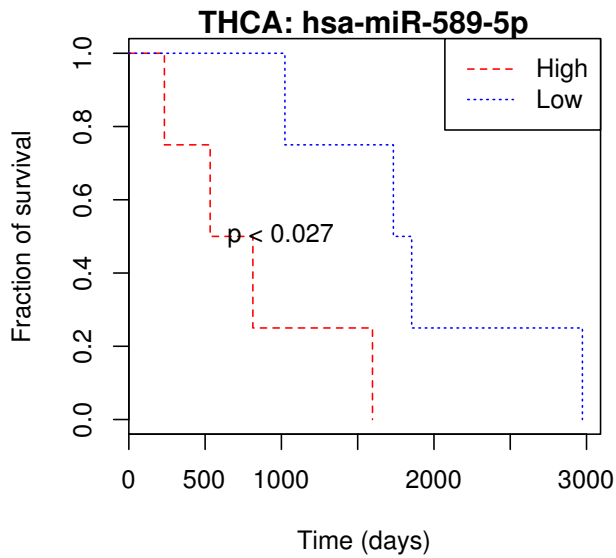
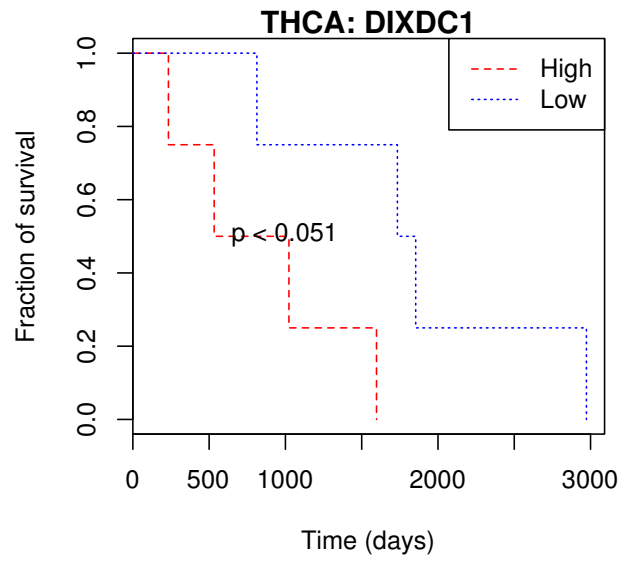
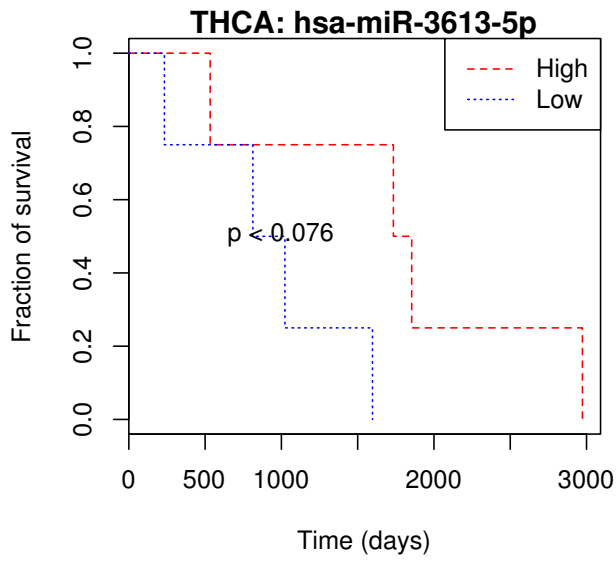
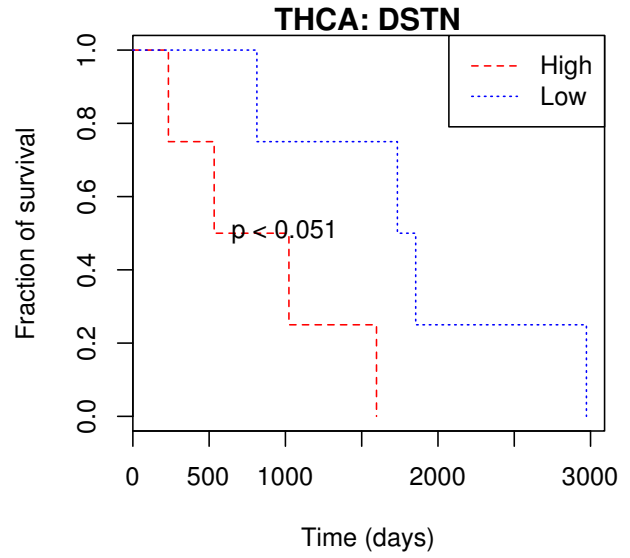
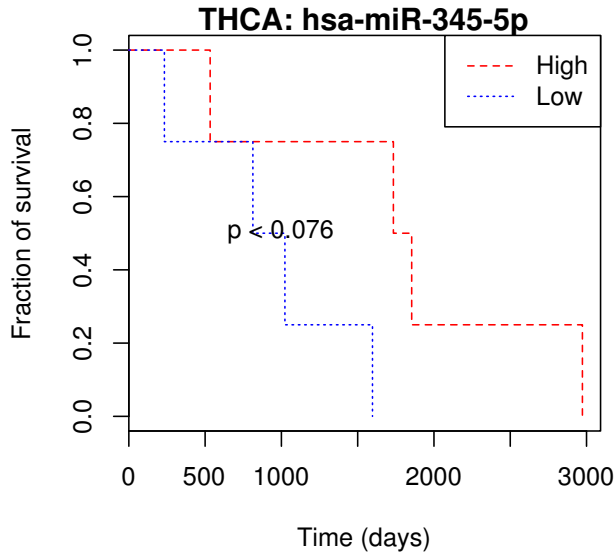


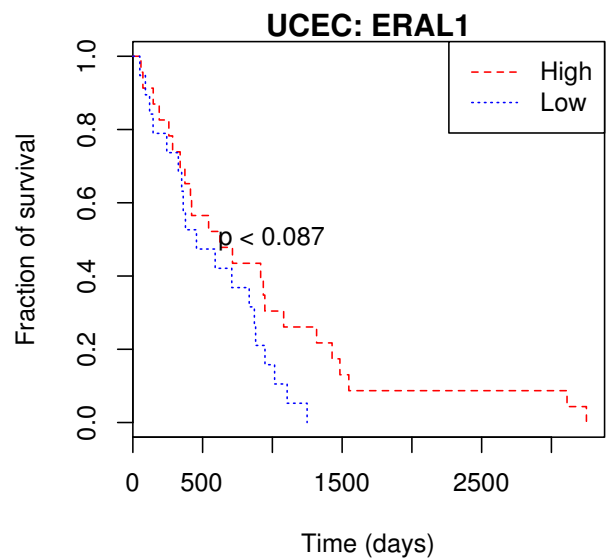
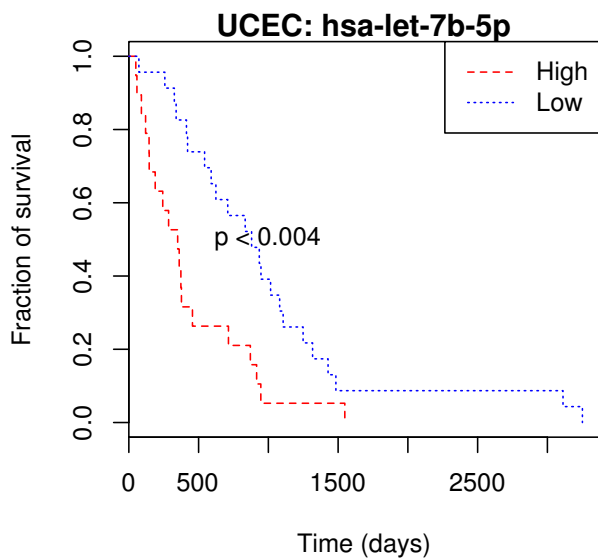
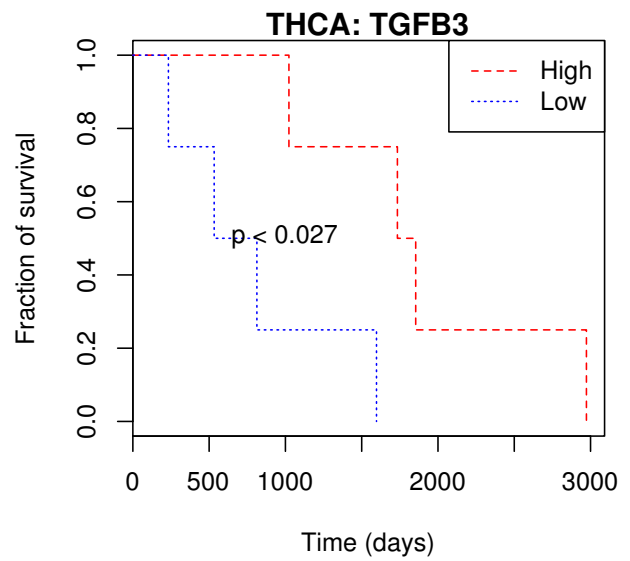
