

## Measuring the extension and retraction of cells or the movement of cells using Measure Colocalization

**Document ID**  
T10133

**Product**  
MetaMorph

**Created**  
30-Jul-1998

### Abstract

Measuring the extension and retraction of cells or the movement of cells using Measure Colocalization.

Cell movement can involve 4 basic steps: formation of a protrusion at the front of the cell, adhesion to the substratum, translocation of the cell body, and release from the substratum in the rear of the cell. Problems with any of the steps can decrease the efficiency of cell crawling.

The Measure Colocalization function can be used to measure two of the steps of motility: the protrusion at the front of the cell and the release from the substratum at the rear of the cell.

### Instructions

#### Requirements

- ♦ MetaMorph version 3.0 or higher and the colocalization option.
- ♦ The colocalization dropin must be loaded.
- ♦ A time-series stack of images in which the cell can be easily thresholded from the background.

#### Procedure

1. Set the threshold level to differentiate the cell from the background. The cell should be red. Use Threshold Image (Process menu) or the Threshold Tool and Contrast Slider (Image Window Tools) to set the minimum and maximum gray values for thresholding.
2. Create a journal to measure the colocalization of your source stack current image and the next plane in the same stack. This is done in two steps.
  - Start recording with the journal recorder (Toolbar or Journal Menu). Open the Measure Colocalization dialog (Measure Menu). Image A and Image B should both contain the name of your stack of interest. Image A should also say Current for the plane number. Change the plane setting for Image B so that it says '+1' (use the pull down menu and choose Relative (+1)). Choose the Record button on the Measure Colocalization dialog.
  - Stop Recording the journal and save the journal using a name of your choice.
3. Open the Data Log (Log menu). Configure the Measure Colocalization log to save the data that you wish to save. Image A represents the current time point and Image B represents the time point to come.
  - A overlapping B: represents the footprint of the cell that has not changed over time.
  - A not overlapping B: represents the region that has been released from the substratum and retracted into the cell or protrusions that were extended and never adhered.
  - B not overlapping A: represents the region of further protrusion at that time point.

**Keywords:** metamorph techniques

**Issue Type:** Application