

Bioconductor Expression Assessment Tool for Affymetrix Oligonucleotide Arrays (affycomp)

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Contents

In this report only assessment using the **HGU133** spike-In experiment are presented. Figures 2,3, and 4b are therefore omitted.

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method: FARMS
nickname: FARMS
competition: YES

Overall signal to ratio assessment:

	slope	R2	medianSD	Null FC	IQR	Null FC	99.9%	Rank
FARMS	0.5539193	0.8843051	0.000194024	0.0003355026		0.003106035		1

Expected Rank (out of 12626) for genes with fold change of 2 when all other genes are not differentially expressed stratified by nominal concentration.

	FARMS
0.125:0	4
0.25:0.125	4
0.5:0.25	4
1:0.5	3
2:1	2
4:2	2
8:4	2
16:8	2
32:16	1
64:32	1

128:64	1
256:128	1
512:256	2

Table 1 for Spike-in Data:

	FARMS
Signal detect slope	0.55391930
Signal detect R2	0.88430514
AUC (FP<10)	0.57581665
AUC (FP<15)	0.61250031
AUC (FP<25)	0.67089260
AUC (FP<100)	0.84565530
AFP, call if fc>2	1.30402930
ATP, call if fc>2	30.21245421
IQR	0.00127566
Obs-intended-fc slope	0.55322874
Obs-(low)int-fc slope	0.18295759
FC=2, AUC (FP<10)	0.52666761
FC=2, AUC (FP<15)	0.57924139
FC=2, AUC (FP<25)	0.64811379
FC=2, AUC (FP<100)	0.83468423
FC=2, AFP, call if fc>2	0.04761905
FC=2, ATP, call if fc>2	6.61904762

Table 2 for Spike-in Data:

	FARMS
null log-fc IQR	0.0003355026
null log-fc 99%	0.0013779728
null log-fc 99.9%	0.0031060346
low AUC	0.9393996543
med AUC	0.9878987899
high AUC	0.9935564985
weighted avg AUC	0.9515810152
25% SD	0.0001089220
Median SD	0.0001940240
75% SD	0.0003517102
99% SD	0.0006716801
low.slope	0.1858795895
med.slope	0.5898084659
high.slope	0.7999043862
low.R2	0.2317201023

med.R2	0.5387817142
high.R2	0.7023730026
0.125:0	0.0764246186
0.25:0.125	0.0849769956
0.5:0.25	0.0833492621
1:0.5	0.2260603013
2:1	0.3803066068
4:2	0.4935615205
8:4	0.5258526083
16:8	0.5509019568
32:16	0.7056396690
64:32	0.8506387763
128:64	0.9725522382
256:128	0.8305867384
512:256	0.5863467315

