**Supplementary Table 1: Description of Mitochondria morphometrics.**

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| **METRIC NAME** | **DEFINITION** | **Illustration** |
| **MORPHOLOGY MEASUREMENTS** | | |
| **Mito\_Area** | Area of the mitochondria |  |
| **Mito\_Perimeter** | The length of the outside boundary of the mitochondria. |  |
| **AreaPerimeter\_Ratio** | Ratio between Perimeter and Area |  |
| **Mito\_CentroidX and Mito\_CentroidY** | X and Y coordinates of the center point of the mitochondria. |  |
| **Mito\_Circularity** | Shape of the mitochondria defined as ***(4 π \*area/perimeter^2)***. A value of 1.0 indicates a perfect circle. As the value approaches 0.0, it indicates an increasingly elongated shape |  |
| **Mito\_Roundness** | Shape of the mitochondria defined as ***(4\*area/(π\*major\_axis^2))***, or the inverse of the aspect ratio. |  |
| **Mito\_Solidity** | Ratio between area and convex area |  |
| **Mito\_AR** | Aspect Ratio : Ratio between major axis and minor axis |  |
| **Mito\_Feret\_Diameter** | The longest distance between any two points along the mitochondria boundary, also known as maximum caliper |  |
| **Mito\_FeretX and Mito\_FeretY** | Starting coordinates of the Feret’s diameter |  |
| **ULTRASTRUCTURE MEASUREMENTS** | | |
| **Mito\_MeanInt** | Average intensity calculated from mitochondria’s gray values |  |
| **Mito\_MeanInt\_CORR** | Average intensity calculated from mitochondria’s gray values after High frequency filtering (FFT noise correction) |
| **Mito\_MedianInt** | Median intensity calculated from mitochondria’s gray values. |  |
| **Mito\_MedianInt\_CORR** | Median intensity calculated from mitochondria’s gray values after High frequency filtering (FFT noise correction) |
| **Mito\_TotalInt** | Sum of the mitochondria’s gray values |  |
| **Mito\_TotalInt\_CORR** | Sum of the mitochondria’s gray values, after High frequency filtering (FFT noise correction) |
| **Intensity\_SD** | Standard deviation of the mitochondria’s gray values used to generate the mean intensity. Measure of crista’s density within the mitochondria |  |
| **Intensity\_SD\_CORR** | Standard deviation of the mitochondria’s gray values used to generate the mean, after High frequency filtering (FFT noise correction). Measure of crista’s density within the mitochondria |
| **Intensity\_SD\_percent** | Ratio between Intensity\_SD and MeanInt. Measure of crista’s density within the mitochondria |
| **Intensity\_SD\_percent\_CORR** | Ratio between Intensity\_SD\_CORR and MeanInt\_CORR. Measure of crista’s density within the mitochondria |
| **Skewness** | Third order moment about the mean. Measure of the asymmetry of the mitochondria’s gray values about the mean intensity |  |
| **Kurtosis** | The fourth order moment about the mean. Measure of the "tailedness" of the mitochondria’s gray values about the mean intensity. |  |
| **CristaOrientation\_Major** | Primary axis of the best fitting ellipse calculated from the frequency spectrum of the mitochondria’s gray values. Measure of the Crista’s orientation, alignment and number within the mitochondria. |  |
| **CristaOrientation\_Minor** | Secondary axis of the best fitting ellipse calculated from the frequency spectrum of the mitochondria’s gray values. Measure of the Crista’s orientation, alignment and number within the mitochondria. |  |
| **CristaOrientation\_Angle** | Angle (between the primary axis and a **line parallel to the x-axis** of the image) of the best fitting ellipse calculated from the frequency spectrum of the mitochondria’s gray values. Measure of the Crista’s orientation, alignment and number within the mitochondria. |  |
| **CristaOrientation\_Area** | Area of the best fitting ellipse calculated from the frequency spectrum of the mitochondria’s gray values. Measure of the Crista’s orientation, alignment and number within the mitochondria. |  |