NeuroLines

A Subway Map Metaphor for Visualizing Nanoscale Neuronal Connectivity

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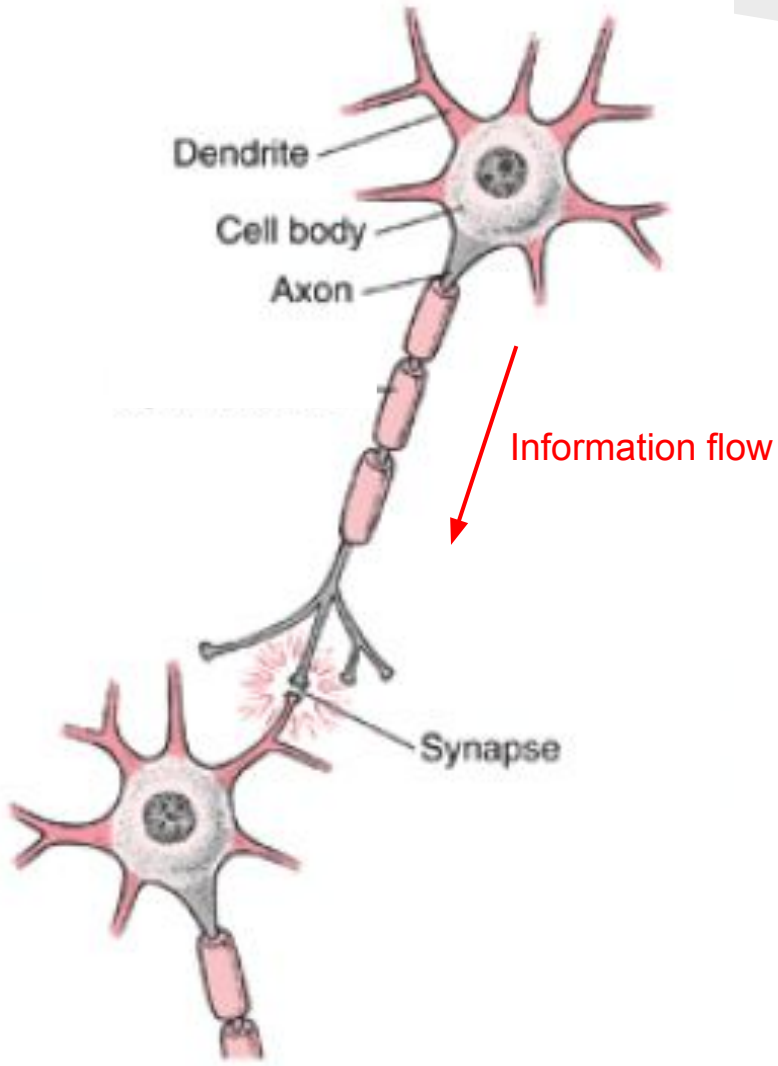
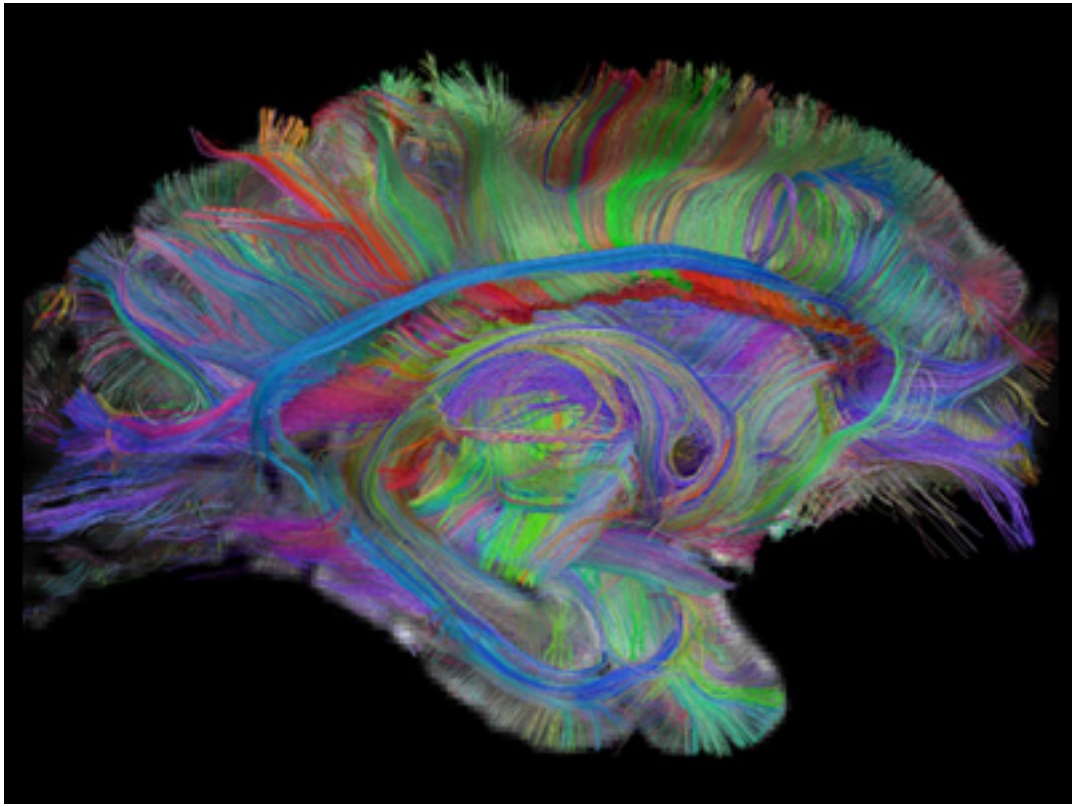
Neuroscience 101

