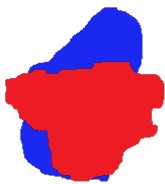# Mitotic Parameters

The cell tracker bases its decision on detecting mitotic events using cell overlap between mother and its 2 daughter cells. If the cell overlap between one frame and the next is above the ***Min Mitotic Overlap*** threshold, the Cell Tracker will label that as a possible mitosis event. The Cell Tracker will then test the ***Daughter Size Similarity, Daughter Aspect Ratio Similarity***, and ***Mother Circularity Index*** thresholds to determine if a mitotic event has occurred. If all of the tests pass, the Cell Tracker will record the mitotic event in the division matrix.

Enable Cell Mitosis

If cell mitosis is enabled, the daughter cells of a mitotic event will be assigned new cell labels, different from their mother cell label. If disabled, the daughters will keep the same label as the mother cell and no mitotic e vent will be considered. This functionality is helpful when dealing with particle tracking or colony tracking.
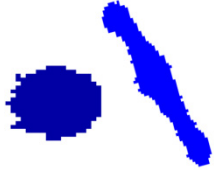
Min Mitotic Overlap

If cell overlap in percent is above this threshold between one frame and the next the Cell Tracker will record a possible mitotic event. The following table illustrates the value of this parameter with respect to the overlapping positions between a red cell from the current frame and the blue cell from the next frame. If this parameter is set to 0%, all cases will be considered as a potential mitotic event. If this parameter is set to 100% cell mitosis is discarded where the daughter cell that overlaps the most with the mother cell will keep its unique global ID label and the other one will get a new label.

>75% overlap	>30% Overlap	0% Overlap

Daughter Size Similarity

This parameter is a measure of the size similarity between daughter cells. In a real mitotic event the size of the daughter cells should be very similar to each other. A mother cell doesn't really produce a large daughter and a small one. Set this parameter to 0% to discard it.

| 95% Daughter Size Similarity | 55% Daughter Size Similarity | 40% Daughter Size Similarity |

Daughter Aspect Ratio Similarity

This parameter is a measure of the aspect ratio similarity between daughter cells. In a real mitotic event daughter cells should have similar shapes to each other. Set this parameter to 0% to discard it.

| 100% Daughter Aspect Ratio Similarity | 50% Daughter Aspect Ratio Similarity | 20% Daughter Aspect Ratio Similarity |

Mother Circularity Index

For a cell to be considered a mother cell in a possible mitotic event it must have been round within the previous **Number of Frames to Check Circularity** parameter. This circularity threshold determines what is round enough to be considered a mitotic cell. Set this parameter to 0% to discard it.

| 80% Circularity Index | 55% Circularity Index | 25% Circularity Index |

Number of Frames to Check Circularity

The Cell Tracker will determine if the cell had a circularity threshold above the **Mother Circularity Index** between the current frame and the previous number of frames. If the cell's circularity is not above the threshold at least for one frame within this range, then the mitotic event will not be recorded.