Figure 1

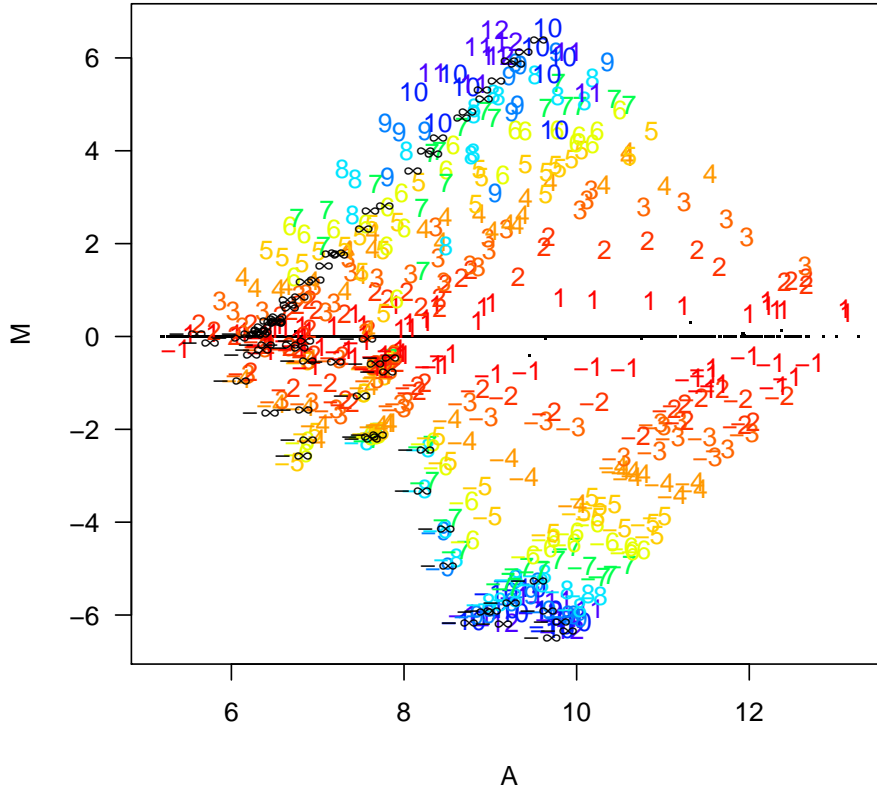


Figure 1: The MA plot shows log fold change as a function of mean log expression level. A set of 14 arrays representing a single experiment from the Affymetrix spike-in data are used for this plot. A total of 13 sets of fold changes are generated by comparing the first array in the set to each of the others. Spiked-in genes are symbolized by numbers representing the nominal \log_2 fold change for the gene. Non-differentially expressed genes with observed fold changes larger than 2 are plotted in red. All other probesets are represented with black dots.

Figure 1b

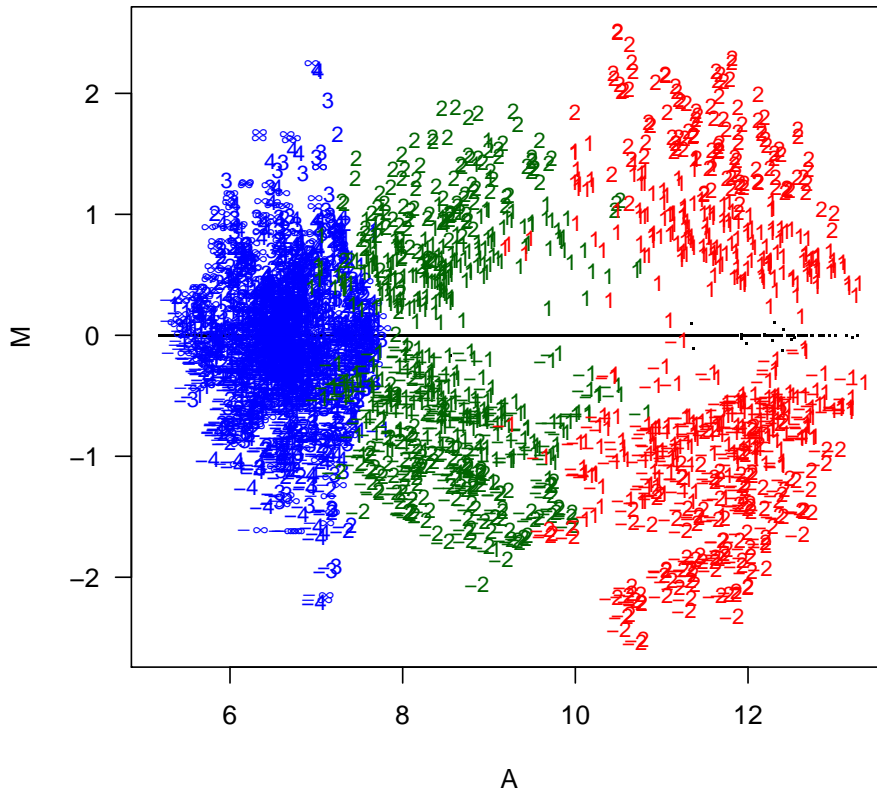


Figure 1b: The MA plot shows log fold change as a function of mean log expression level. A set of 28 arrays representing a single experiment from the Affymetrix spike-in data are used for this plot. Fold changes are generated for all possible comparisons of the first 14 arrays and the second 14 arrays. Spiked-in genes are symbolized by numbers representing the nominal \log_2 fold change for the gene. Of the genes that are spiked to be differentially expressed, only genes with small nominal fold changes are shown. The colors represent four different groups: nominal concentration of genes being compared less than or equal to 2 picoMolar (blue), between 4 and 32 picoMolar (green), greater than or equal to 64 picoMolar (blue). Non-differentially expressed genes with observed fold changes larger than 2 are plotted in red. All other probesets are represented with black dots.