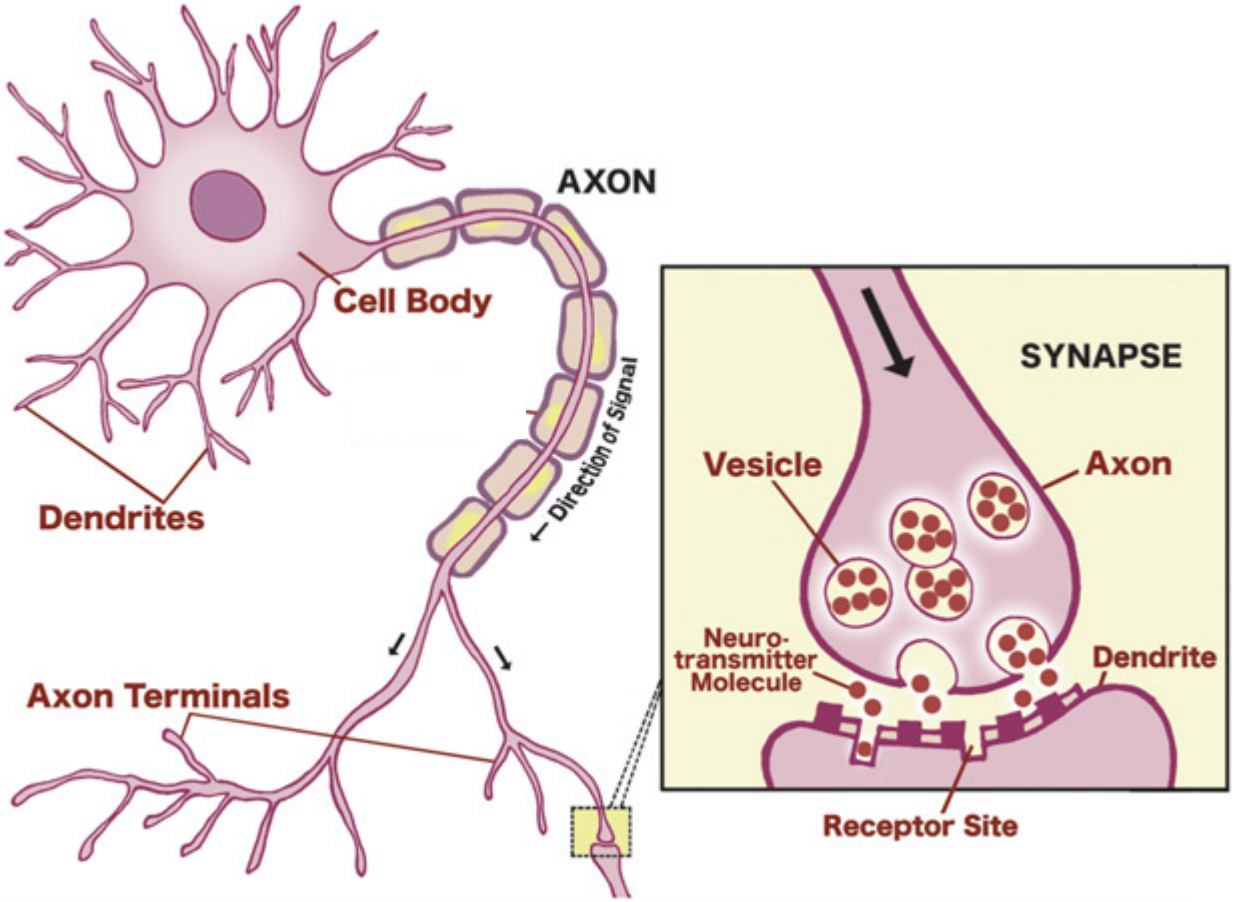


High-level

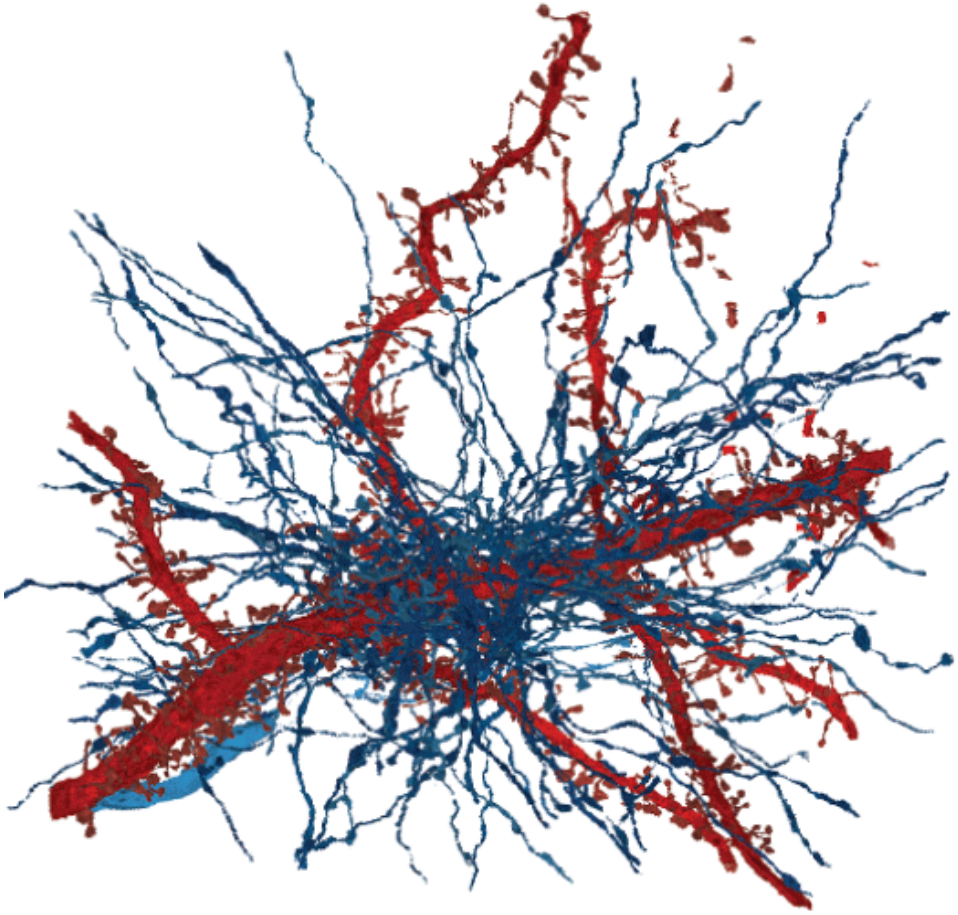
- Most visualizations stay high-level



Neuroscience 101

