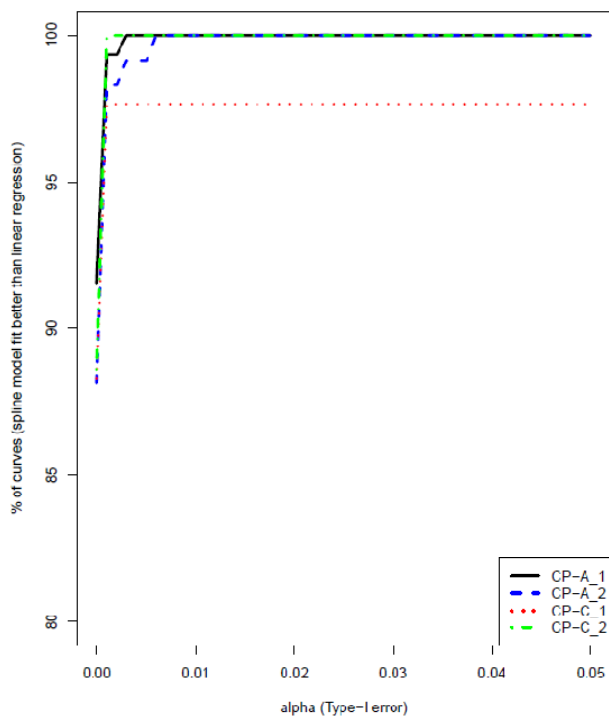


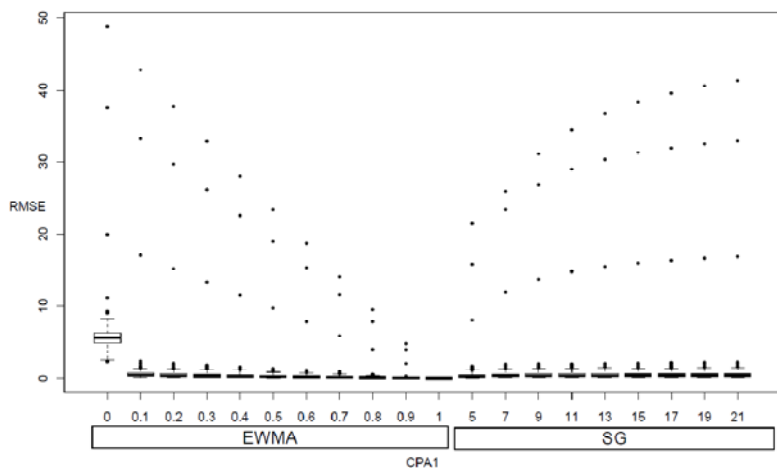
Supplementary Figure 1: Comparative multiple hypothesis testing between spline models vs. a simple linear regression model.



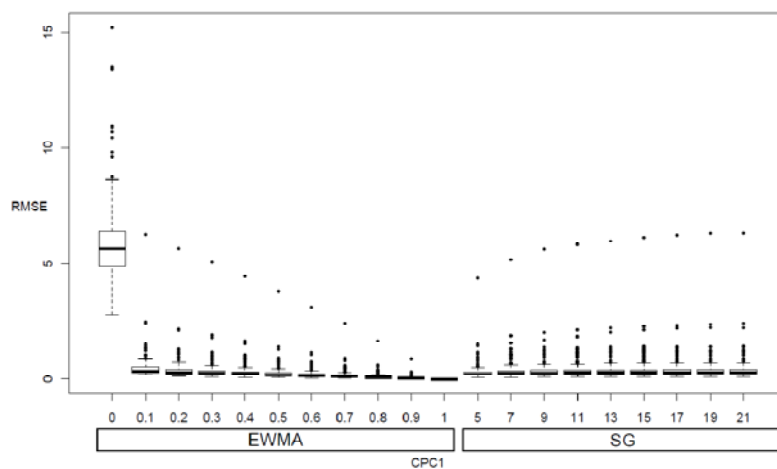
* Percentage of OC kinetics curves for both cell types that revealed a significantly better fit with the spline model than with the simple linear regression model are shown as a function of α (Type-I error). Bonferroni correction was applied to the individual test p -values to alleviate the multiple hypothesis testing problems with false-positives when multiple comparisons are performed.

