

Growth Cone Collapse Assay at GlaxoSmithKline

(Customer Success Slides)

Dr. Elena Di Daniel, Senior Scientist, GlaxoSmithKline
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Definiens in Life Sciences

'Image analysis is frequently a bottleneck when evaluation morphological endpoints in cellular assays. Using Definiens automated process the time to completion of analysis is significantly reduced, coupled with a significant increase in objectivity. Definiens' technology is now integral in the analysis of the growth cone collapse assay at GlaxoSmithKline.'

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AT A GLANCE

Key Challenges

Bipolar disorder is a severe psychiatric illness. The drugs that are currently used to treat this illness are only partially efficacious and exhibit side effects, therefore, there is a clear need to develop better tolerated and more efficacious drugs.

The most commonly used mood stabilizers - LiCl, valproate and carbamazepine - each reduce the percentage of growth cone collapse and increase the growth cone spread area in sensory neuron explants.

(Williams RS et al., Nature, 2002; Di Daniel E et al., MCN, 2006)

The original assay format was a 24-well plate configuration with manual image acquisition and manual growth cone area measurement (method used prior to implementation of Definiens analysis).

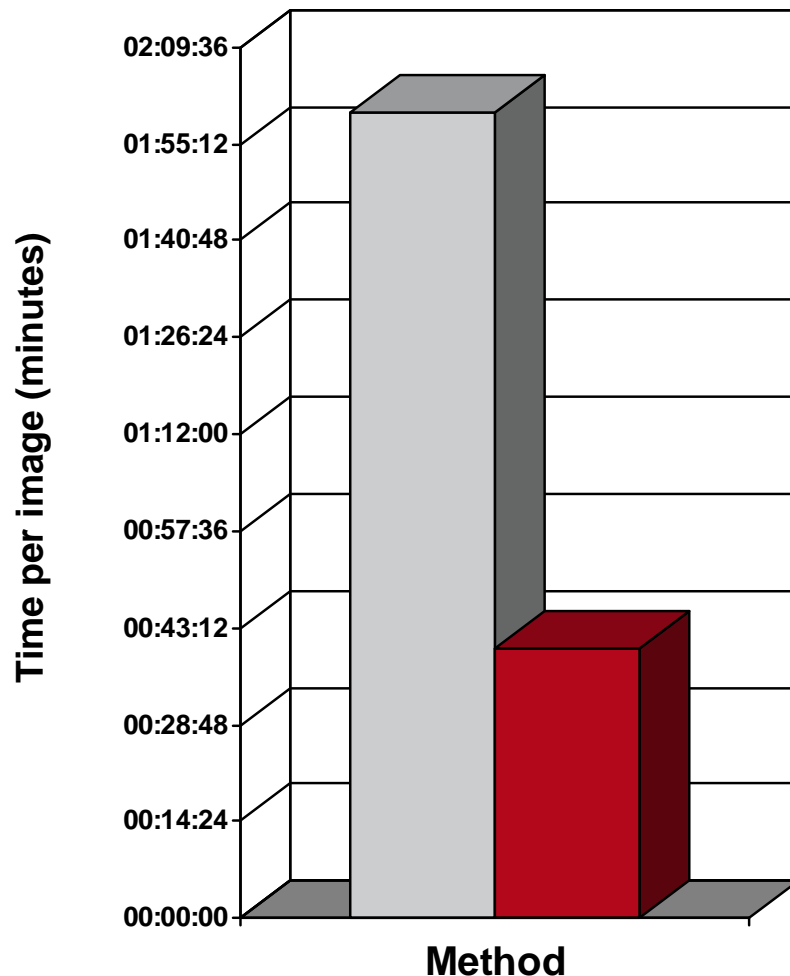
Key Benefits

Definiens allows accurate rapid image analysis
Definiens expands utility of assay system
Definiens Improves consistency

Major Achievement

Faster image analysis results - 40% time saving on assay turnaround

Major Achievement: Faster image analysis results



‘Manual image acquisition and growth cone area analysis were very low throughput and allowed only a limited number of compounds/conditions to be tested. With Definiens the data set can be analyzed in hours instead of days.’

