The Nervous System has a major responsibility of maintaining homeostasis through coordinating information and eliciting responses throughout the entire human body. The Nervous System is made up of various cell types and can be divided into two main divisions, the peripheral nervous system and the central nervous system. The peripheral nervous system consists of the brain and spinal cord and the peripheral nervous system contains all other nerves that connect to the periphery. The central nervous system involves the brain and spinal cord. The functions of the nervous system include Multiple Sclerosis (MS), Alzheimer’s Disease, Parkinson’s Disease, and spinal cord injuries. 

The purpose of Jane’s project is to determine the decreased myelination of motor neurons due to oligodendrocytes not being able to produce sufficient proteins needed for the myelination process following PAR-1 activation. Since Anna is using a developmental model, spinal cord cells are isolated from chick embryos at various stages of development. Spinal cord cells isolated on the fifth day of development have been shown to have the largest number of cells in the spinal cord, but by the tenth day of development, the number of cells has been lost. This is a naturally occurring process that happens during the embryonic development of all vertebrates. Past research has shown that PAR-1 is present during this period [5]. To examine how PAR-1 activation affects the amount of motor neurons, SFLLRNP, a ligand that causes activation of PAR-1 or phosphate buffered saline (control) is used. On the specified days, the cords were moved, stained, and the proteins were removed. The proteins were separated using a gel and then tested for any differences in levels of PLP1 and MF2, two myelin-associated proteins, between the control and experimental embryos.

Motor neurons and oligodendrocytes have an important relationship with one another in the central nervous system. Oligodendrocytes are responsible for myelination of motor neurons with a fatty insulation layer called myelin. Myelin also helps to relay signals more quickly throughout the body. Past research has shown that there is a relationship between motor neurons and muscle cells that involve healthy motor neurons stimulating muscle cells and muscle cells releasing growth factors, such as insulin-like growth factor (IGF). Since myelin insulation on a motor neuron can decrease its ability to communicate with muscle cells, decreased levels of myelin should be followed. Thrombin is a protease released by clots that can cause a decrease in myelination. This cut causes a piece of viable cells. Since motor neurons are responsible for myelin production in the CNS, the last step in this investigation will be to determine if neuropsin affects an oligodendrocyte ability to produce myelin.