Supplementary Figure 2: EWMA and SG filters parameter evaluation for CP-A and CP-C.

a)



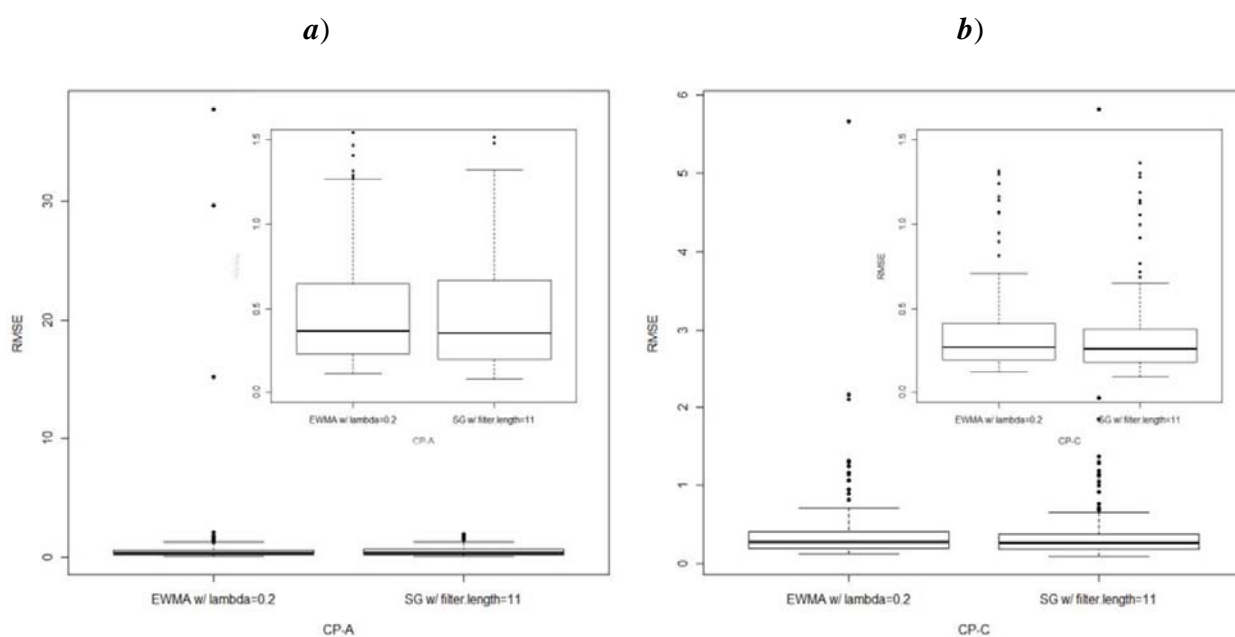
b)



* These figures portray root-mean-square-error (RMSE) values for different parameter values for both low-pass filters (EWMA and SG) for parameter estimation for both cell types CP-A (a) and CP-C (b) both for single cells.

** We use the Savitzky-Golay (SG) and Exponential Weighted Moving Average (EWMA) low-pass smoothing filters (see Methods section for more detailed information on methodology and parameter estimation). Both low-pass filters perform better than other filters in most cases⁶ and are used to smooth data while preserving certain features of the signal. We assessed that both filters showed similar performances based on goodness-of-fit statistics such as root-mean-squared-error (RMSE). The similar smoothing performance, the extensive use in practice, and the lower number of parameters to be estimated led us to choose the EWMA over the SG filter.

