

## Using the DataRail toolbox to analyze inflammatory signals in U937 macrophages

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In order to better understand the signaling events surrounding inflammation, high-throughput techniques were used to measure the dynamics of intracellular phospho-protein levels and cytokine release from U937 cells treated with a various inflammatory stimuli. The U937 cell line serves as a model for monocytes and macrophages, both of which are present in inflamed tissue. The cells were treated with lipopolysaccharide (LPS), pro-inflammatory cytokines, and small-molecule inhibitors, resulting in a data set of more than 100,000 measurements.

The challenges of handling such large data sets motivated the development of the DataRail toolbox [<http://code.google.com/p/sbpipeline/wiki/DataRail>]. DataRail is an open source MATLAB toolbox for managing, transforming, visualizing, and modeling data, in particular the high-throughput data encountered in Systems Biology. The U937 data were analyzed using DataRail's data-driven modeling techniques, which include principal component analysis (PCA), partial least-squares regression (PLSR), and multiple linear regression (MLR). DataRail also connects to knowledge-based modeling approaches, like Boolean logic and differential equations models.