Dr. Elena Di Daniel, Senior Scientist,
GlaxoSmithKline

GSK achieved 40% time saving on assay turnaround

□ Manual
■ Definiens

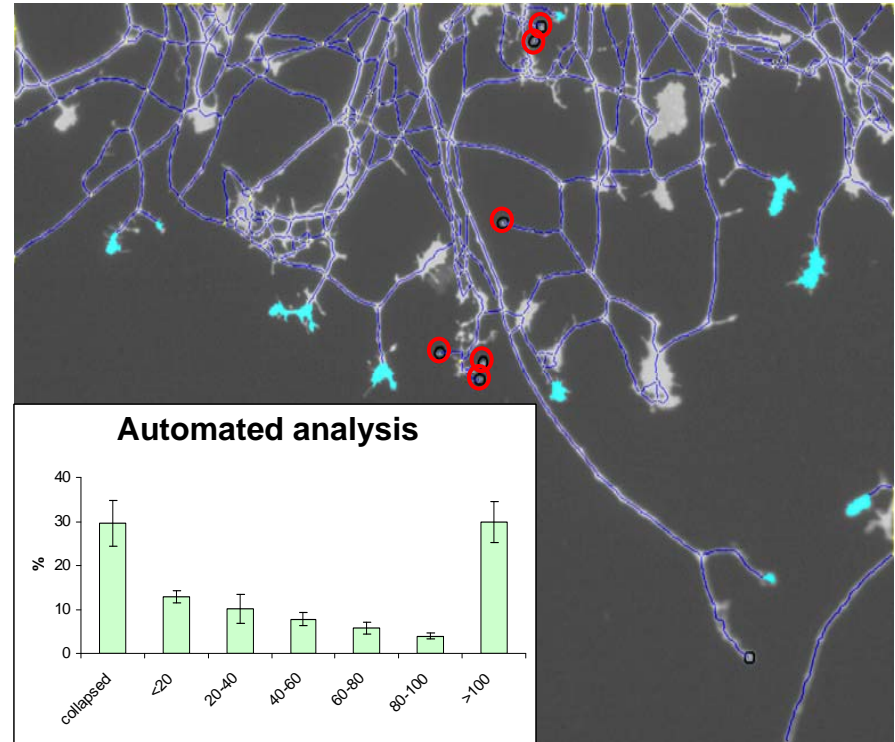
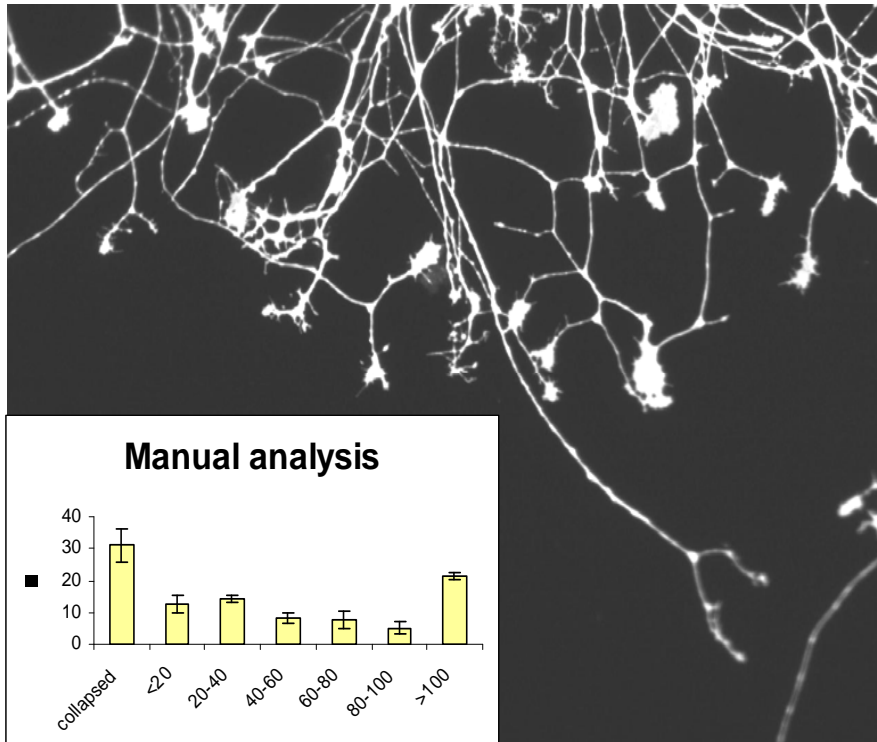
Reducing Cycle Time While Delivering Results

