

MAPPING THE SYNAPTIC CONNECTIONS OF RETINAL GANGLION CELLS

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It is known that Retinal Ganglion Cells (RGCs) project from the eye to approximately 46 different regions in the mammalian brain, but where specific subtypes of RGCs project remains largely unknown due to imaging and computing power restrictions. Locating these specific pathways will be important in understanding the process by which vision is perceived. By using transgenic mice with fluorescent RGCs and the clearing process known as CLARITY, I have been able to image these pathways in whole brain pieces, making location and reconstruction much easier than the more common practice of serial slicing and reconstruction. The process involved fixing the mouse brain in a 2% Acrylamide Hydrogel, and then sectioning the brain into 1-2mm thick coronal sections. The pieces were then cleared using the CLARITY process, and were subsequently imaged under a two-photon microscope to look for areas of interest where the axons of RGCs are suspected to terminate. These areas were then imaged more in depth, saving imaging time and computer power by selecting only suspected areas in the brain. Currently I am working on locating these structures in the whole mouse brain, and creating three-dimensional renderings of the areas that have been imaged.

