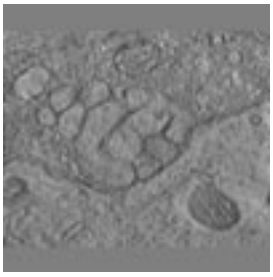
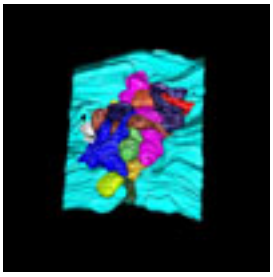
Cell Centered Database

University of California, San Diego

Maryann Martone

Microscopy Product #:3629 embryo

For the most updated information, please visit
http://ccdb.ucsd.edu/CCDBWebSite/main?event=displaySum&mpid=3629

Image2D	Reconstruction	Segmentation
		

Project Information:

PROJECT_ID	P1692
PROJECT_NAME	Reconstruction of ciliary ganglion spine mats in adult and embryonic chick
PROJECT_DESCRIPTION	Detailed structural investigation of the structure and distribution of synaptic densities on the spine mats from adult and embryonic ciliary ganglion neurons. Reconstructions were derived from serial electron tomography of in vivo neurons.
LEADER	Rick Shoop
FUNDING_AGENCY	NIH
PROJECT_START_DATE	
PROJECT_END_DATE	
COLLABORATORS	Darwin Berg, Mark Ellisman, Naoko Yamada, Ed Esquenazi
PUBLICATION1	Shoop RD, Esquenazi E, Yamada N, Ellisman MH, Berg DK. Ultrastructure of a somatic spine mat for nicotinic signaling in neurons. J Neurosci. 2002 Feb 1;22(3):748-56. PMID: 11826104
PUBLICATION2	
PUBLICATION3	

Experiment Information -	
PURPOSE	To employ serial electron tomography to reconstruct an entire spine mat from embryonic chick ciliary ganglion.
TITLE	Serial tomography of embryonic ciliary ganglion spine mat
EXPERIMENTER	Rick Shoop
EXPERIMENT_NAME	
EXPERIMENT_DATE	

Subject Information -	
GROUP_BY	age
SUBJECT_NAME	embryonic
FIXATION_METHOD_ID	
SCIENTIFIC_NAME	Gallus gallus
SPECIES	chicken
STRAIN	White leghorn
AGE	15 days
AGECLASS	embryonic
ANIMAL_NAME	
LITTER_ID	
SEX	unspecified
VENDOR	
WEIGHT	grams

Tissue -	
ANATOMIC_LOCATION	ciliary ganglion
MICROTOME	ultramicrotome
ORIENTATION	
THICKNESS	100 um
TISSUE_PROD_STORAGE	
EXTERNAL_FILE_NAME	
TISSUE_GROUP_TYPE	

Microscopy Product Information -	
MICROSCOPY_PRODUCT_ID	3629
IMAGE_BASENAME	embryo
CREATE_DATE	
INSTRUMENT	JEOL 4000EX IVEM
MICROSCOPE_TYPE	IVEM
PLANE_COUNT	
PRODUCT_TYPE	SINGLE TILT
PURL	
SESSION_NAME	
TELESCIENCE_SRB	P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629
X_RESOLUTION	nm/pixels
Y_RESOLUTION	nm/pixels
XSIZE	
YSIZE	

Protocol:

Embryonic day (E) 15 chicks or 2-year-old adult chickens were perfusion-fixed with 2% paraformaldehyde plus 2% glutaraldehyde in cacodylate buffer, pH 7.4. Ciliary ganglia were removed, transferred to fresh fixative, and incubated for 3 hr at room temperature. Adult ciliary ganglia were cut into 1 mm3 pieces. After being rinsed several times in 0.1 M sodium cacodylate buffer, pH 7.4, the tissue was treated for 30 min with 2% osmium tetroxide in 0.1 M sodium cacodylate and then counterstained with

uranyl acetate. The ganglia were dehydrated in a series of ethanol solutions followed by two rinses in acetone, infiltrated with Durcupan ACM resin (Electron Microscopy Sciences, Fort Washington, PA), allowed to polymerize for 24 hr at 60¿C, and then sectioned. For serial tomography a continuous series of 10 1-¿m-thick sections was prepared to encompass a complete spine mat. For traditional thin section analysis 100-nm-thick sections were made.