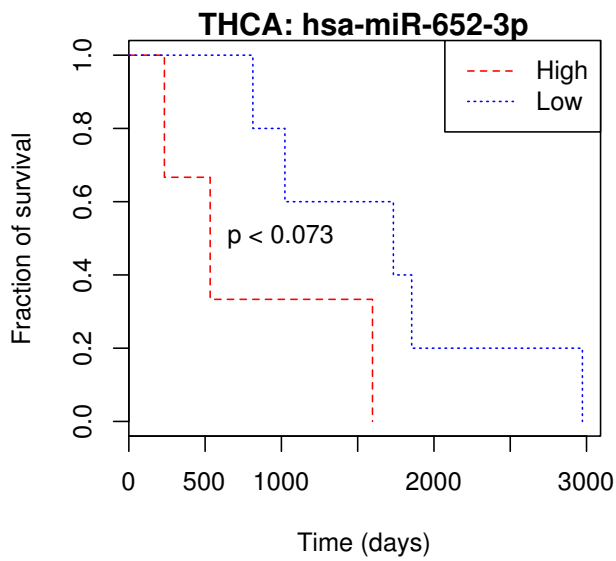
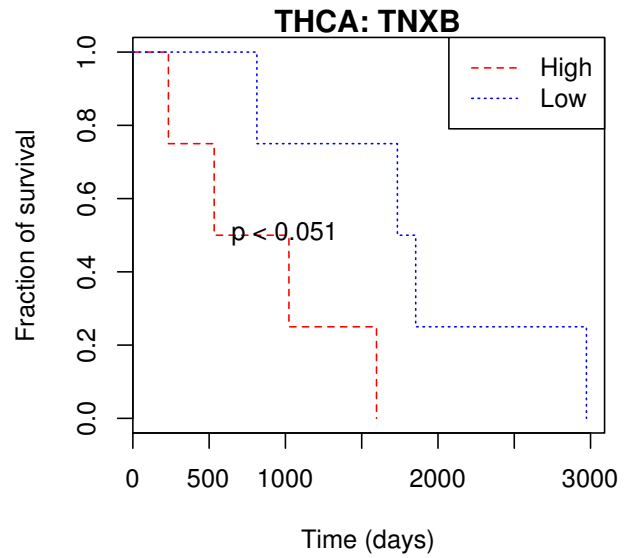
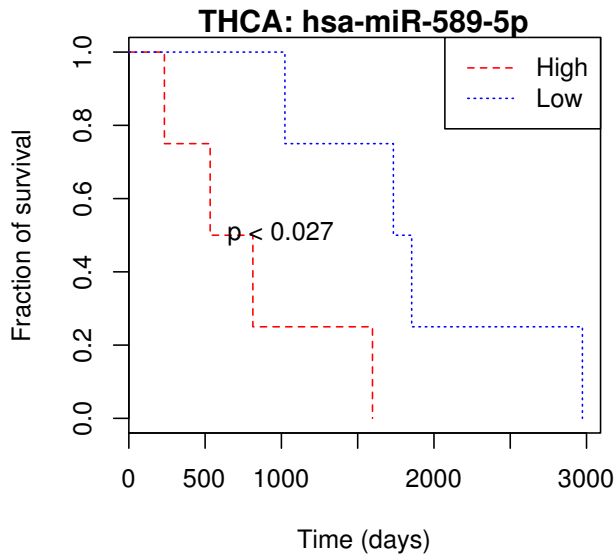


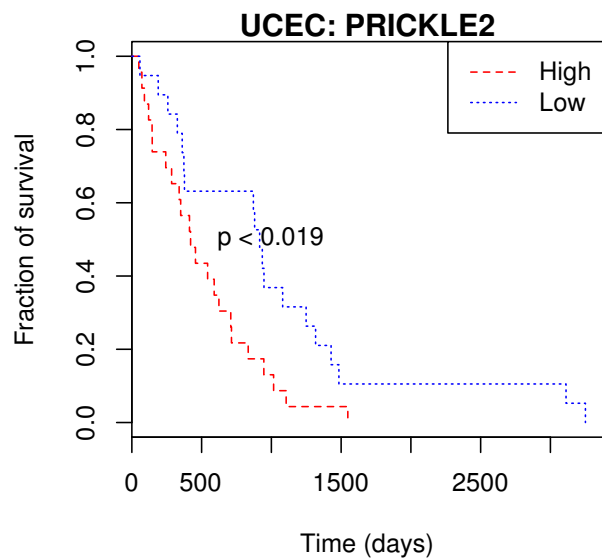
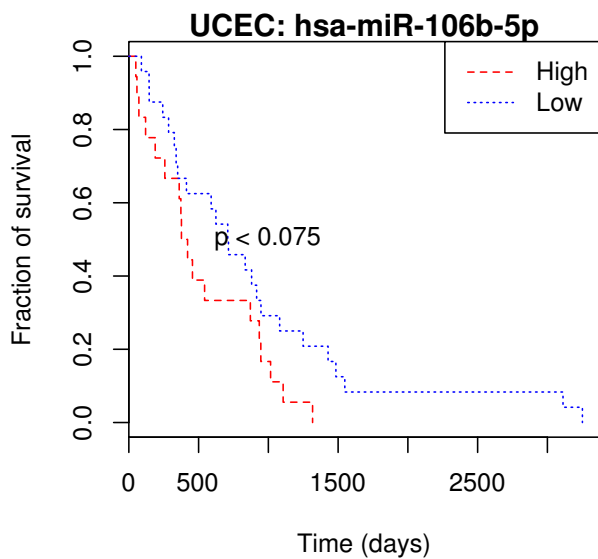
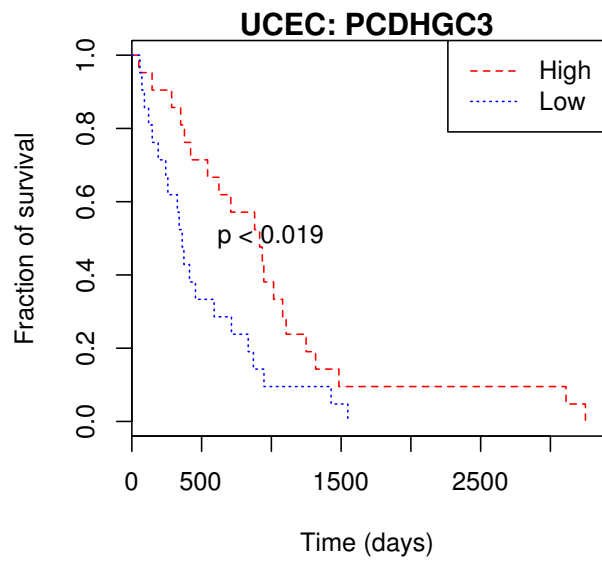
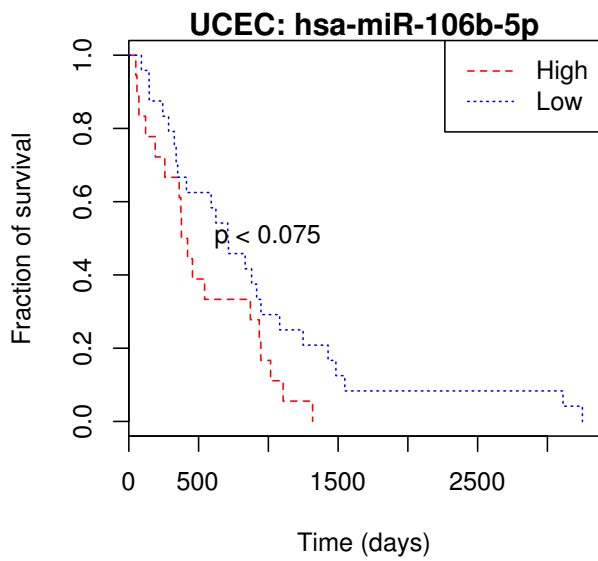