Figure 2b

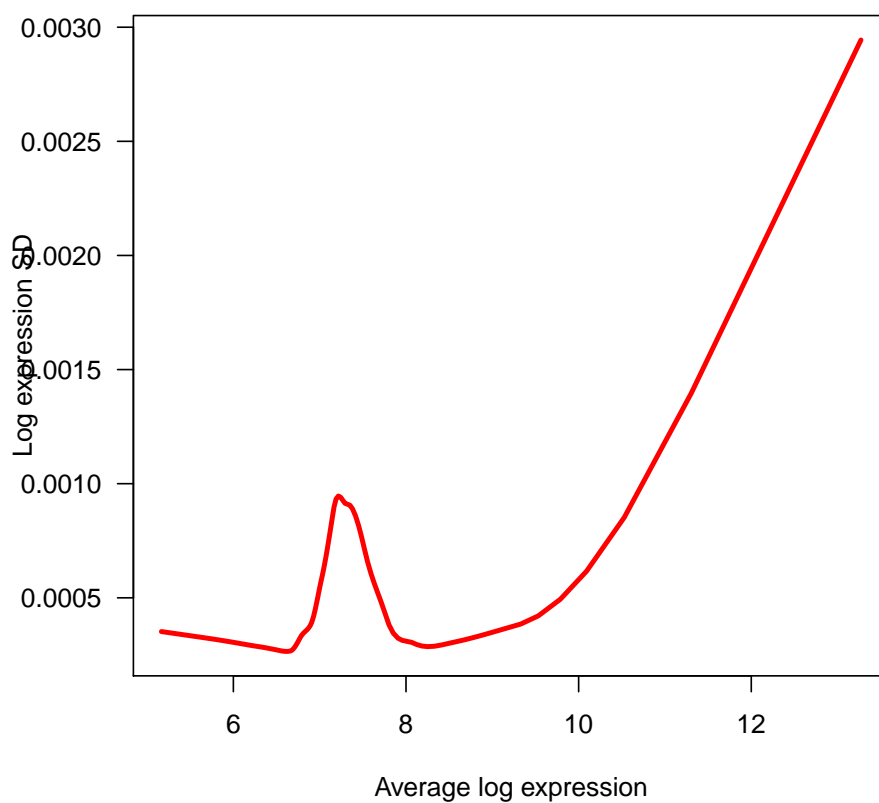


Figure 2b: For each non-spiked-in gene in the 28 arrays used in Figure 1b, we calculate the mean log expression and the observed standard deviation across the 28 replicates. The resulting scatterplot is smoothed to generate a single curve representing mean standard deviation as a function of mean log expression.

