NON-TECHNICAL ABSTRACT: *(State in layman's terms the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project.)*

The adult brain is composed of nerve cells called neurons and supporting cells called glia. Adult neurogenesis is the development of new neurons in a mature animal. Neurons are born from stem cells that can become either neurons or supporting cells called glia. Many experiments have determined how this occurs in mammals and birds, but little is known about this process in reptiles and no literature exists on neurogenesis in snakes. To determine the extent of adult neurogenesis in snakes, we will inject snakes with a marker called BrdU that is incorporated into actively dividing cells, i.e. cells being "born". We will sacrifice some snakes shortly after injection to determine where those cells are born. Other snakes will be sacrificed two weeks and two months after injection to determine the fate and location of these new cells. Brain tissue will be collected, sliced into thin sections, and stained for the cell birth marker. To determine if the new cells are neurons or glia, we will use a staining technique that will mark the new cells (BrdU-containing cells) with one fluorescent tag and neurons or glia with another fluorescent tag. Confocal microscopy is a tool that allows us to determine if the cells that contain BrdU are neurons or glia by seeing if the different fluorescent tags are co-localized in the same cell as the BrdU tag. Our studies will give us a better understanding of how the adult brain changes and will allow us to study how new brain cells in snakes are affected by their physiology and environment. Previous findings from adult neurogenesis studies are currently being used to develop therapy trials to treat Parkinson's disease and stroke. Despite this progress, little is known about how incorporation of new neurons into existing brain circuits will affect behavior or what physiological or environmental factors may affect survival of new neurons. We expect our findings will allow us to do future studies to explain the underlying physiological mechanisms of adult neurogenesis and to determine how new brain cells affect behavior.