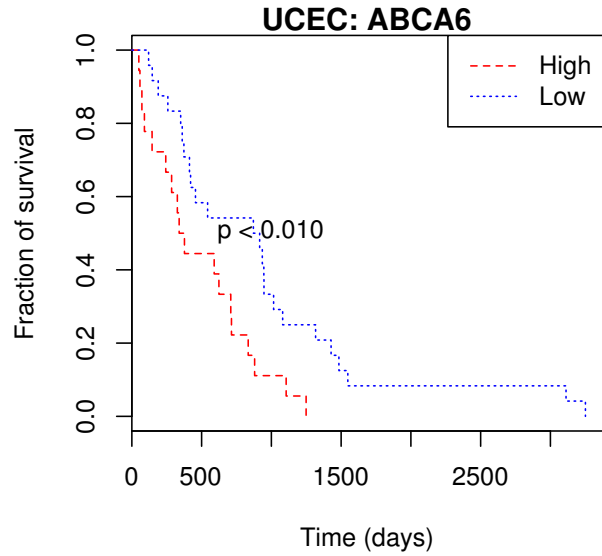
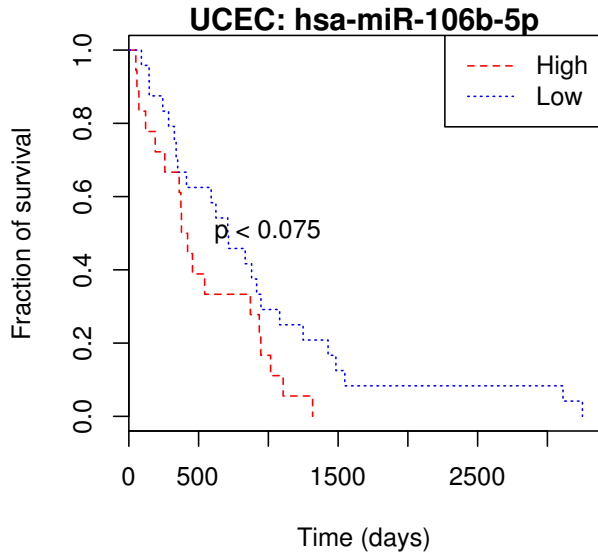


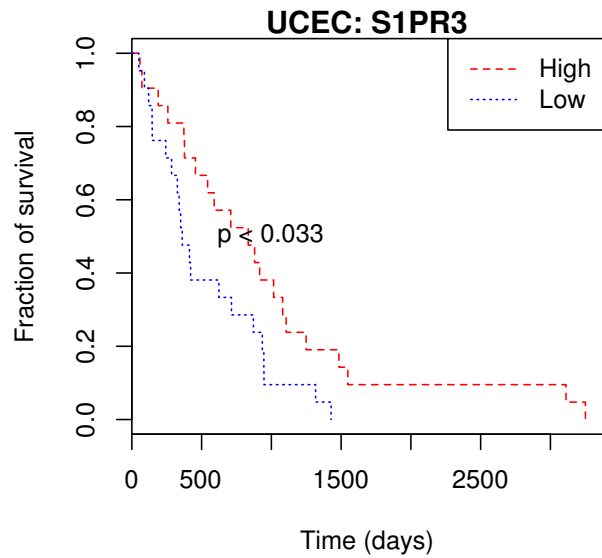
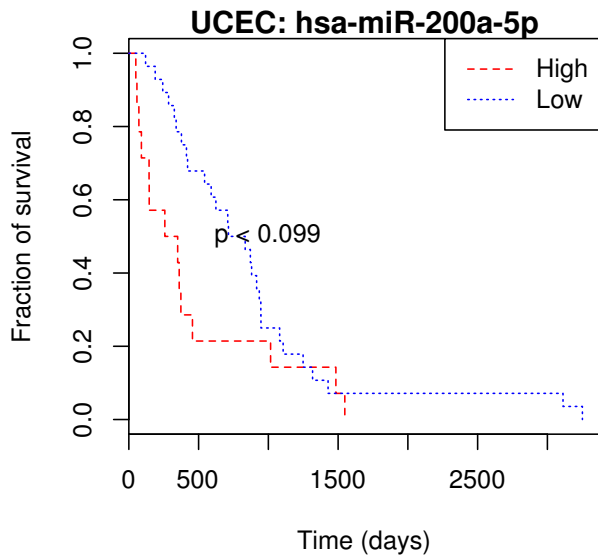
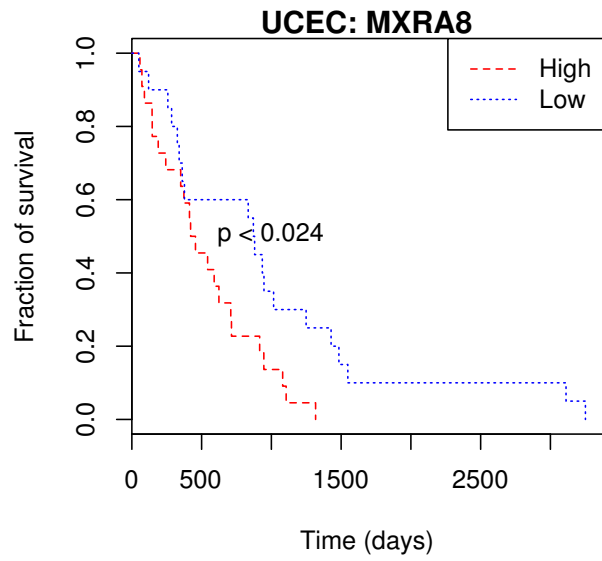
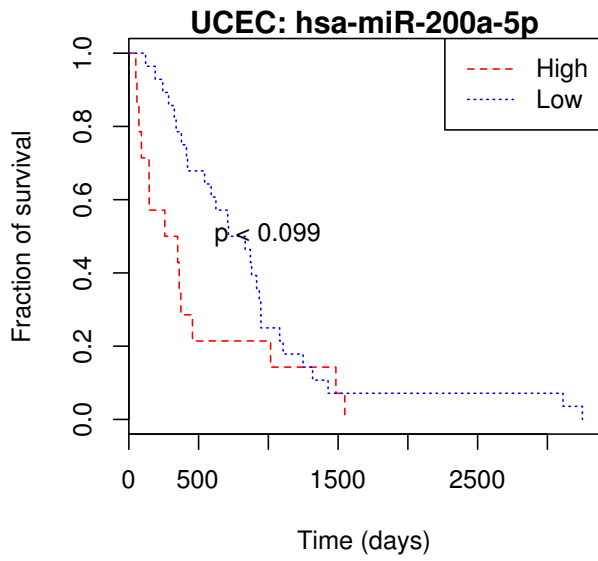
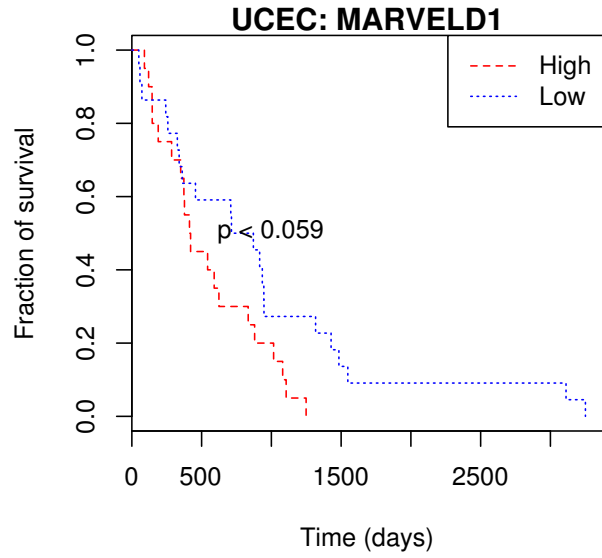
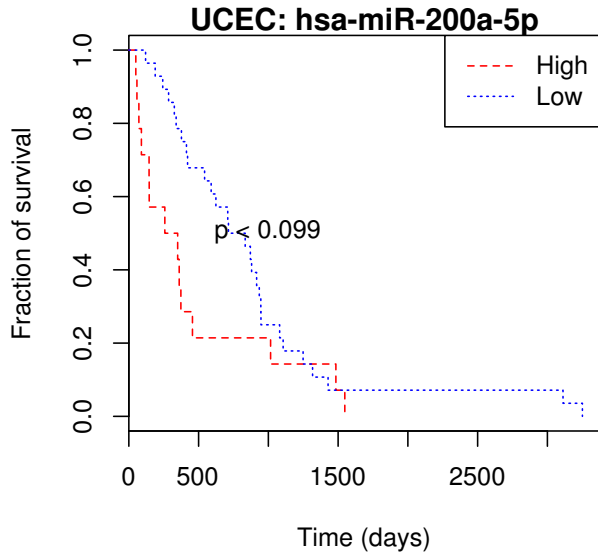


