

---

# Multi-layered maps of neuropil with segmentation-guided contrastive learning

---

In the format provided by the  
authors and unedited

| dataset | subcompartment     | #training segments | total #training examples |
|---------|--------------------|--------------------|--------------------------|
| human   | axon               | 1,256              | 262,395                  |
|         | dendrite           | 933                | 1,151,175                |
|         | soma               | 993                | 40,649                   |
|         | astrocytic process | 212                | 1,392,702                |
| mouse   | axon               | 121                | 4,653,326                |
|         | dendrite           |                    | 2,343,169                |
|         | soma               |                    | 13,830                   |

**Supplementary Table 1. Cellular subcompartment ground truth label sets.**

The number of distinct segments and total number of training examples of each type available for subcompartment classification (Fig. 2). For both fully supervised training on the human dataset and linear classifiers trained on SegCLR embeddings, both full and reduced subsets of the training set were evaluated (Fig. 2d).

| dataset | cell supertype | cell subtype and abbreviation        | #segments | #embeddings total |
|---------|----------------|--------------------------------------|-----------|-------------------|
| human   | neuron         | Excitatory (E)                       | 159       | 863,644           |
|         |                | Inhibitory (I)                       | 52        | 91,283            |
|         | glia           | Microglia cell (MGC)                 | 36        | 29,536            |
|         |                | Oligodendrocyte precursor cell (OPC) | 19        | 23,614            |
|         |                | Oligodendrocyte glia cell (OGC)      | 17        | 4,449             |
|         |                | Astrocyte (AC)                       | 45        | 1,394,056         |
| mouse   | neuron         | Layer 2/3 Pyramidal cell (P23)       | 95        | 1,281,244         |
|         |                | Layer 4 Pyramidal cell (P4)          | 23        | 254,156           |
|         |                | Layer 5 Pyramidal cell (P5)          | 36        | 633,328           |
|         |                | Layer 6 Pyramidal cell (P6)          | 8         | 67,504            |
|         |                | Basket cell (BC)                     | 76        | 1,347,142         |
|         |                | Bipolar cell (BPC)                   | 33        | 141,179           |
|         |                | Martinotti cell (MC)                 | 30        | 460,301           |
|         |                | Neurogliaform cell (NGC)             | 17        | 126,407           |
|         |                | Thalamocortical axon (THLC)          | 11        | 108,639           |
|         | glia           | Microglia cell (MGC)                 | 9         | 22,819            |
|         |                | Oligodendrocyte precursor cell (OPC) | 6         | 16,404            |
|         |                | Oligodendrocyte glia cell (OGC)      | 28        | 20,142            |
|         |                | Astrocyte (AC)                       | 6         | 269,367           |

**Supplementary Table 2. Cell type ground truth label sets.**

The number of distinct segments and total number of embeddings available for cell type classification (Figs. 3-6). Note that only a fraction of the embedding nodes were used during training.

|         |       | Axon      |        |       | Dendrite  |        |       | Soma      |        |       | Astrocyte |        |       |
|---------|-------|-----------|--------|-------|-----------|--------|-------|-----------|--------|-------|-----------|--------|-------|
| Sample  | F1    | Precision | Recall | F1    | Precision | Recall | F1    | Precision | Recall | F1    | Precision | Recall | F1    |
| 10      | 0.918 | 0.940     | 0.939  | 0.934 | 0.928     | 0.939  | 0.926 | 0.874     | 0.830  | 0.845 | 0.961     | 0.973  | 0.966 |
| 18      | 0.916 | 0.943     | 0.934  | 0.933 | 0.921     | 0.946  | 0.929 | 0.856     | 0.864  | 0.851 | 0.982     | 0.928  | 0.951 |
| 33      | 0.956 | 0.963     | 0.976  | 0.969 | 0.930     | 0.983  | 0.955 | 0.961     | 0.876  | 0.915 | 0.978     | 0.991  | 0.984 |
| 61      | 0.967 | 0.968     | 0.985  | 0.976 | 0.949     | 0.974  | 0.961 | 0.965     | 0.917  | 0.939 | 0.990     | 0.993  | 0.991 |
| 112     | 0.972 | 0.970     | 0.984  | 0.977 | 0.952     | 0.989  | 0.970 | 0.978     | 0.921  | 0.949 | 0.992     | 0.996  | 0.994 |
| 206     | 0.983 | 0.972     | 0.993  | 0.982 | 0.976     | 0.992  | 0.984 | 0.991     | 0.949  | 0.969 | 0.994     | 0.997  | 0.996 |
| 379     | 0.990 | 0.986     | 0.995  | 0.991 | 0.986     | 0.990  | 0.988 | 0.991     | 0.977  | 0.984 | 0.997     | 0.997  | 0.997 |
| 550     | 0.990 | 0.986     | 0.996  | 0.991 | 0.985     | 0.991  | 0.988 | 0.993     | 0.978  | 0.985 | 0.998     | 0.998  | 0.998 |
| 695     | 0.991 | 0.987     | 0.996  | 0.992 | 0.986     | 0.993  | 0.990 | 0.995     | 0.978  | 0.987 | 0.998     | 0.998  | 0.998 |
| 1274    | 0.994 | 0.992     | 0.996  | 0.994 | 0.991     | 0.994  | 0.993 | 0.994     | 0.989  | 0.992 | 0.999     | 0.998  | 0.999 |
| 2335    | 0.995 | 0.993     | 0.996  | 0.994 | 0.993     | 0.995  | 0.994 | 0.996     | 0.992  | 0.994 | 0.999     | 0.999  | 0.999 |
| 4281    | 0.996 | 0.994     | 0.996  | 0.995 | 0.995     | 0.996  | 0.995 | 0.996     | 0.994  | 0.995 | 0.999     | 0.999  | 0.999 |
| 7847    | 0.996 | 0.994     | 0.997  | 0.996 | 0.994     | 0.997  | 0.995 | 0.998     | 0.993  | 0.995 | 1.000     | 0.999  | 0.999 |
| 14384   | 0.997 | 0.995     | 0.997  | 0.996 | 0.997     | 0.996  | 0.997 | 0.997     | 0.995  | 0.996 | 0.998     | 0.999  | 0.999 |
| 26366   | 0.997 | 0.995     | 0.997  | 0.996 | 0.997     | 0.997  | 0.997 | 0.997     | 0.996  | 0.997 | 0.999     | 0.999  | 0.999 |
| 48329   | 0.997 | 0.995     | 0.998  | 0.996 | 0.996     | 0.997  | 0.997 | 0.998     | 0.994  | 0.996 | 0.998     | 0.999  | 0.999 |
| 88586   | 0.997 | 0.995     | 0.998  | 0.996 | 0.996     | 0.996  | 0.996 | 0.998     | 0.995  | 0.997 | 0.999     | 0.999  | 0.999 |
| 162377  | 0.997 | 0.996     | 0.997  | 0.997 | 0.996     | 0.996  | 0.996 | 0.998     | 0.994  | 0.996 | 0.998     | 0.999  | 0.999 |
| 297635  | 0.997 | 0.996     | 0.998  | 0.997 | 0.997     | 0.997  | 0.997 | 0.998     | 0.996  | 0.997 | 0.998     | 0.999  | 0.999 |
| 545559  | 0.997 | 0.996     | 0.998  | 0.997 | 0.997     | 0.997  | 0.997 | 0.998     | 0.996  | 0.997 | 0.999     | 0.999  | 0.999 |
| 1000000 | 0.997 | 0.996     | 0.998  | 0.997 | 0.996     | 0.996  | 0.996 | 0.998     | 0.995  | 0.997 | 0.999     | 0.999  | 0.999 |

**Supplementary Table 3. Performance of a linear classifier trained on SegCLR embeddings for producing subcompartment labels on the h01 dataset.**

Performances are means across multiple runs for sample sizes < 5,000. These data correspond to the black line in Figure 2d.