Figure 4a

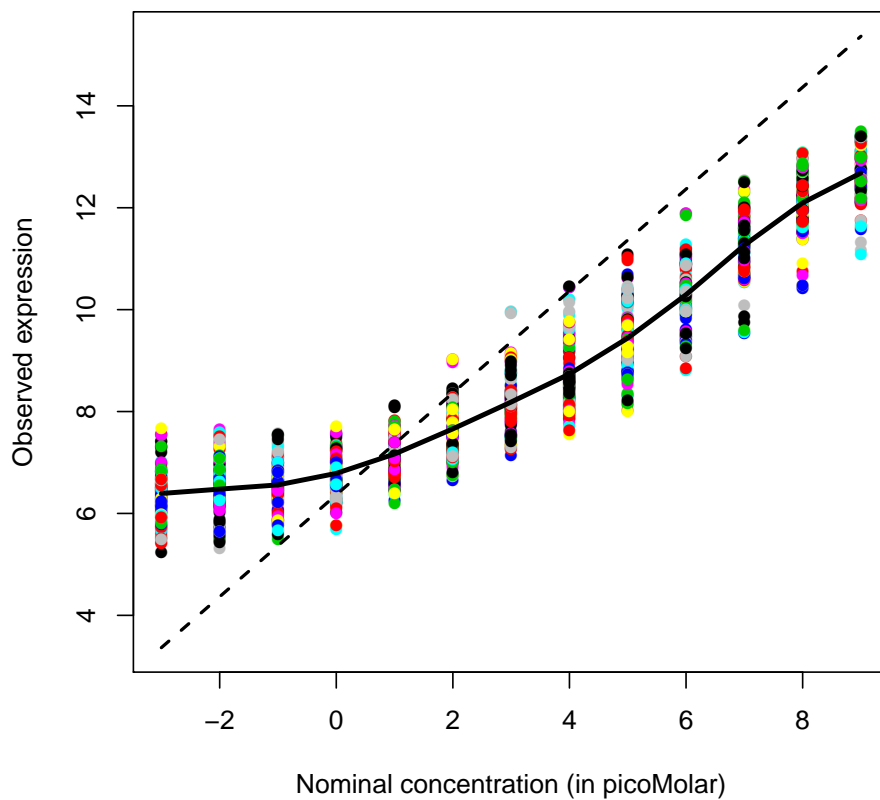


Figure 4a) Average observed \log_2 intensity plotted against nominal \log_2 concentration for each spiked-in gene for all arrays in Affymetrix spike-In experiment. The dashed line has the ideal slope of 1.

Figure 4c

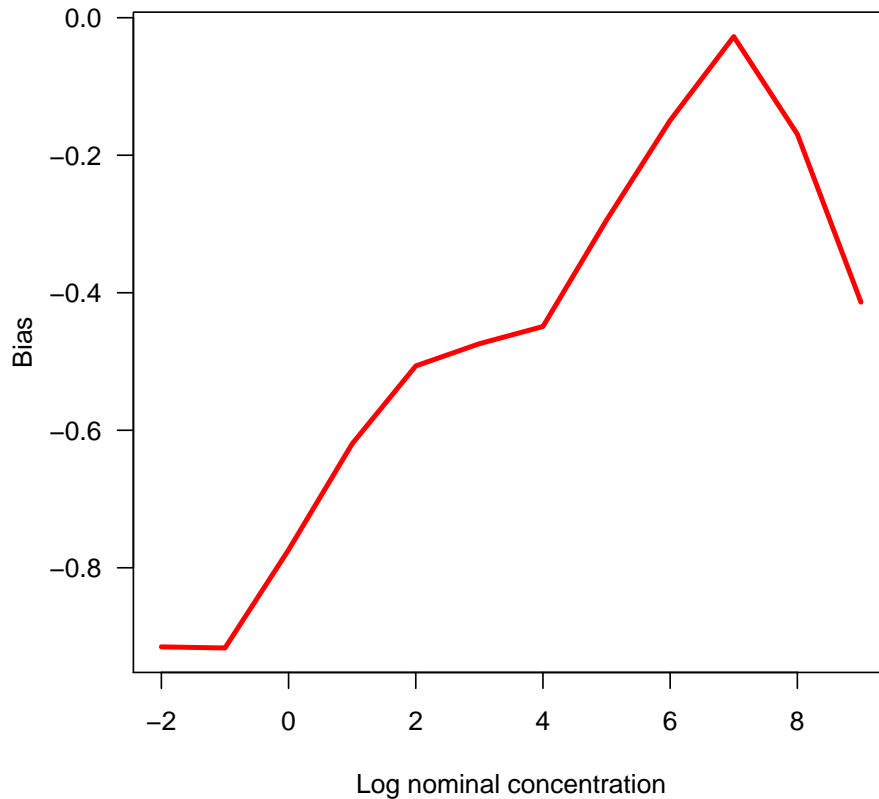


Figure 4c) Using the 28 arrays of Figure 1b), we compute local slopes. As the slopes shown in Figure 4a), the local slopes represent the expected observed log fold-change for probesets with true fold-change of 2 but they are presented as a function of the total nominal probeset concentration in the two samples being compared. In theory the local slopes should be one so we show the bias (difference between the observed local slope and one).