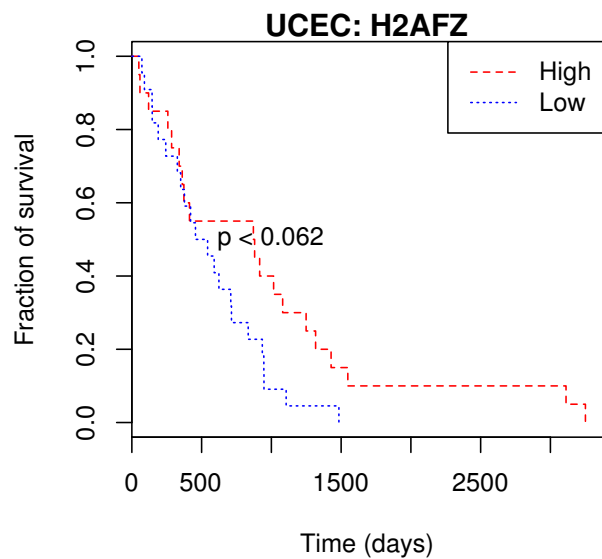
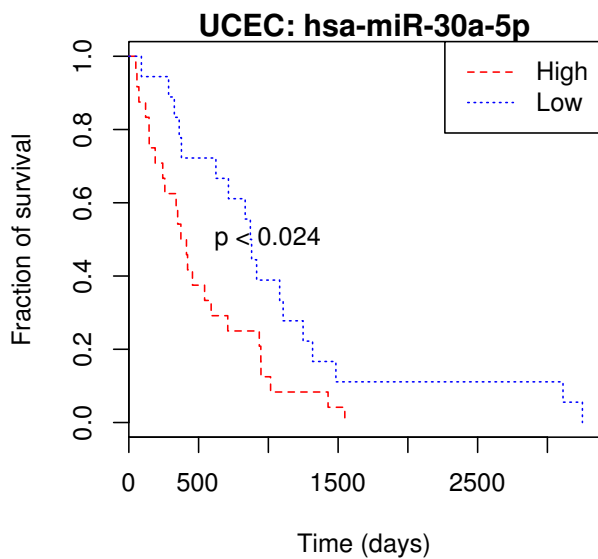
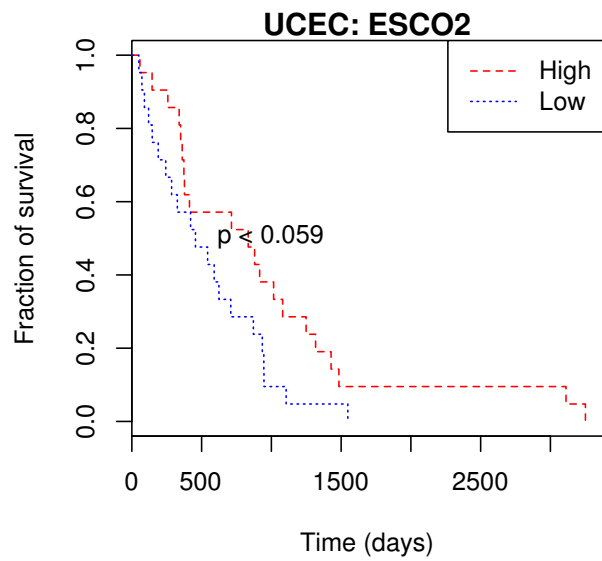
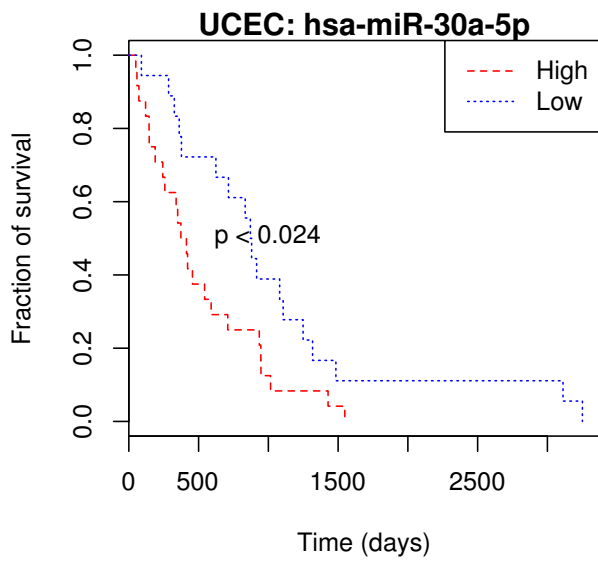
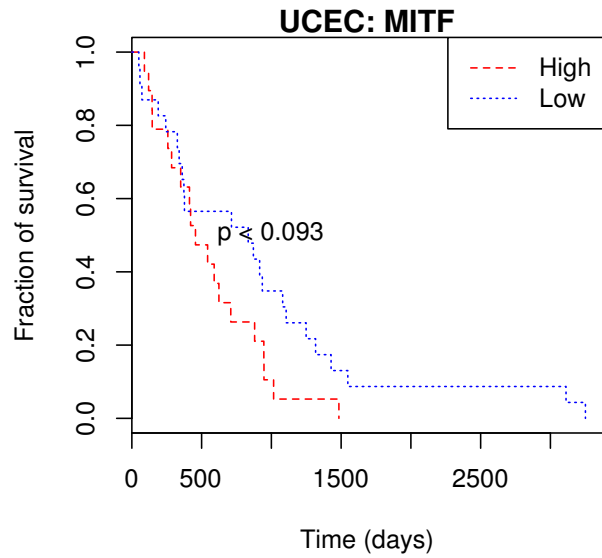
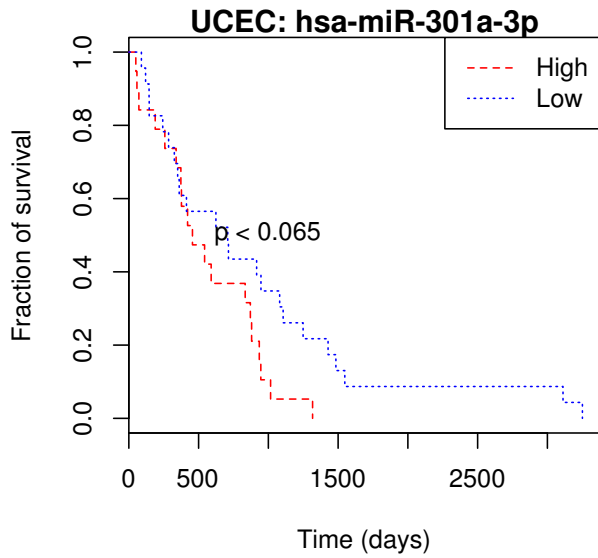


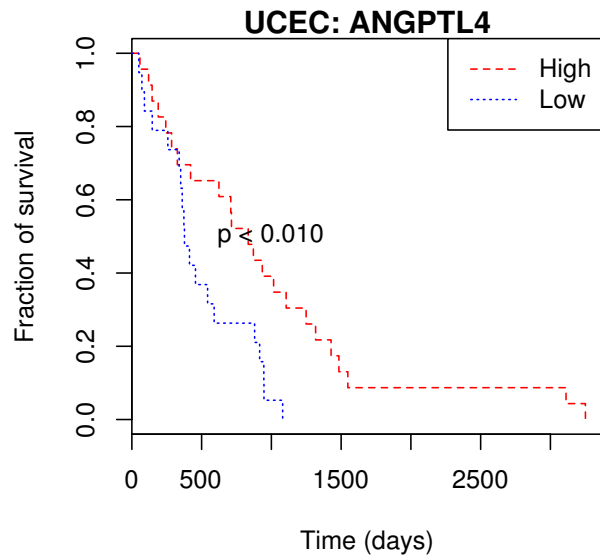
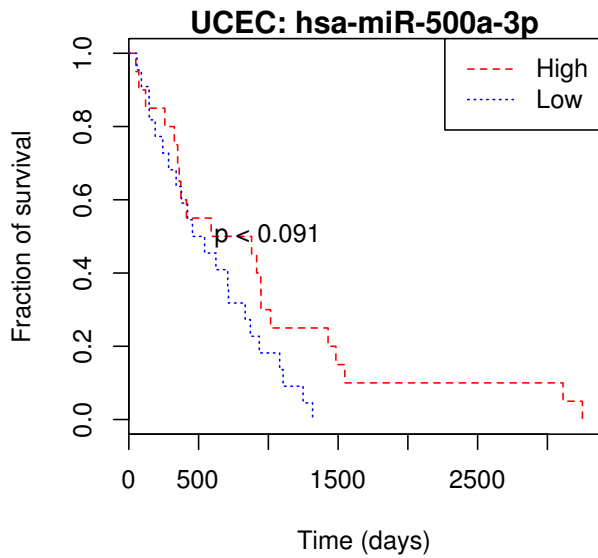