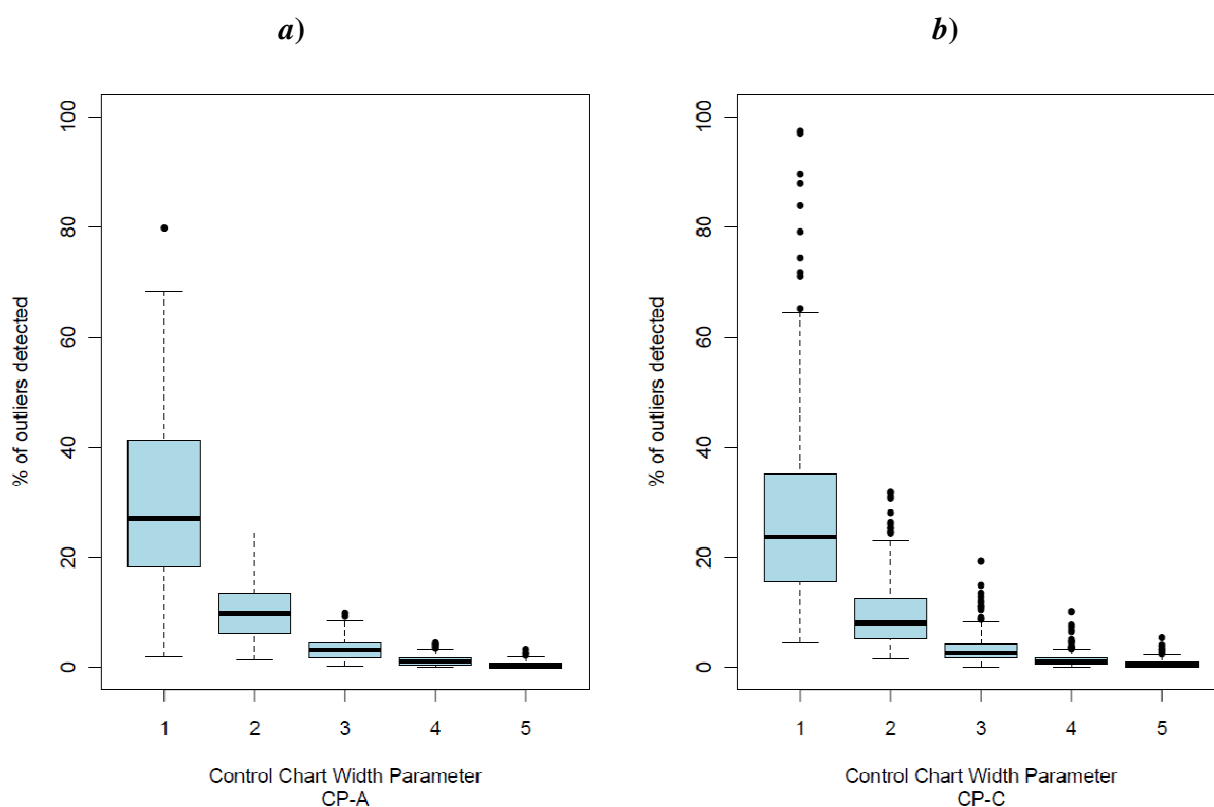
Supplementary Figure 3: Smoothing filters comparison.



* This figure shows low-pass filtering performance for specific parameters. For both filters (EWMA and SG) provides similar RMSE measures. Based on this result we've chosen EWMA filter as it provided better local shapes with more smooth filtered data.

** The figure displays an example of the smoothed result from the EWMA filter for OC time series. The importance of this noise reduction platform lies in the ability to automatically reduce random artifacts from the OC kinetics curves that otherwise would prevent further data analysis through feature extraction.

Supplementary Figure 4: Control chart width parameter evaluation in terms of % of points in a curve across all curves detected as outliers.



* These boxplots showcase percentages of points within a curve detected as outliers by using a specific QC width parameters (*i.e.*, 1, 2, 3, 4, 5) into the outlier detection methodology implemented for all curves across both cell types: CP-A (**a**) and CP-C (**b**). The smaller the QC parameter the more outliers are detected as this parameter controls the in-control region.