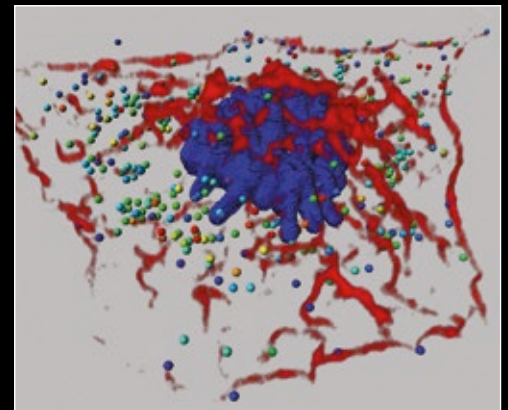


Visualize and analyze relationships between individual cells and intracellular structures. Map out organelles and other cellular components with ImarisCell. Obtain novel insights into cells' structure and function

It is challenging to gain quantitative insights into intricate relationships between cell compartments and structural relations within cell groups. **ImarisCell** uses the biologist's concept of cells and applies topological constraints on the detection of organelles. It encapsulates Bitplane's powerful image analysis algorithms and simple creation wizards to manage the detection, display and editing of cells, intracellular boundaries and multiple organelles.. **ImarisCell** enables researchers to qualitatively and quantitatively examine micro-relationships that exist within and between cells in your image.

ImarisCell is an Imaris module specifically designed for the analysis of 2D, 3D and 4D images of cells and their components. **ImarisCell** provides statistics not on a per image basis but on a per cell and per component basis preventing unnecessary generalizations caused by the limitations of single image analysis. **ImarisCell** can be combined with **Imaris MeasurementPro** for measurements of cells and organelles distances, volumes and intensity changes. When combined with **ImarisTrack**, **ImarisCell** becomes a tool for detection and analysis of temporal changes in cells caused by developmental and environmental factors.



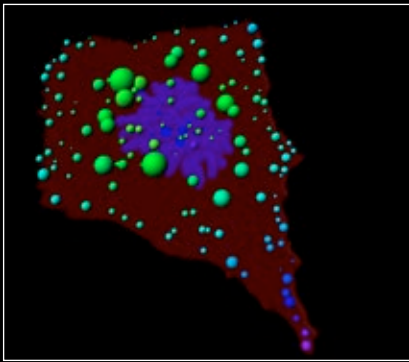
Main Image: Original image volume rendered using a blend projection and image after segmentation with **ImarisCell**. Image courtesy of Kaoru Geddes and Aurelie Snyder at OHSU, Portland, Oregon.

Secondary image: Courtesy of William Maximiano, Dra. Maria Célia Jamur e Dra. Constance Oliver, Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo.

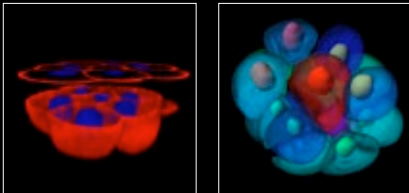
This cell has been visualized and analysed in **ImarisCell** to show population of vesicles (color-coded for their z position), the cell nucleus (blue) and cytoskeleton (red, shadow projection display)

ImarisCell

Making Sense Out Of Your Cell's Relationships



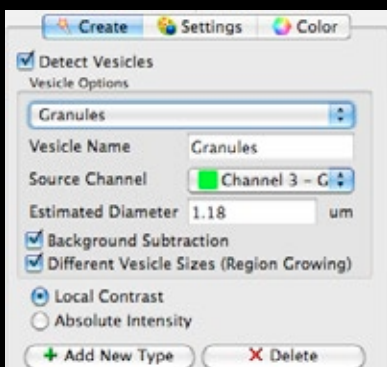
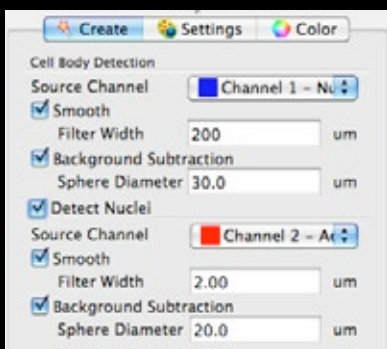
Classify vesicles inside an analyzed cell based on their position or distance from key structures like the nucleus or the plasma membrane.