‘Image analysis is frequently a bottleneck when evaluation morphological endpoints in cellular assays. Using Definiens automated process the time to completion of analysis is significantly reduced, coupled with a significant increase in objectivity. Definiens’ technology is now integral in the analysis of the growth cone collapse assay at GlaxoSmithKline.

Definiens enables an automatic detection of growth cones to discriminate morphological changes after drug treatment. The rule set selectively recognizes growth cones, without detecting filopodia. It allows identification of collapsed versus spread growth cones and subsequent area measurement. Furthermore, It allows an automated workflow that increases throughput. The assay will be used extensively.’

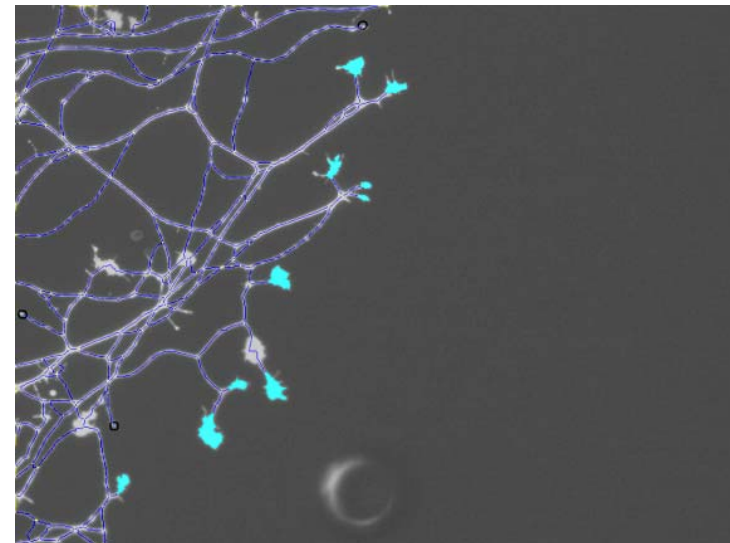
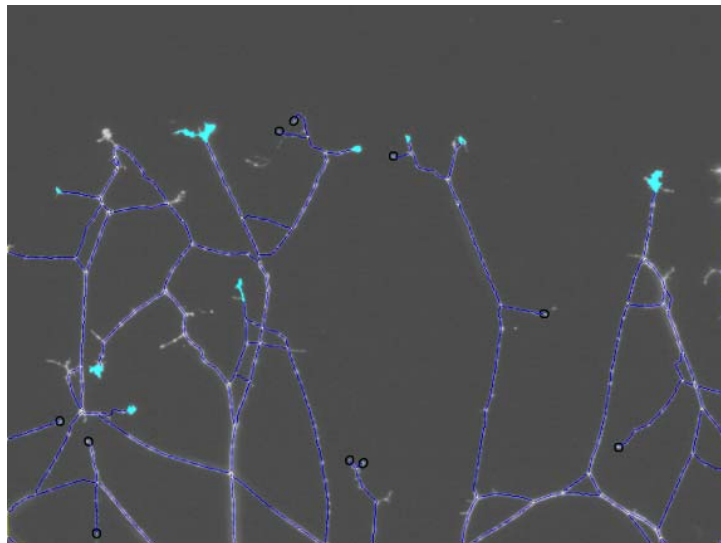
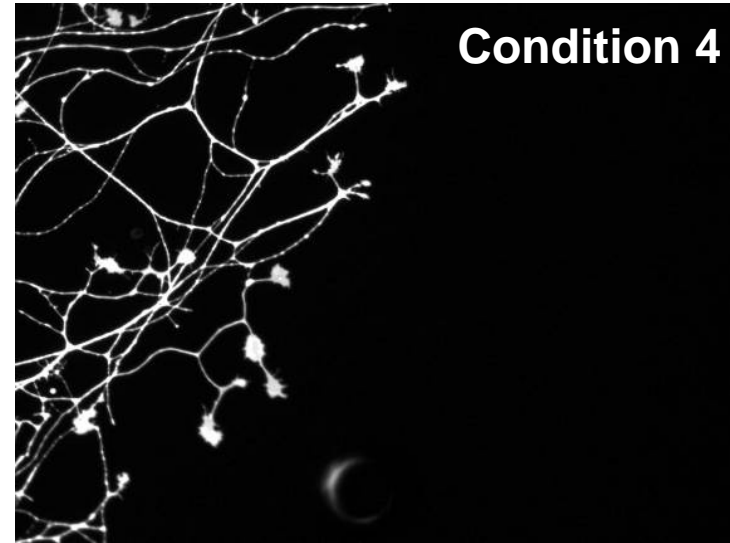
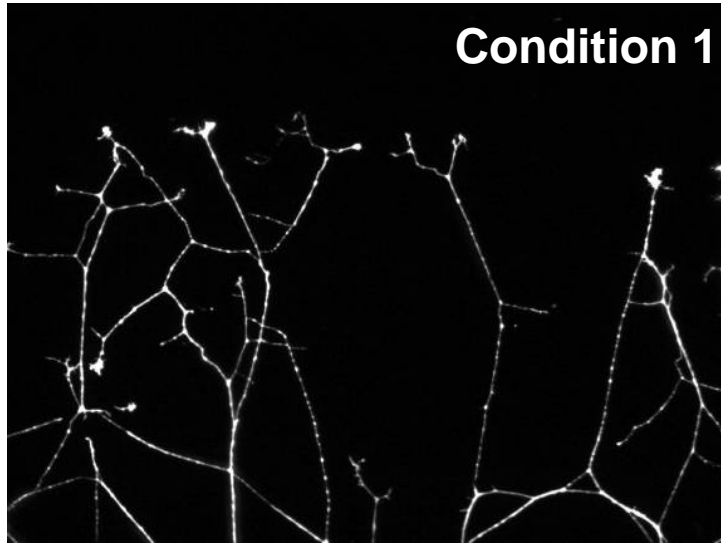
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Images to Illustrate Example

