
A Guide on Modelling Synapses in CellBlender and MCell

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Abstract

1 Pre- and Postsynaptic Genomtry with Blender

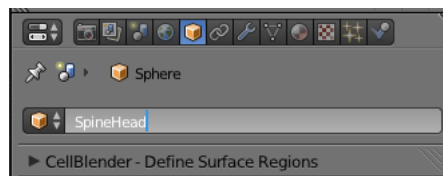
This section follows the paper written by Czech et. al. closely.

1.1 Creating a Spine Head

1. Open Blender. In the '3D View' pane, delete the default object (shortcut: x)
2. Create a sphere. Select the 'UV Sphere' option from the sidebar. Below a pane called 'Add Circle' appears; set 'Segments' and 'Rings' to 16, 'Radius' to '0.25'.



3. Rename the sphere. Double-click the entry box below to change the default name to 'SpineHead'.



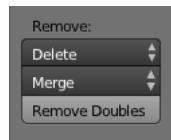
4. Change view to see the sphere from the XZ view. (shortcut: 1 on numpad)
5. Deselect the sphere (shortcut: a) and make it transparent (shortcut: z)
6. Select the vertices to be removed. First, switch from 'Object Mode' to 'Edit Mode'. Ensure that 'Edge select' is enabled. Then use box select (shortcut: b) to capture only the faces that make up the top half of the sphere. Delete these faces (shortcut: x) and select the 'Faces' option in the delete menu.



7. Close the opening. Select the topmost vertices (remaining in 'Edge select' mode) using box select (shortcut: b). Then, extrude (shortcut: e) and click 'Edges Only' under 'Extrude' in 'Mesh Tools'.



Set the extrude distance by pressing 0 and Enter to confirm. Scale the extrusion by pressing s, 0 and Enter to confirm. Select 'Remove Doubles' under 'Mesh Tools' to remove the duplicated vertices and reconnect the triangles. Blender should note that you remove 15 vertices as a result.



The object should now be closed by a flat top.

8. Subdivide triangles at the top. Unfortunately the 'Multicut tool' has been deprecated. To create set of concentric rings, first select the topmost vertices (shortcut: b). Then enter 'Knife' mode (shortcut: k), and hold down *control*. This locks the knife cut to the midpoint. Click around to make a circle cut, and then press *Enter* to complete the cut. Continue these cuts until the picture looks as below:

