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Remapping a Damaged Mind

An Interview with **Shayna Rosenbaum**, Neuroscientist, York University
Vision: Science to Applications (VISTA)

The hippocampus is a part of the brain, highly associated with the formation and maintenance of memories. It seems to be especially needed for forming and retaining memories of personal experiences - such as what you did yesterday, what you ate for dinner - and also for generating a map of your environment in order to navigate. Now it seems as though these things would not necessarily relate to one another, but our work is actually showing that there might be some sort of a relationship and that this might help us predict what would be lost if you were to have hippocampal damage.

What has your research added to your field?

For many years it was believed that the hippocampus is needed to form new spatial memories, but also to retain them over long periods of time, and in particular, to create a map-like representation of the world. So what we were finding was that patients with hippocampal damage had little difficulty navigating in neighbourhoods in their day-to-day life, so they were able to get from their home to their school to a close by mall. What we found, though, is that although these individuals were able to navigate efficiently in their environments and retain those types of memories, what they were unable to do is describe those environments in any great detail. So we've also found parts of the brain outside of the hippocampus that are needed, and that perhaps could help a patient who has hippocampal damage compensate.

Our more recent work is looking at the level of precision that's needed for the hippocampus to be involved, and this allows us to predict the types of deficits that we might see in a patient with Alzheimer's disease who has significant atrophy at the hippocampus. So I really want to understand why it is that memory is so vulnerable to neurological disease, how it breaks down, and how we can help these individuals function in everyday life in a better way.