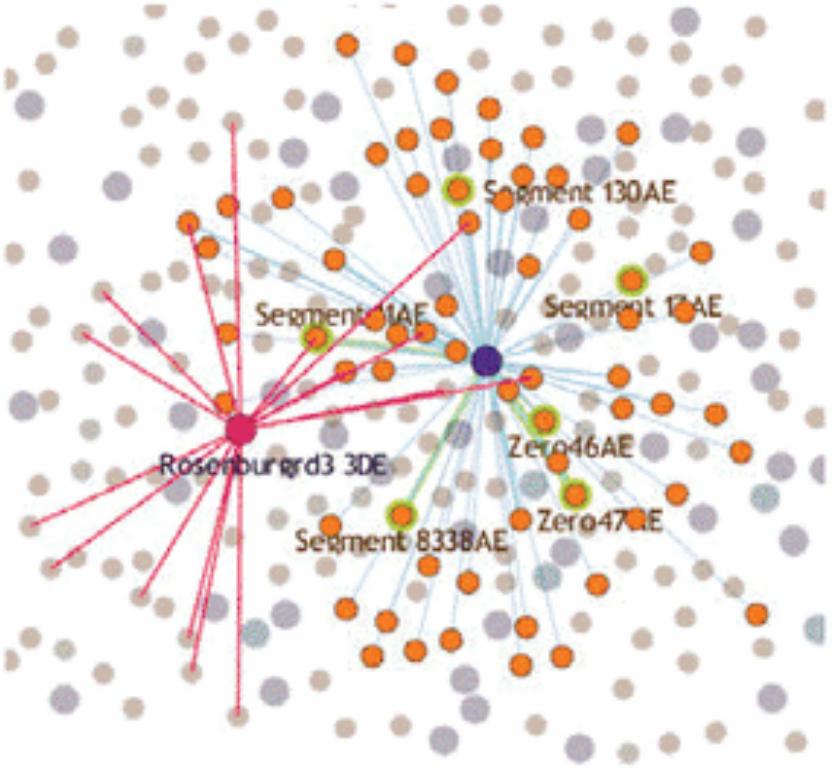


The Problem



Low-level

- Low-level visualizations go abstract
  - Lose anatomical and topological information