Figure 5a

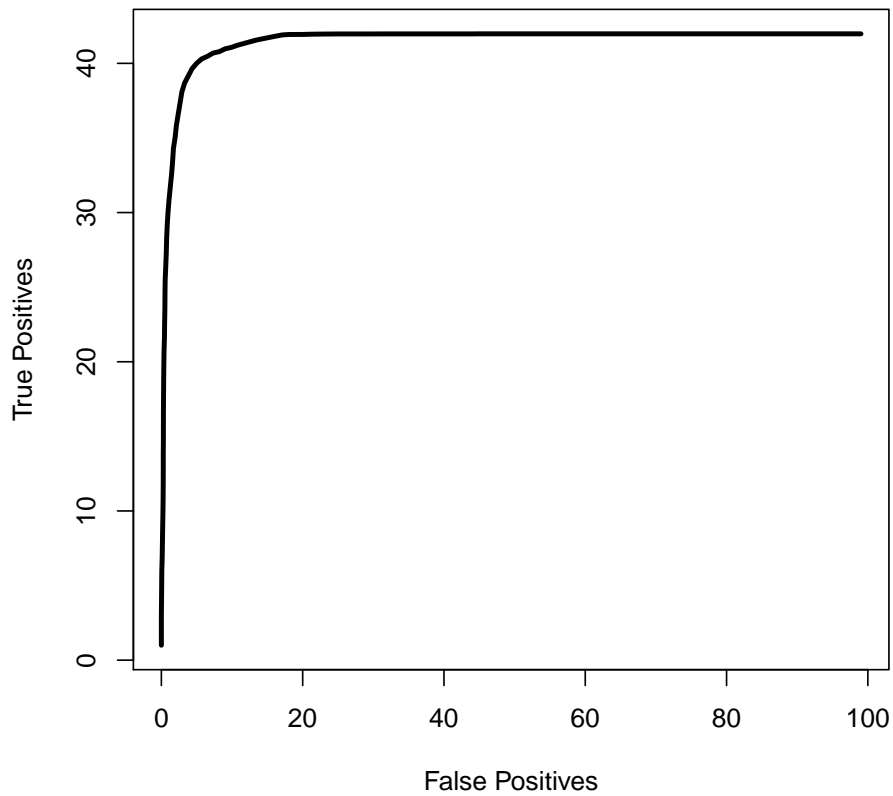


Figure 5a) A typical identification rule for differential expression filters genes with fold change exceeding a given threshold. This figure shows average ROC curves which offer a graphical representation of both specificity and sensitivity for such a detection rule. Average ROC curves based on comparisons with nominal fold changes ranging from 2 to 4096.

Figure 5b

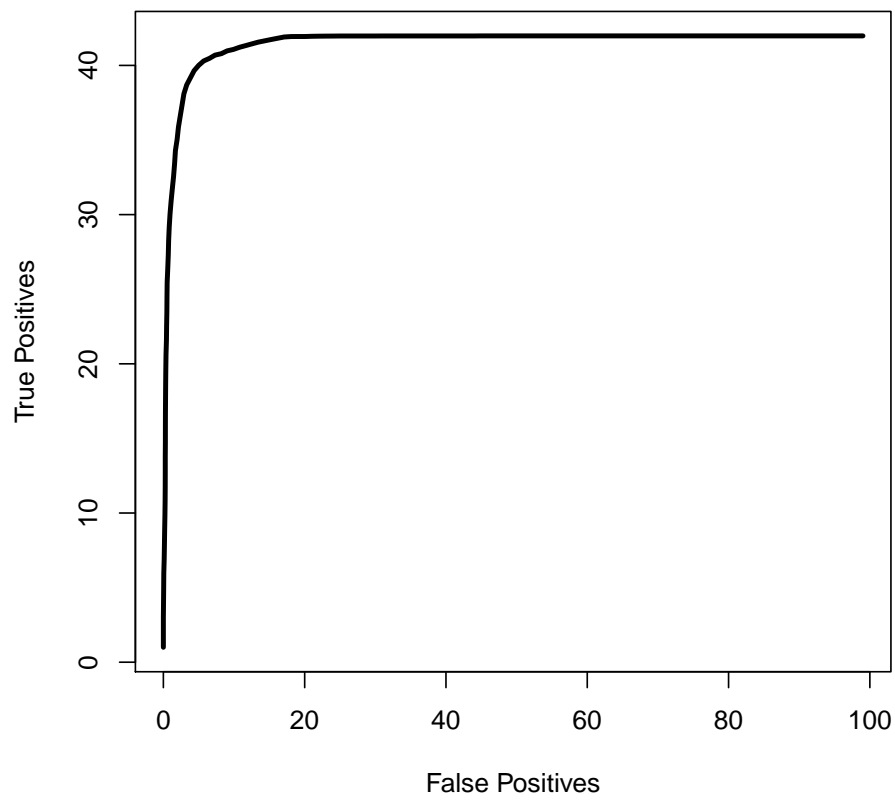


Figure 5b) As 5a) but with nominal fold changes equal to 2.