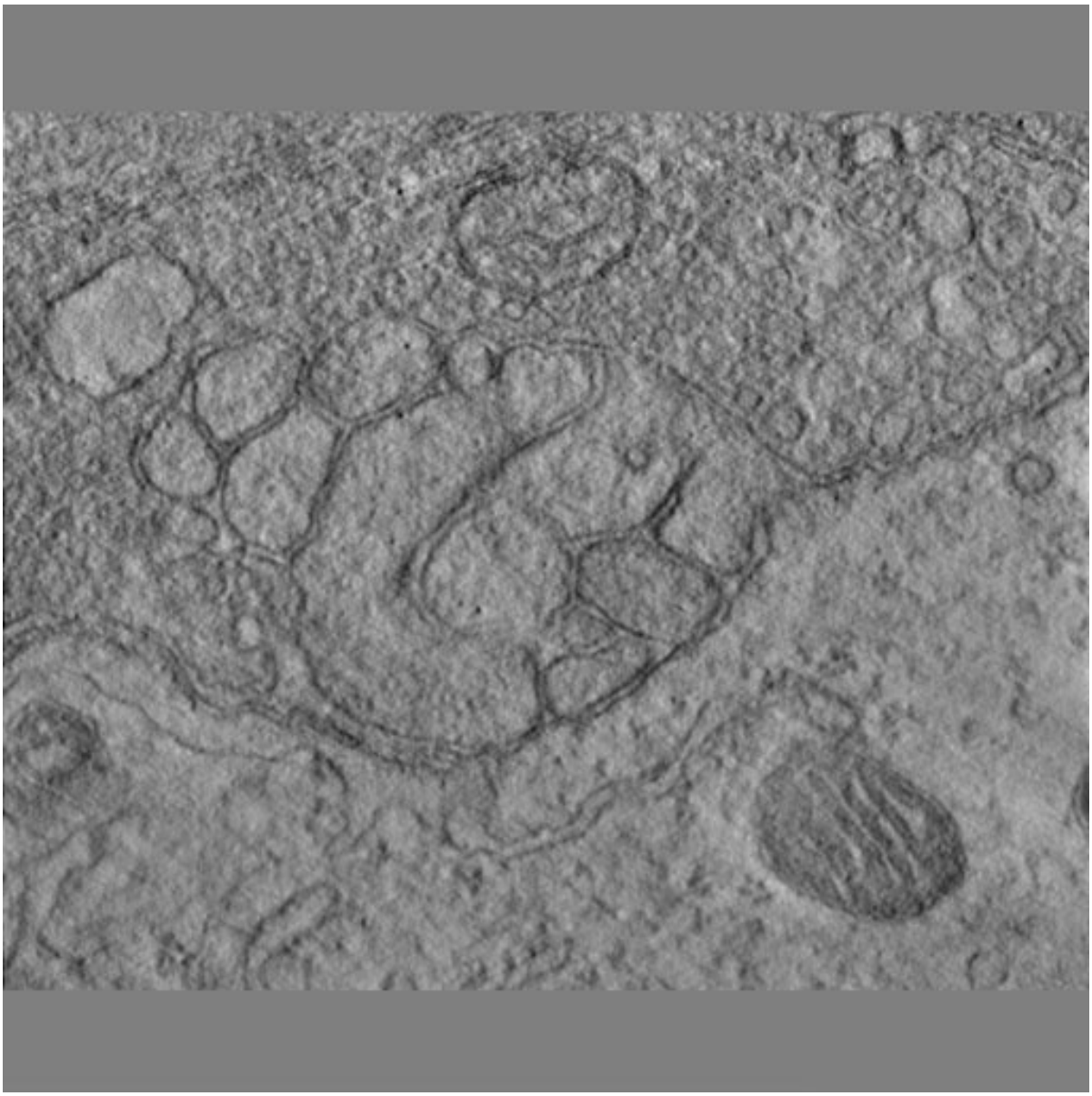
Image Type -	
SINGLE_TILT_IMAGE_SEQ_ID	6101
TILT_INCREMENT	2 degrees
SINGLE_TILT_NOTES	The reconstruction shown is actually from a serial tomogram derived from 6 serial sections. As far as can be derived from the published paper, all tilt series were -60 to 60 at 2 degree increments.
SINGLETILTIMAGESEQ_ID	6101
TILT_INCREMENT	2 degrees
RANGE_MAX	60 degrees
RANGE_MIN	-60 degrees
SINGLE_NOTES	The reconstruction shown is actually from a serial tomogram derived from 6 serial sections. As far as can be derived from the published paper, all tilt series were -60 to 60 at 2 degree increments.