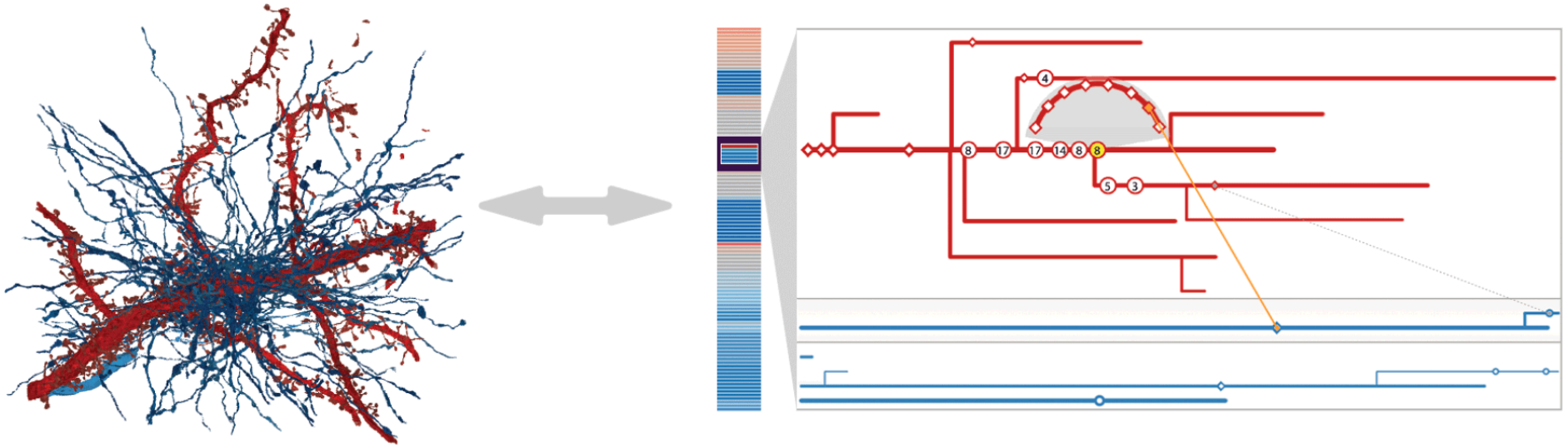


Vis Goals

- Allow neuroscientists to:
  - Explore and identify patterns in **synaptic connections**
  - Explore and identify patterns in **branching structures**
  - Explore **synaptic pathways**

