

Supplementary information | S2

Nomenclature of morphological features.

(Age, species, region and method should be specified)

1. Soma

1.1. Location

- 1.1a Layer
- 1.1b Region

1.2 Shape

- 1.2a Round
- 1.2b Fusiform
- 1.2c Triangular/pyramidal – Apex towards pia or towards white matter
- 1.2d Polygonal
- 1.2e Other

1.3 Size (quantify)

- 1.3a Vertical diameter
- 1.3b Horizontal diameter
- 1.3c Cross-sectional area

1.4 Orientation

- 1.4a Radial
- 1.4b Tangential
- 1.4c Other

1.5 Other

2. Dendrite

2.1 Arbor polarity (intra/interlaminar, intra/intercolumnar)

- 2.1a Unipolar
- 2.1b Bidirectional (radial/tangential)
 - 2.1b1 Bitufted: Two tufts in opposite directions
 - 2.1b2 Bipolar: Two long primary dendrites in opposite directions
- 2.1c Multipolar: Three or more primary dendrites in multiple directions
- 2.1d With one large “pyramidal cell-like” thick, tapering projection in any direction
- 2.1e Other

2.2 Tree size

- 2.2a Total surface area
- 2.2b Total length
 - 2.2c Maximum distance from soma
 - 2.2c1 Euclidean
 - 2.2c2 Along the path
 - 2.2c3 Number of bifurcations (branch order)
 - 2.2d Other

2.3 Branch metrics (label branches in a hierarchical fashion)

- 2.3a Frequency and number (stems, nodes, endings)
- 2.3b Thickness (diameter or section area)
- 2.3c Length
 - 2.3d Taper
 - 2.3e Diameter power relation
 - 2.3f Sholl or “Sholl-like” analysis
 - 2.3g Fractal dimension
 - 2.3h Tortuosity
 - 2.3i Partition asymmetry
 - 2.3j Angles (e.g. amplitude, planarity)
 - 2.3k Other

2.4 Fine structure

- 2.4a Spines (number per unit length, size and distributions - dendrite order)
- 2.4b Beads (number per unit length, size and distributions - dendrite order)

- 2.4c Other (e.g. filopodia)

2.5 Morphology of synaptic inputs

- 2.5a Origin
- 2.5b Symmetry/type
- 2.5c Density
- 2.5d Location
- 2.5e Other
- 2.6 Other

3. Axon

3.1 Initial Segment

- 3.1a Origin (soma/dendrite)
 - 3.1b Course
 - 3.1b1 Deep/superficial (ascending/descending)
 - 3.1b2 Radial/tangential
 - 3.1b3 Other
 - 3.1c Other

3.2 Branch metrics (label branches in a hierarchical fashion)

- 3.2a Frequency and number (stems, nodes, endings)
- 3.2b Thickness (diameter or section area)
- 3.2c Length
 - 3.2d Taper
 - 3.2e Diameter power relation
 - 3.2f Sholl or “Sholl-like” analysis
 - 3.2g Fractal dimension
 - 3.2h Tortuosity
 - 3.2i Partition asymmetry
 - 3.2j Angles (e.g. amplitude, planarity)
 - 3.2k Origin of the first collateral (distance from the soma)
 - 3.2l Other

3.3 Arbor

- 3.3a Unmyelinated/myelinated and myelination pattern
- 3.3b Density (e.g. length per unit volume, by layer and/or distance from soma)
 - 3.3c Orientation - radial/tangential
 - 3.3d Ascending/descending
 - 3.3e Intra/interlaminar (specify layers innervated)
 - 3.3f Intra/intercolumnar
 - 3.3g Total tree size (see 2.2)
 - 3.3h Arborization patterns
 - 3.3h1 Dense plexus of highly branched axons
 - 3.3h2 Recurrent (ascending/descending) arches (willows)
 - 3.3h3 Bundles of long, vertical branches or tufts (horsetail)
 - 3.3h4 Other
 - 3.3i Terminal branch shape (curved/straight)
 - 3.3j Other

3.4 Boutons

- 3.4a Size and shape
- 3.4b Density (by layer and horizontal distance from soma)
- 3.4c Clustering pattern
- 3.4d Structure
 - 3.4c1 Terminal/en passant - proportions
 - 3.4c2 Axonal stalks
 - 3.4c3 Other
- 3.4e Ultrastructure
 - 3.4e1 Density/type of vesicles

SUPPLEMENTARY INFORMATION

3.4e2 Type of synapse (e.g. symmetric/asymmetric)

3.4e3 Postsynaptic density size

3.4e4 Density of mitochondria

3.4e5 Other

3.4f Other

4. Connectivity (specify predicted/putative vs. identified/confirmed)

4.1 Chemical synapses: postsynaptic targets

4.1a Cellular type

4.1a1 Pyramidal cells (by layer and type – incl. proportions)

4.1a2 Interneuron (by subtype and layer of postsynaptic soma)

4.1a3 Other (e.g. vascular system, glia)

4.1b Location (quantify spine/shaft ratio)

4.1b1 Soma/Proximal (1st order) dendrite

4.1b2 Distal dendrite

4.1b3 Dendritic tuft (pyramidal cell)

4.1b4 Basal dendrite (pyramidal cell)

4.1b5 Apical main dendrite (pyramidal cell)

4.1b6 Apical oblique dendrite (pyramidal cell)

4.1b7 Axon initial segment

3.5b9 Axon arbor

3.5b10 Other

4.1c Pattern on postsynaptic target

4.1c1 Clustered

4.1c2 Distributed

4.1c3 Gradient

4.1c4 Other

4.1d Other

4.2 Electrical synapses (gap junctions)

4.2a Cellular type

4.2a1 Pyramidal cells

4.2a2 Interneuron

4.2b Source

4.2b1 Soma

4.2b2 Dendrite

4.2b3 Axon

4.2c Location and distribution (quantify density/probability)

4.2c1 Soma

4.2c2 Proximal dendrite

4.2c3 Distal dendrite

4.2c4 Axon arbor

4.2d Other

4.3 Other