Figure 5c

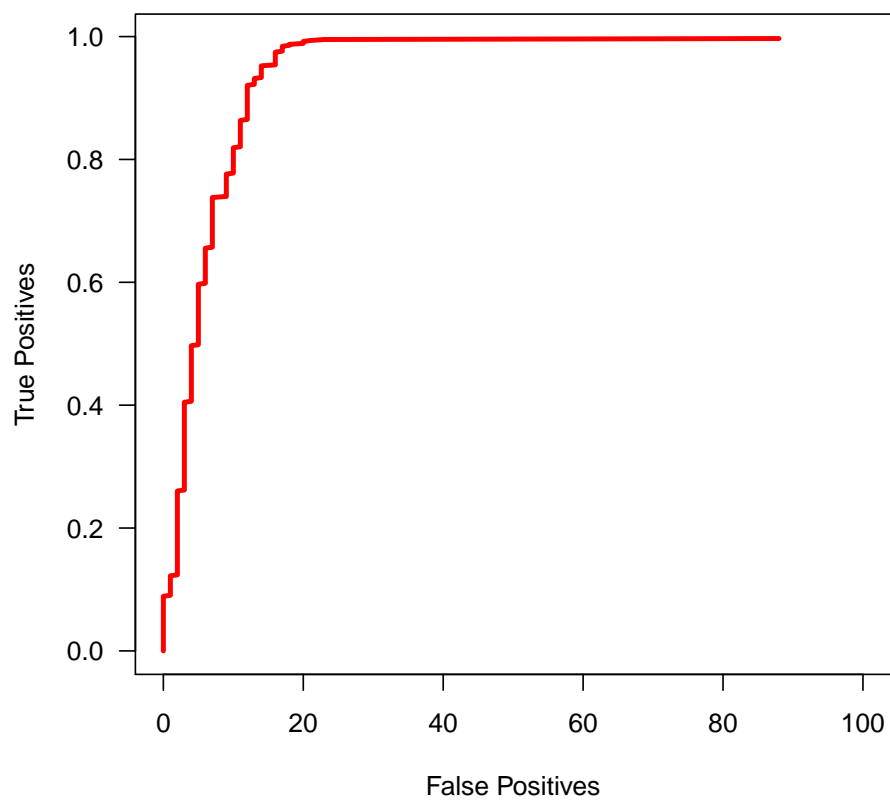


Figure 5c) As 5a) but for comparisons with both nominal concentrations at most 4 picoMolar and nominal fold changes at most 2.