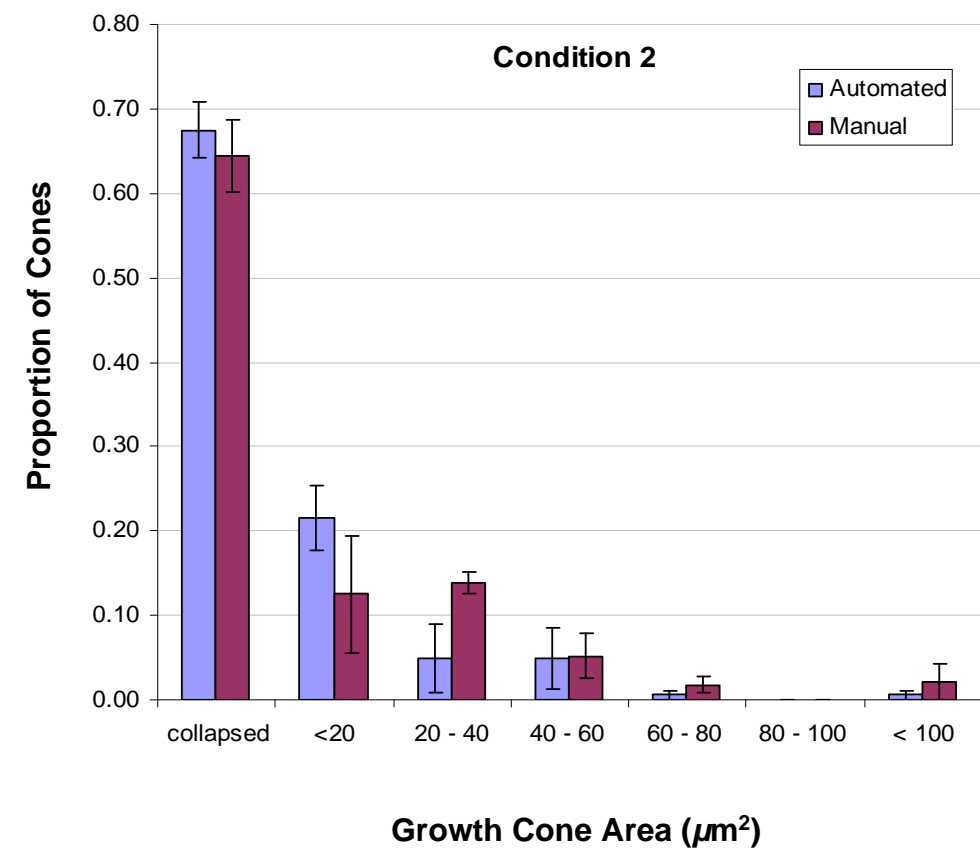
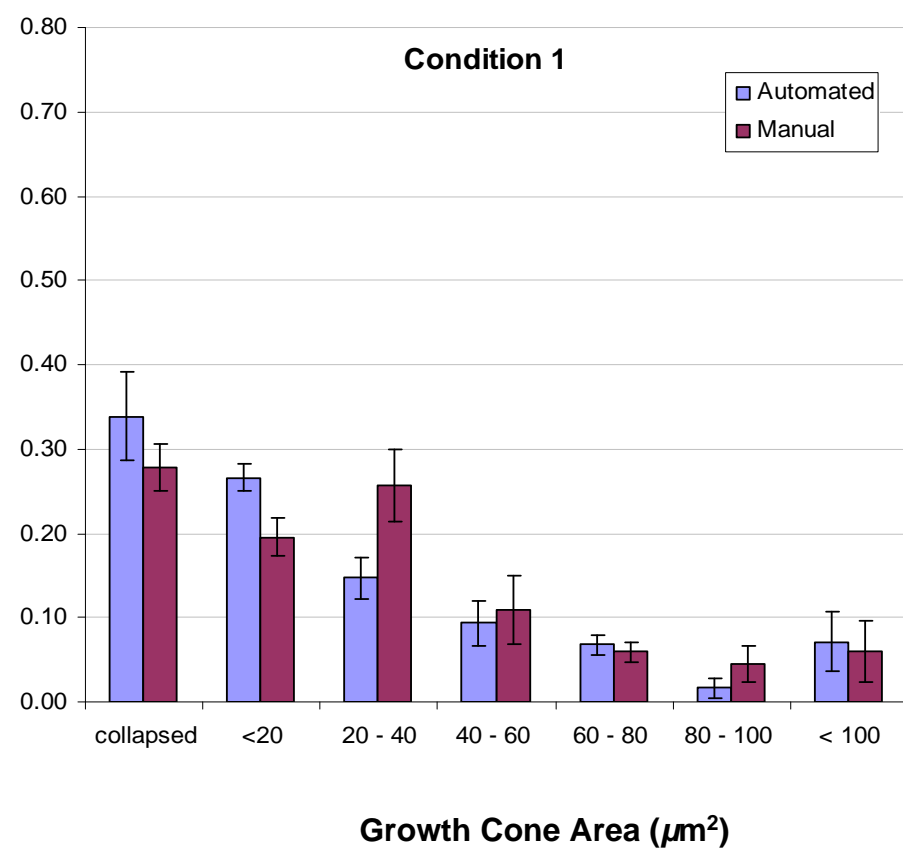


Graphs illustrate the percentage of growth cone collapse and growth cone spread area (μm^2) of mouse DRG growth cones. DRGs were labelled with an anti-GAP43 antibody to allow visualisation of cell morphology. The area distribution has been arbitrarily divided into size bins. N=63 images were analysed and data shown are means \pm sem. In blue: analysed spreading growth cones; In red circles: collapsed growth cones. Only well separated growth cones are identified and measured. Filopodia and collaterals are not measured

Images - Original and Analyzed



Analysis Results – Growth Cone Sizes



Analysis Results – Growth Cone Sizes

