

Additional File 3

PMF-GRN Recovers True Interactions in Prokaryotes as Evaluated by Cross-Validation

To demonstrate GRN inference on a forth additional dataset, we carry out experiments using two microarray datasets for the prokaryote *Bacillus Subtilis* (B1 - GSE27219 [116] and B2 - GSE67023 [117]). Although PMF-GRN is not primarily designed to learn GRNs from microarray data, we show that it is still possible to learn informative GRNs with this data. For our *B. subtilis* experiments, we have access to prior-knowledge derived from the subtiwiki database [118, 119, 120]. Here, we implement a 5 fold cross-validation approach by using five random splits of the subtiwiki database-derived information, where 80% is used as prior knowledge and 20% is used as the gold standard for evaluation.

The two *B. subtilis* datasets were previously normalized after data collection as part of standard microarray processing. However, each dataset was normalized using different approaches (described in [Methods](#)). For B1, the expression data underwent no further normalization and was simply converted to integers to simulate single-cell-like data. For B2, the expression data was re-scaled and then converted to integers, in order to contain only positive integers resembling single-cell-like data. The results from our experiments are shown in [Figure S1](#), and the numbers used to create this figure are given in [Table S1](#) and [S2](#). Using five repeats of cross-validation, we show the performance of GRNs inferred for the two *B. subtilis* datasets (B1 and B2). We remark that the difference in performance between B1 and B2 is likely a result of the chosen microarray processing normalization. To further support this claim, we demonstrate GRN performance after re-scaling the data with min-max scaling ([Figure S1](#)).

‘No Prior’ and ‘Shuffled’ results are also shown in [Figure S1](#) by black and gray dots respectively. Here, we are able to demonstrate that for B1 and B2, each GRN yields a better performance as compared to negative controls.