Figure 5d

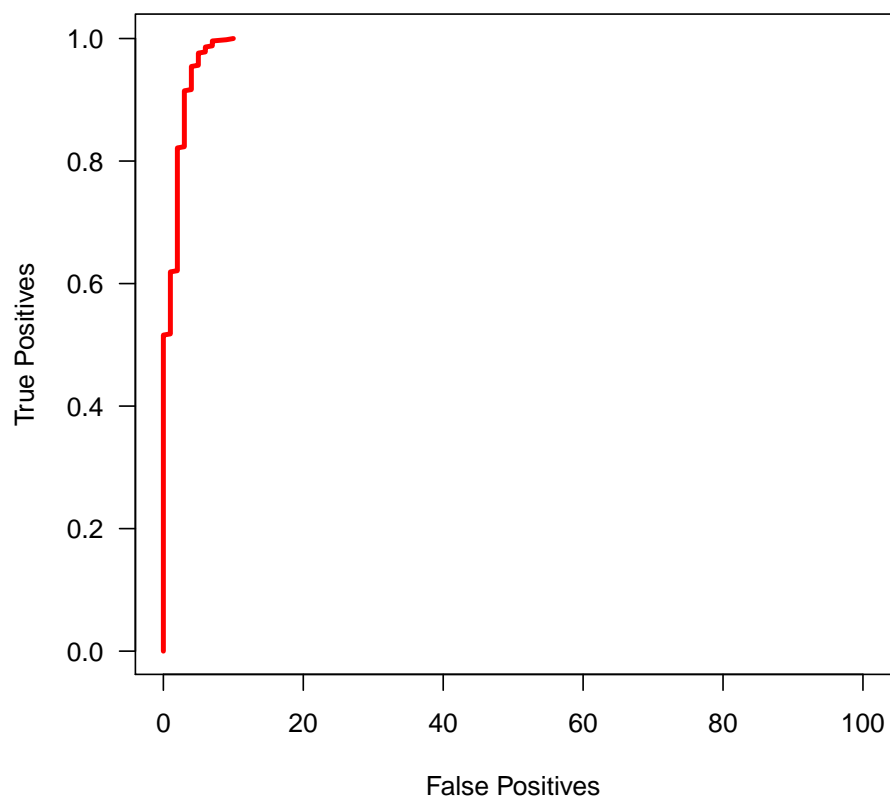


Figure 5d) As 5a) but for comparisons with both nominal concentrations between 4 and 64 picoMolar and nominal fold changes at most 2.

Figure 5e

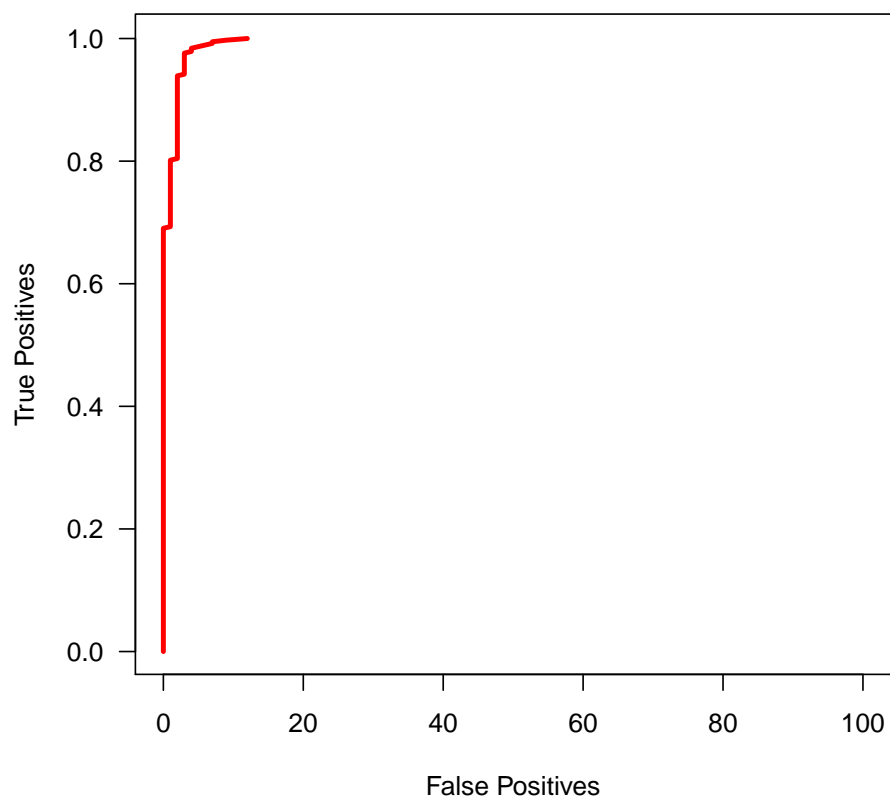


Figure 5e) As 5a) but for comparisons with both nominal concentrations at least 64 and with nominal fold changes at most 2.