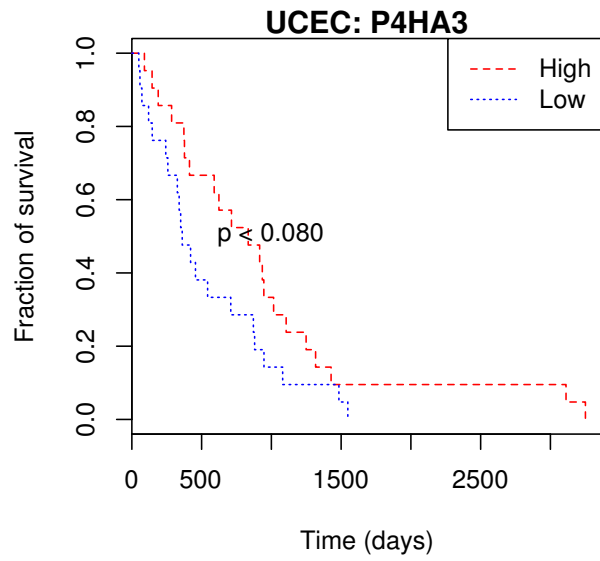
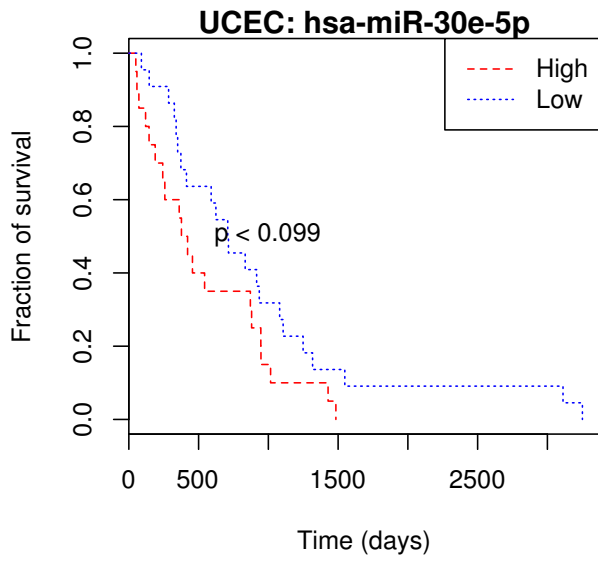
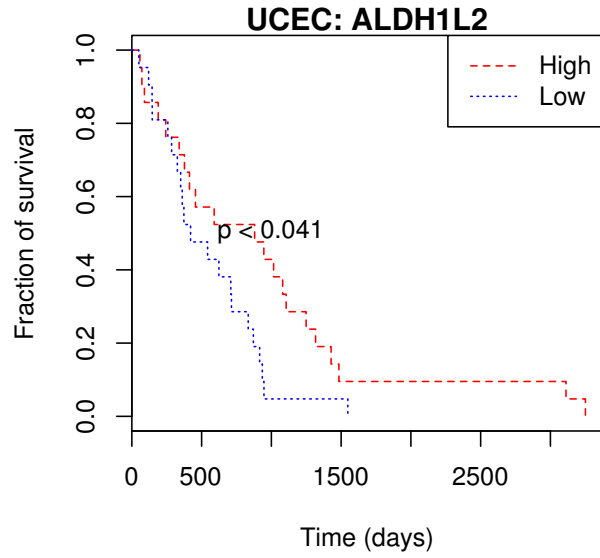
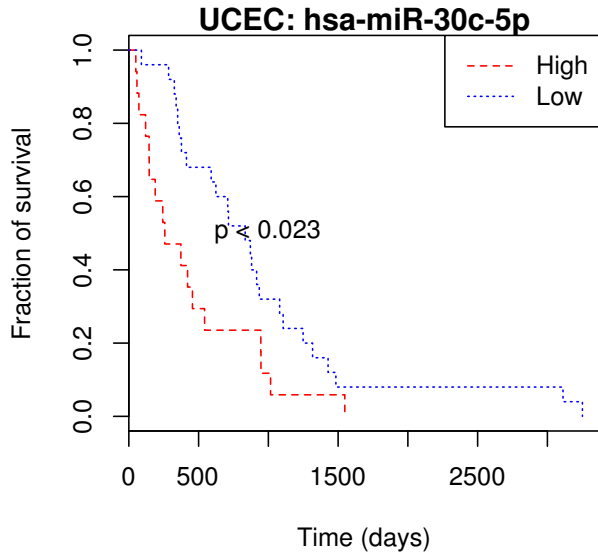












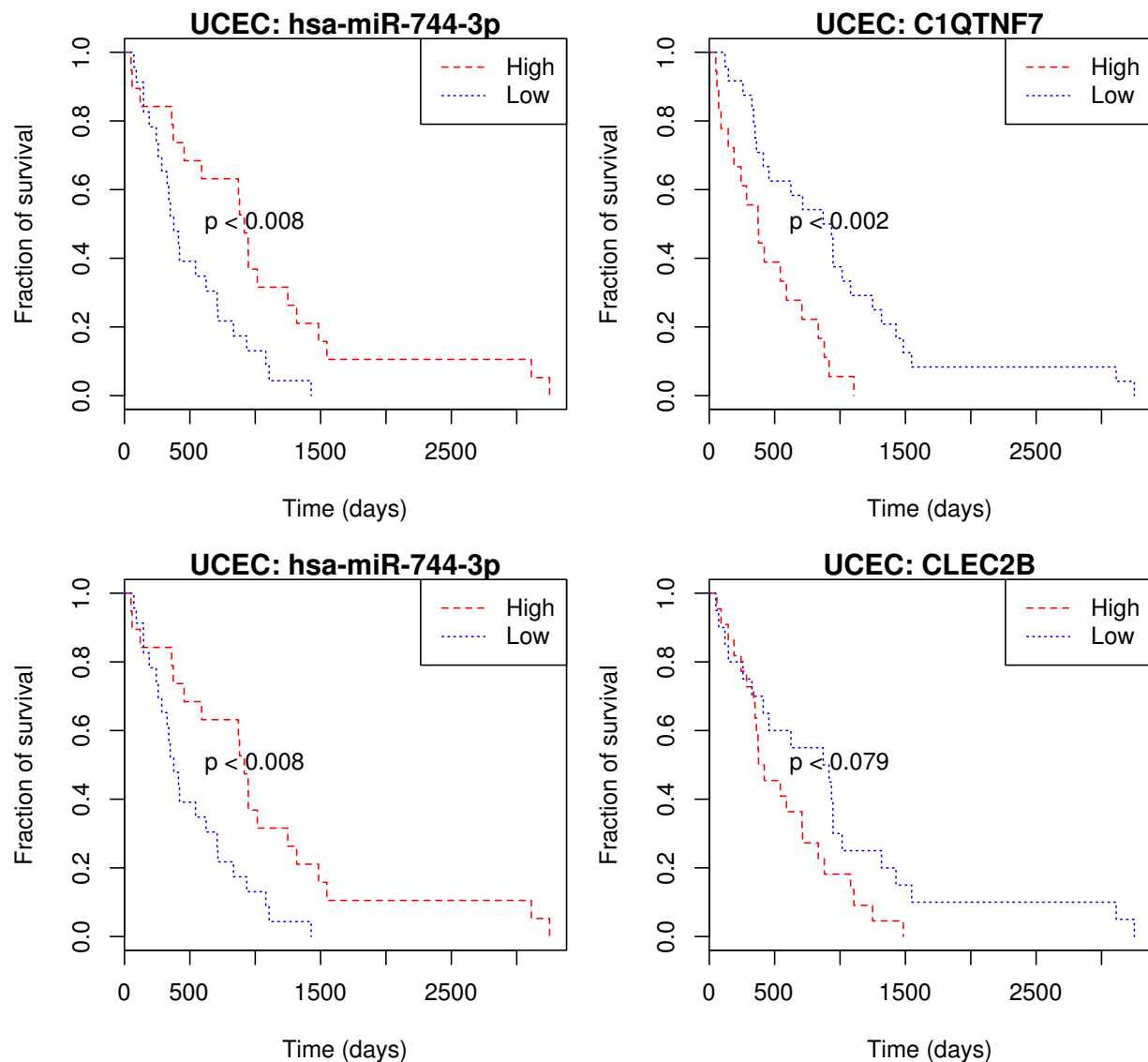


Figure S7: **Kaplan-Meier survival plots of the genes and miRNAs involved in the recurrent interactions.** Each plot display the KM survival curves for the two groups of samples with gene or miRNA expression higher and lower than the sample means. Only the recurrent interactions with both gene and miRNA exhibiting significant prognostic power for specific cancer type(s) ( $p < 0.1$ ; log-rank test) were shown. Notably, some interactions were prominent in more than one cancer types.

## Supplementary Tables

Table S1: **A full list of the positive recurrent interactions (XLS)**

Table S2: **Functional enrichments by DAVID of target genes involved in the confidence recurrent network (XLS)**

Table S3: **Survival analysis results (XLS)**. Binary value under each cancer column indicates whether the corresponding interaction (both gene and miRNA; sheet 1), gene alone (sheet 2), or miRNA alone (sheet 3) confer significant ( $p < 0.1$ ) prognostic power (KM-survival and log-rank test).

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