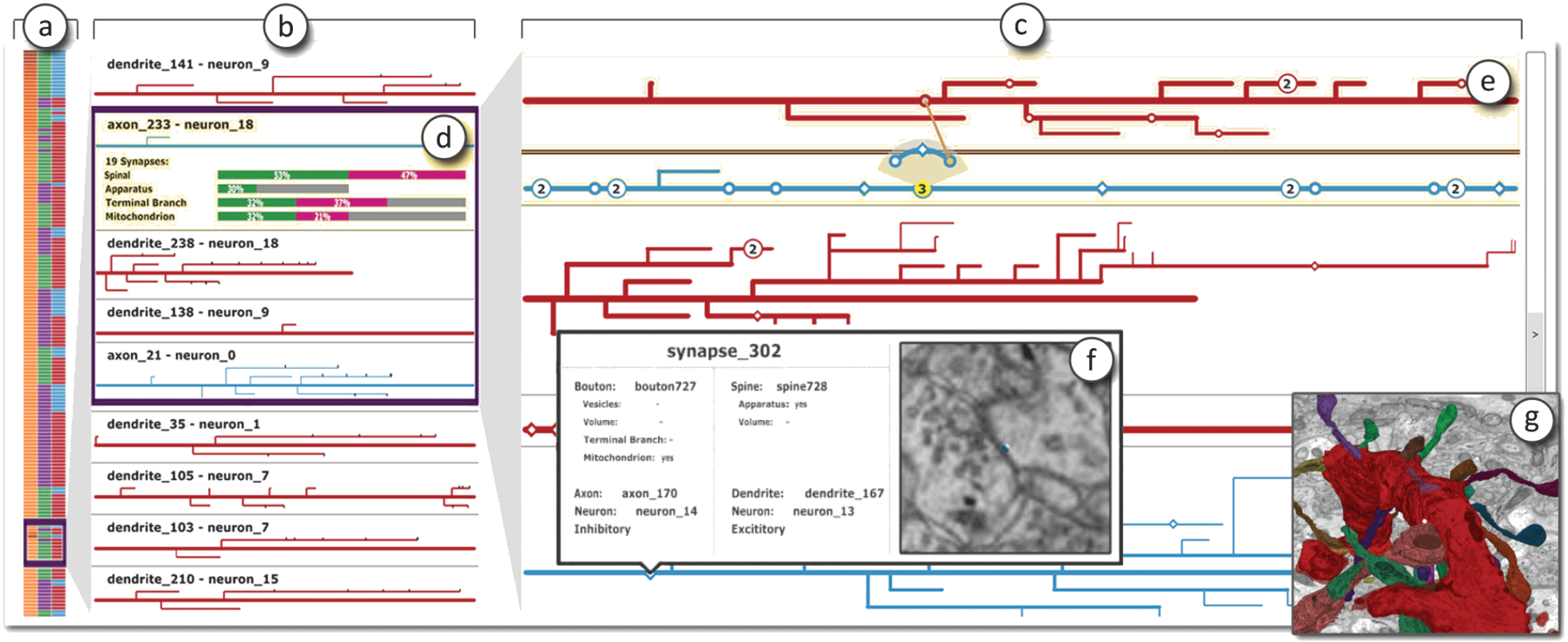
NeuroLines Solution

- Subway map of neurites



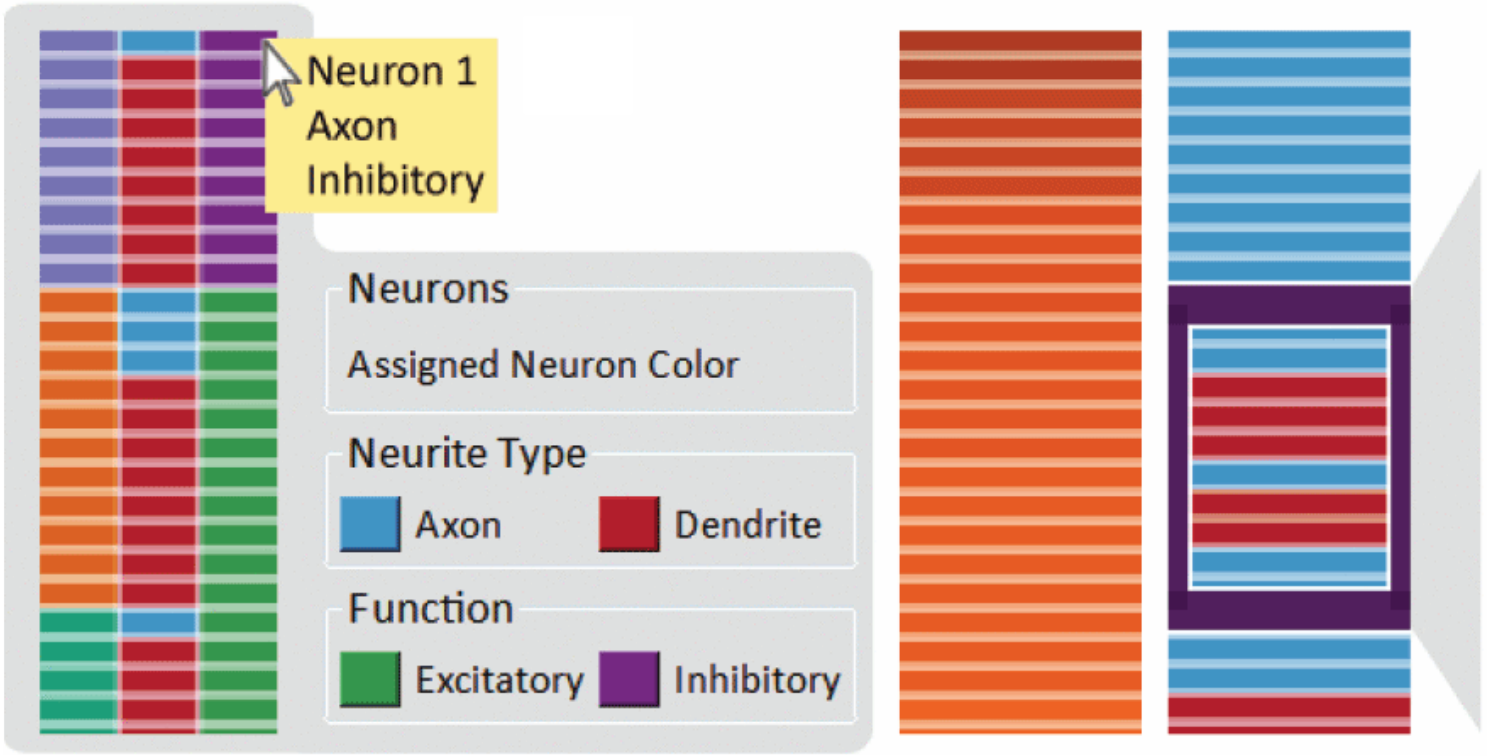
Interface

- Three main views



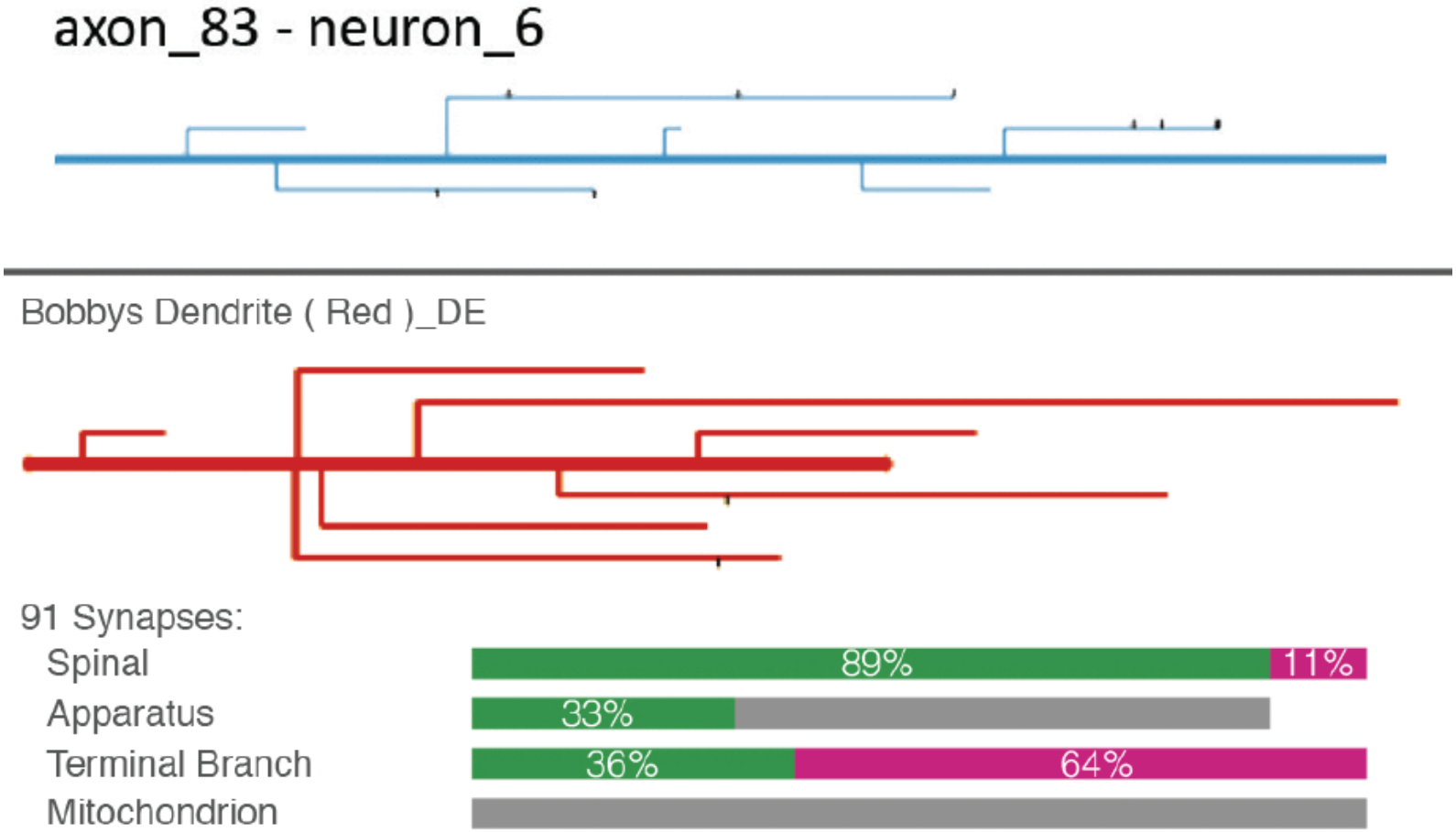
Interface

- Overview