Figure 6a

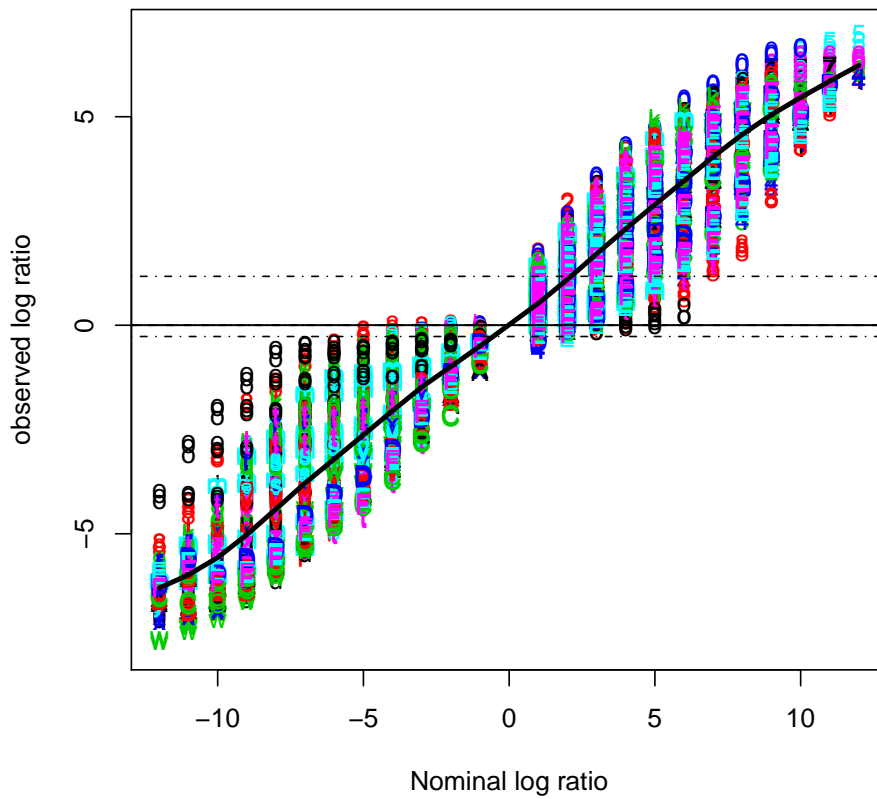


Figure 6a) Observed log fold changes plotted against nominal log fold changes. The dashed lines represent highest, 25th highest, 100th highest, 25th percentile, 75th percentile, smallest 100th, smallest 25th, and smallest log fold change for the genes that were not differentially expressed.

Figure 6b

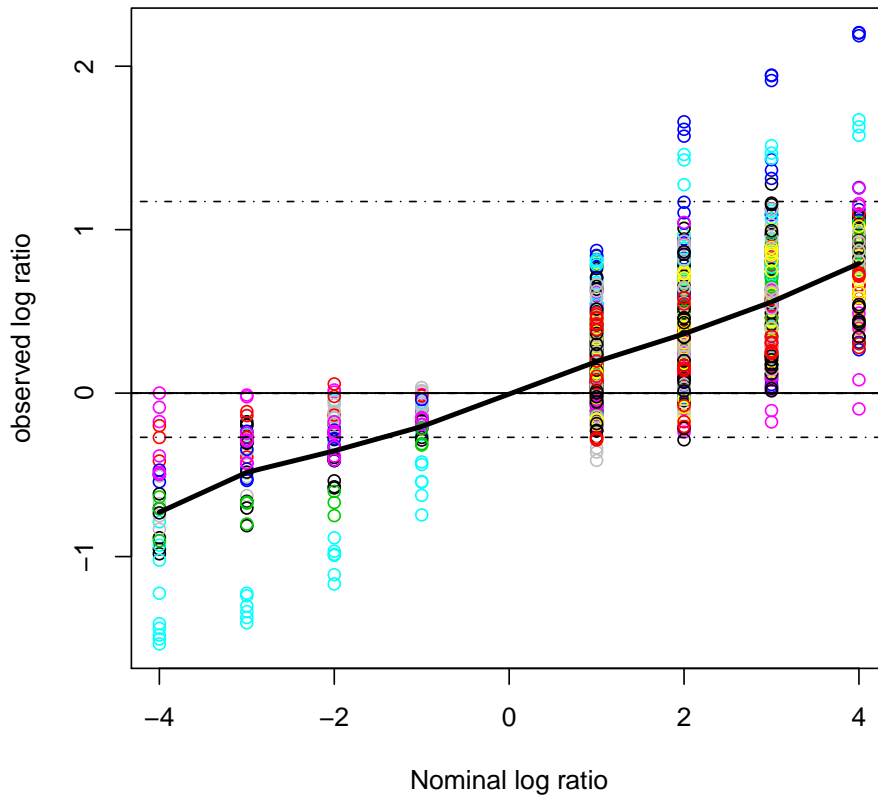


Figure 6b) Like a) but the observed fold changes were calculated for spiked in genes with nominal concentrations no higher than 2pM.