Specimen Description -	
ANATOMICAL_DETAIL	6122
ATLAS_COORD	, ,
CELL_TYPE	ciliary ganglion neuron
ORGAN	ciliary ganglion
STRUCTURE	calycal synapse
SYSTEM	peripheral nervous system

Electron Microscopy Product -	
EM_PRODUCT_ID	6121
ACCELERATING_VOLTAGE	400 KeV
MAGNIFICATION	10000
RECORDING_MEDIUM	film

Reconstruction

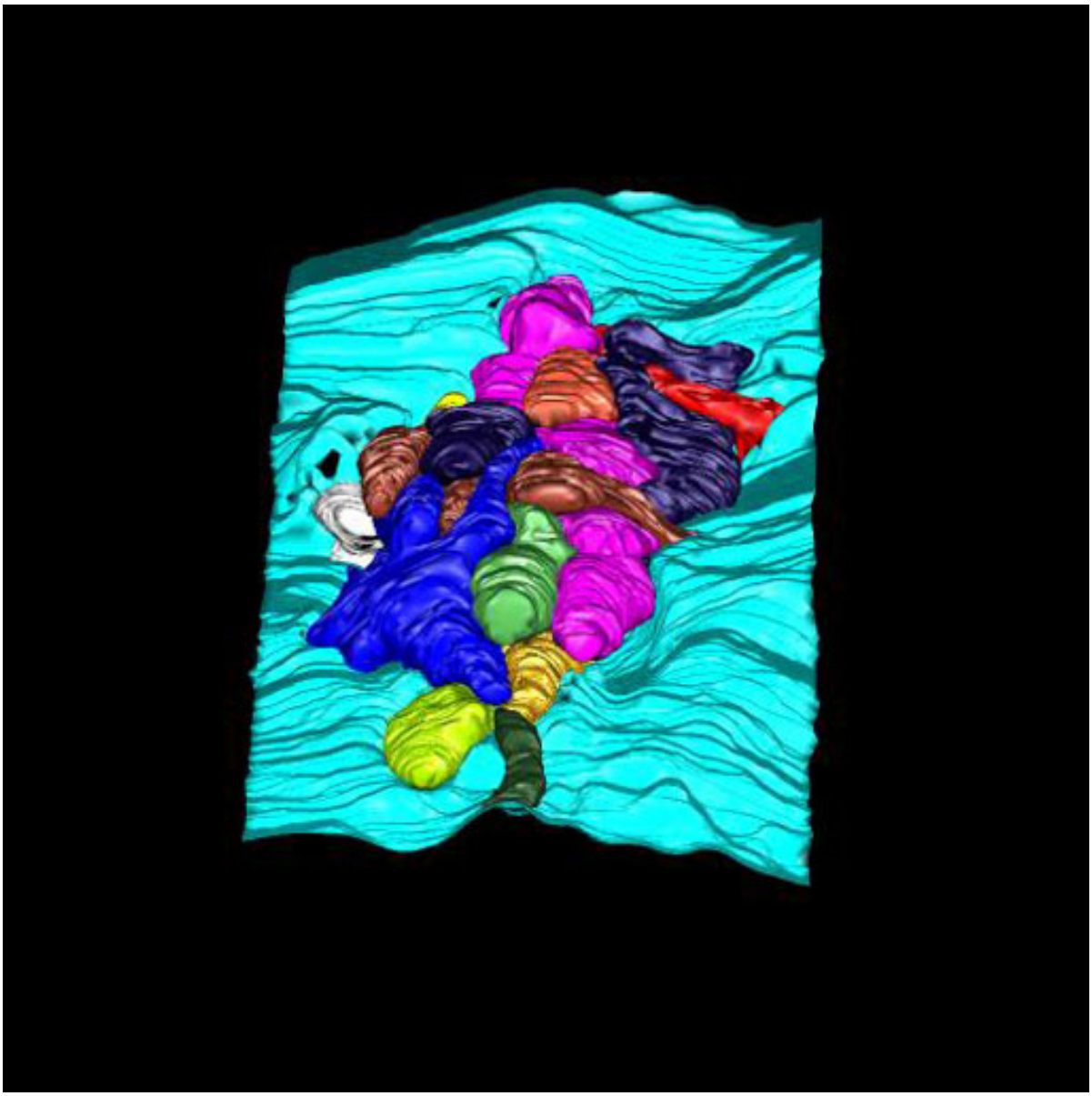
Reconstruction Image -



Reconstruction -	
RECONSTRUCTION3D_ID	6082
ALIGNMENT_METHOD	manual
ALIGNMENT_PROGRAM	xfido, saxalign
CROPPING_COORDINATE1	,
CROPPING_COORDINATE2	,
NOTES	This reconstruction is actually a serial tomogram from 6 serial volumes.
RECON_ALGORITHM	R-weighted back projection
RECON_DESC	Zip file containing entire serial tomographic volume in Analyze 7.5 format (embryo.hdr/embryo.img). This volume was creating by aligning and concatenating 6 serial tomograms. The volume file is 269.5 Mb.
RECON_PROGRAM	Suprim
RECON_TYPE	single tilt electron tomography
VOLUME_DIMENSION	640, 640, 690
VOLUME_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_vol.zip
VOXEL_SCALE	, ,
RECONSTRUCTION_IMAGES_ID	6082
RECON_IMAGE_DESC	Computed slice through a tomographic reconstruction of the pre- and post-synaptic structures of the calycal synapse onto a chick ciliary ganglion neuron. This slice was derived from the 3rd of 6 serial volumes comprising the entire reconstruction.
RECON_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_vol.jpg
VOLUME_THUMBNAIL	P1692/embryo_vol_thmb.jpg
ANIMATION_FILE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_vol.mpg
ANIMATION_FILE_FORMAT	mpg
ANIMATION_DESC	Downsampled animation (256x256) through the computed slices of the aligned and merged volumes showing the pre- and post-synaptic structures of the calycal synapse onto a chick ciliary ganlgion neuron.

Segmentation

Segmentation Image -



Segmentation -	
SEGMENTED_OBJECT_ID	6100
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata file required for visualization with Synuview.
IS_MANUAL	Y
LABELING_RANK	none
LENGTH	.64 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine0
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6100
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.zip

Segmentation -

SURFACE_AREA	.23 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.01 um3
SEGMENTED_OBJECT_ID	6101
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata file required for visualization with Synuview.
IS_MANUAL	Y
LABELING_RANK	none
LENGTH	.88 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine1
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6101
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.

Segmentation -

SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	.49 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.04 um3
SEGMENTED_OBJECT_ID	6102
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata file required for visualization with Synuview.
IS_MANUAL	Y
LABELING_RANK	none
LENGTH	3.08 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine2
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6102
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of

Segmentation -	
	PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	1.06 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.06 um3
SEGMENTED_OBJECT_ID	6106
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata file required for visualization with Synuview.
IS_MANUAL	Y
LABELING_RANK	none
LENGTH	.88 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine6
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6106
SEGMENT_PERSON_NAME	Rick Shoop