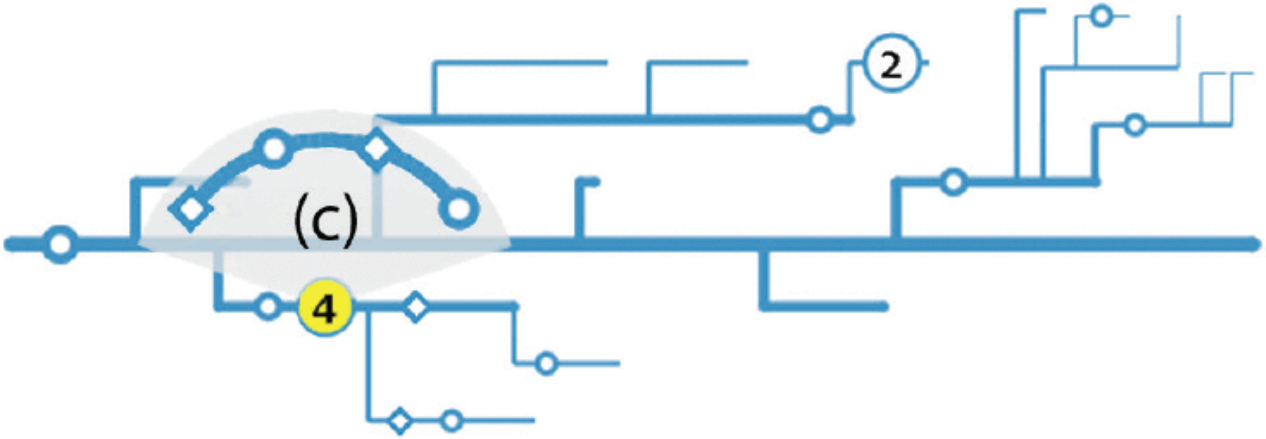
Interface

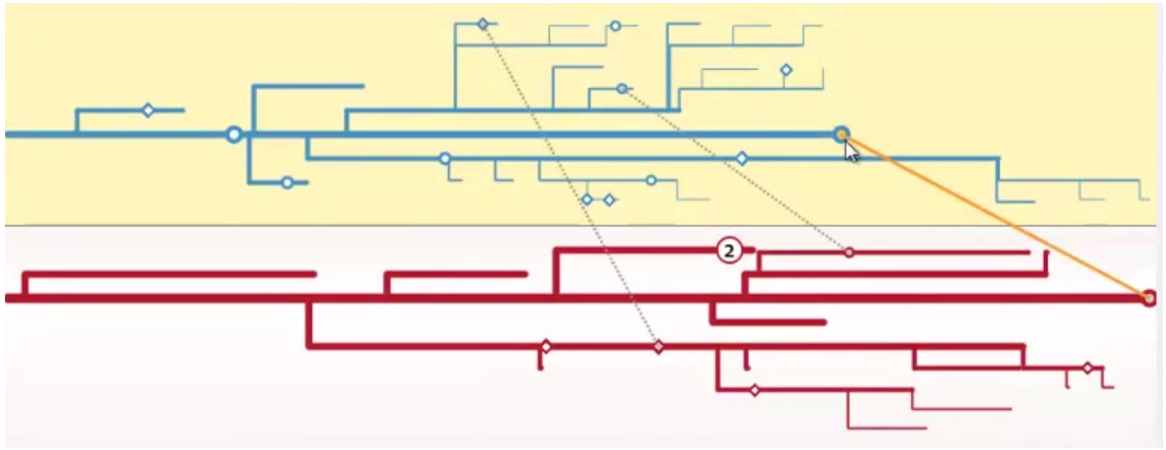
- Mid-scale view



Interface

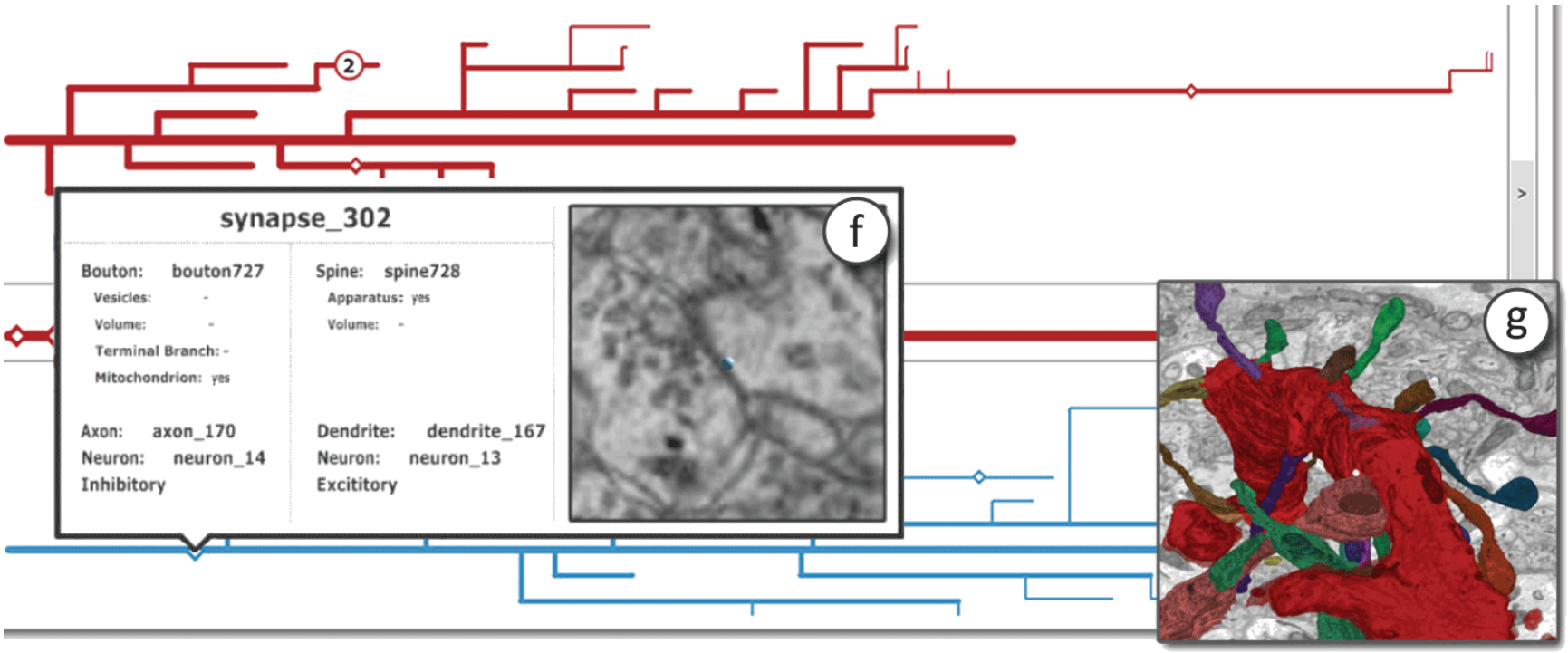
- Detailed view





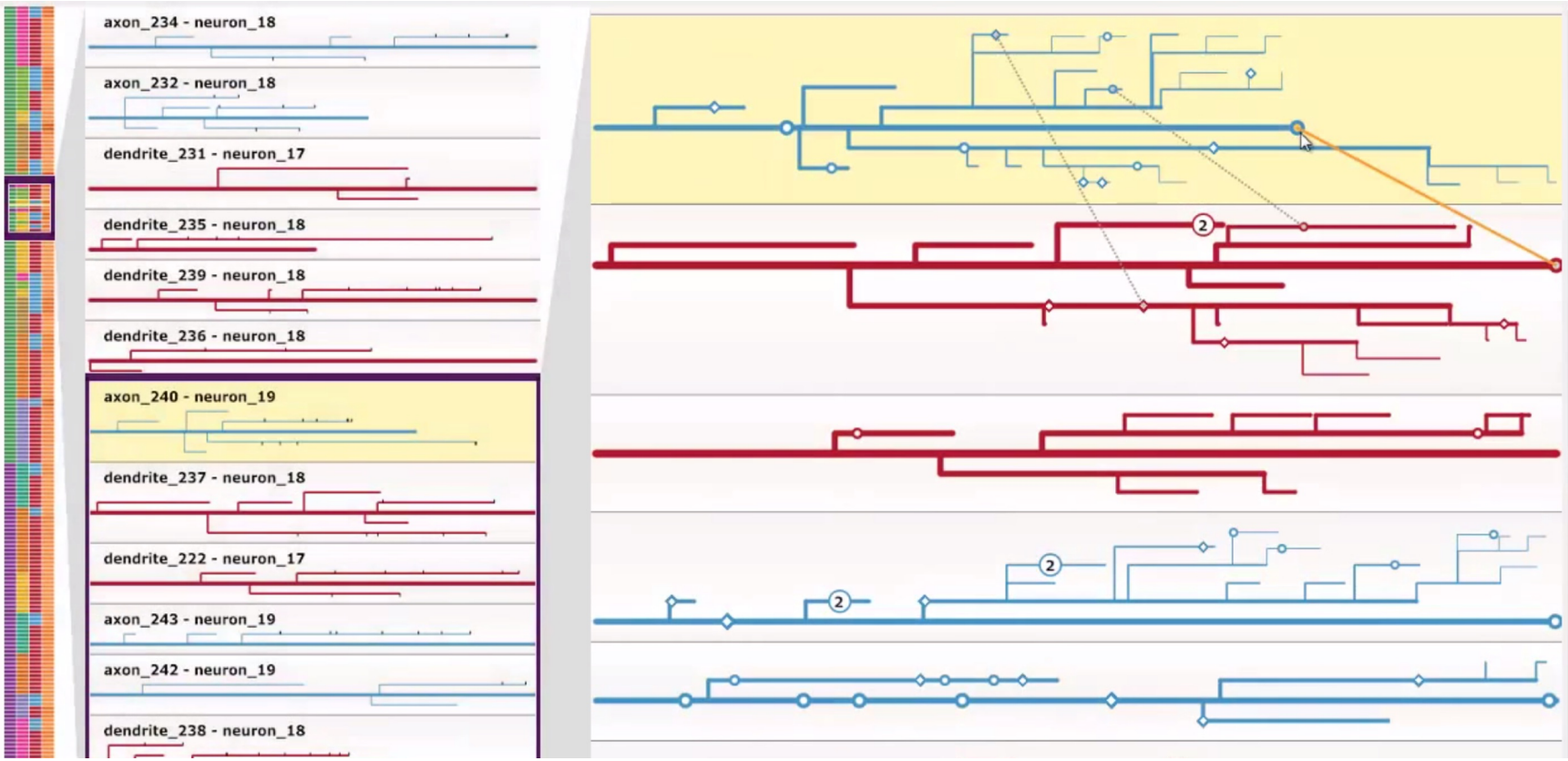
Interface

- Detailed view



Interface

- Linked highlighting



Validation

- Case studies
  - Error-checking
  - Still rely on original photographs
- No larger user study

Analysis

- Exploratory application
- Advantages
  - Easier to find patterns
  - Error-checking
  - Theoretically scalable
- Disadvantages
  - Minimal user testing
  - Various minor tweaks needed (colour, slider, branching)

Conclusion

- Some room for improvement
- Potentially very useful

Thank you!