

Cell Shape Metric	Units	Description
Mean Negative Curvature	μm^{-1}	Average reciprocals of each radius of a circular arc that best approximates each local region curvature in the cell outline
Regions of negative curvature	μm^{-1}	Number of boundary region where negative curvature is uninterrupted by positive curvature, normalized to the overall perimeter of the cells(i.e invaginations)
Mean boundary distance	μm^{-1}	Mean distance from the geometrical centroid of the cell to the boundary of the cell as defined by the snake outline
Tortuosity	μm^{-4}	Measures of the length of the curve between two boundary points and shortest distance between those points. Here it was defined from the boundary curvature as the integral square of the derivative of curvature along the cell outline, divided by the length of the cell outline
Circularity	Non-dimensional	Measure of the roundness of the cell and was calculated as $1/(4\pi \times \text{area}/\text{perimeter squared})$. A value of 1 represents a perfect circle and values approaching positive infinity suggest increasingly elongated or dendritic shape
solidity	Non-dimensional	Ratio of the cell area to the area of the convex hull encompassing the cell
Major and Minor axis length	μm	Defined from the major and minor axis of the best fitting ellipse
Aspect ratio	Non-dimensional	Ratio of the major axis to the minor axis where higher aspects ratios indicates a more elongated shape

Table S1: Description of Cell Shape Metrics.