Segmentation -

SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	.48 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.04 um3
SEGMENTED_OBJECT_ID	6107
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata file required for visualization with Synuview.
IS_MANUAL	Y
LABELING_RANK	none
LENGTH	5.49 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine7
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg

Segmentation -

SEGMENTED_OBJECT_ID	6107
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	3.01 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.21 um3
SEGMENTED_OBJECT_ID	6108
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata file required for visualization with Synuview.
IS_MANUAL	Y
LABELING_RANK	none
LENGTH	.93 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine8
OBJECT_TYPE	surface

Segmentation -

SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6108
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	.32 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.02 um3
SEGMENTED_OBJECT_ID	6109
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
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IS_MANUAL	Y
LABELING_RANK	none
LENGTH	2.78 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine

Segmentation -

OBJECT_NAME	Spine9
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6109
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	1.33 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.06 um3
SEGMENTED_OBJECT_ID	6104
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata file required for visualization with Synuview.
IS_MANUAL	Y
LABELING_RANK	none
LENGTH	4.36 um

Segmentation -

NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine4
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6104
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	1.78 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.12 um3
SEGMENTED_OBJECT_ID	6105
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata file required for visualization with Synuview.
IS_MANUAL	Y

Segmentation -

LABELING_RANK	none
LENGTH	5.77 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine5
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6105
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	3.5 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.26 um3
SEGMENTED_OBJECT_ID	6103
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
ANALYZE_DESC	Somatic spine length, volume, and surface area were measured from the segmented volumes with XDend software, and spine neck diameters were measured with Analyze AVW software (National Center for Microscopy and Imaging Research). Length was calculated as the mean length of the longest continuous path from the spine neck to the tip of the spine. Significant deviations from this continuous path were counted as branches. Volume and surface were calculated directly on the basis of the traced morphologies after pixel size was converted to dimensions in micrometers.
DISPLAY_IMAGE_DESC	Surface rendering of the plasma membrane (light blue) and spine mat of a ciliary ganglion neuron from the E15 chick. Each of the spines comprising the mat were segmented separately (various colors). See Shoop et al (J Neurosci. 2002 Feb 1;22(3):748-56) for more details.
DOWNLOADABLE_FILE_DESC	Zip file (~38 Mb) containing the Xvoxtrace files (*.trace) containing the manual tracings of the individual components of the calycyl synapse, including ER, PSD, vesicles, base, and spines. Each of these components was traced in a separate file and are contained in different subdirectories. Also included in each subdirectory are the surfaced contours in Synu (*.synu) format, along with the Viewdata

Segmentation -	
	file required for visualization with Synuview.
IS_MANUAL	Y
LABELING_RANK	none
LENGTH	4.3 um
NUMBER_OF_OBJECT	1
OBJECT_DESC	somatic spine
OBJECT_NAME	Spine3
OBJECT_TYPE	surface
SEGMENTED_OBJ_2D_IMAGE	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/Embryo_seg.jpg
SEGMENTED_OBJECT_ID	6103
SEGMENT_PERSON_NAME	Rick Shoop
SEG_DESC	Manual delineation of the presynaptic calyx and post synaptic spine mat using Xvoxtrace 2.17. Also delineated were the locations of PSD's, vesicles, intracellular components of the post synaptic compartment.
SEG_FILE_NAME	/telescience/home/CCDB_DATA_USER.portal/P1692/Experiment_3422/Subject_136/Tissue_154/Microscopy_3629/embryo_seg.tar
SURFACE_AREA	3.19 um2
THUMBNAIL	P1692/Embryo_seg_thmb.jpg
VOLUME	.19 um3

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ACKNOWLEDGEMENT

Data used from the CCDB should be appropriately referenced, including both the author of the data and the CCDB. If the data were from a published study, the reference is included in the database record. The following reference should be cited for the CCDB:

Martone, M. E., Gupta, A., Wong, M., Qian, X., Sosinsky, G., Ludaescher, B., and Ellisman, M. H. A cell centered database for electron tomographic data. J. Struct. Biology 138: 145-155, 2002.

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Maryann Martone