Parr – Year One Progress Summary

A consequence of traumatic brain and spinal cord injury and other neurological diseases such as multiple sclerosis is damage to oligodendrocytes. These cells are found in the brain and spinal cord and generate a substance called myelin, which insulates the nerves similarly to how insulation around electrical wiring allows those wires to function properly. Without these cells, the nerves are not insulated and cannot transmit signals. Currently, there are no effective treatments for these diseases. Published research suggests that transplantation of oligodendrocytes into animal models of these diseases is beneficial, and therefore one potential treatment strategy is to generate oligodendrocyte progenitor cells (OPCs) and transplant them into patients. Unfortunately sources of OPCs are limited. Our research is focused on generating human OPCs in pigs, but this has never been done before, so our preliminary work is to establish our model. This model utilizes a pig that is deficient in OPCs, and we have complemented this pig with green-labeled pig cells that will then become OPCs. We demonstrated successful incorporation of the labeled cells in both the brain and spinal cord of our pig model, and are currently identifying these cells to confirm that they are OPCs. In addition, we have established what is “normal” in the pig brain and spinal cord for oligodendrocyte development for comparison. Now that we have generated pig OPCs in pigs, we will complement our model with human stem cells to generate human OPCs.