Left: fixed 16-cell stage mouse embryo stained with Phalloidin (f-actin) and DAPI (rendered in Imaris using volume, one orthoslicer and one clipping plane).

Right: Imaris detected cells and nuclei (using plasma membrane-based cell segmentation).

Image courtesy of McDole K, Xiong Y, Iglesias PA and Zheng Y.; Carnegie Institute of Science, Maryland, USA.



Work Flow

Defining the analysis workflow for cells and their components. Select the key parameters of segmentation for visualization of nuclei, cytoplasm and multiple vesicle classes.

Your Benefits

Examine relationships between cells and cellular components within a cell.

Utilize a biologically meaningful image analysis unit (cells or organelles).

Analyze cells in biological space - in 3D and time (4D).

Measure mechanical and structural cell functions involved in cell-to-cell communication.

Save time by utilizing an advanced, structured and intuitive creation wizard.

Two alternative methods of cell detection: a) based on cytoplasm labeled samples, and b) based on cell membrane labeled samples.

Image Input

- Multiple fluorescent channels can be used simultaneously to analyze Cells, Nuclei and various vesicle types / populations.
- Cells and Nuclei may be imported from existing surface objects already present in Imaris.
- Vesicles may be imported from existing spot objects.

Statistical Measurements

- Overall Statistics - number of cells or components per image/time point.
- Object-specific statistics - including size, shape, orientation (sphericity, ellipticity, axes - Cells and Nucleus only), diameter, position and intensity.
- Cell-specific statistics - number of nuclei and vesicles/cell, cytoplasm volume ratio/cell, vesicle intensity data for individual vesicles and vesicle groups.
- Cytoplasm-specific statistics: volume, number of vesicles in the cytoplasm, dimension of vesicles in the cytoplasm.
- Vesicle-specific statistics - its diameter, distance from Vesicle to Membrane or Nucleus center and border, position within a Cell, location within cytoplasm or Nucleus.
- 4D-specific data - available for each tracked Cell, Nucleus or Vesicle. Both relative and absolute motion is monitored, e.g. total distance covered by a vesicle and distance covered by vesicle minus movement of the cell.
- Tracks - obtain speed, duration, length and straightness of tracks, their displacement data, number of branches or fusions and fitting using autoregressive model.
- Tracked objects - changes in Nucleus, Cell and Vesicle statistics over time - speed and acceleration per XYZt point, number of objects within tracked cell.

Cell Detection and Creation

- Wizard-driven detection of Cells, Nuclei and Vesicles
- Each population of vesicles can be detected based on different or the same channel and can be composed by a range of sizes.
- Detect objects using absolute intensity or local contrast method.
- Cells and Nuclei are detected as voxel-based objects later displayed as surfaces.
- Vesicles are detected as spot objects.

Visualization Output

- Use Imaris Vantage to interactively explore relationships between key parameters (from sorted gallery to 3D scatter plots)
- Convert Cells and Nuclei surface objects for additional visualization options.
- Export Vesicles as spot objects.
- Create educative and impressive snapshots and movie animations for your presentations and publications.

Further analysis

- Use the advanced and customized Imaris XT functionality to get an even greater understanding of your results.

Statistical Output

- Export your analyses as .csv or Excel (.xml or .xms) data.
- Create OpenOffice and Mac-compatible files
- Output all generated data.
- Limit data export - output only from currently open statistics tab (overview, detailed or selection)
- Output only the statistics used in generating selected time plot.
- Look up objects' IDs - these unique identifier labels can be found in stats tab and output file and may be used for manual search of objects.

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Software requirements

ImarisCell requires Imaris and Imaris MeasurementPro for statistical output. ImarisTrack is required for tracking objects in 4D and ImarisXT may be added for customer-specific analysis and classifications codes created with MatLab.

Operating system requirement

ImarisCell runs on PCs with Microsoft® Windows® XP, Vista, 7 (32 and 64-bit) and MacOS (10.6 or later).

Windows systems - we recommend using 64-bit OS with 16GB RAM, 3.3 GHz (or faster) quad-core CPU with 64-bit support.

Mac systems - we recommend using Intel 2.8 GHz (or faster) quad-core CPU and 16GB RAM

Graphics boards - ATI/nVidia graphics card with 512 MB RAM. For full list of supported hardware please visit bitplane.com/go/support/system-requirements