Product Set-up & Completion Summary

- ***Introduction and Statement of Purpose***

  The product I created was a review of litature paper on how different general anesthetics can affect the brain. For this paper, I focused on brain dysfunction that leads to cognitive impairment. What I accomplished through this final product was a better understanding of the potential risks that different common anesthetics have. I was also able to compile studies on these potential risks to cognitive impairment together in one paper so that someone interested in this topic can review my study and have an overall understanding of the topic.

- ***Review of Skills and Research***
  - The research topics that I focused on for my final product were how specific general anesthetics affect the brain in different ways with a specific focus on brain dysfunction. I also researched deeper into emotional delirium and how it can also be a contributing factor into if a patient experiences brain impairment. Finally, the final topic I focused on was preventive measures that can be taken prior to surgery in order to prevent this brain dysfunction from occurring.
  - One of the skills that was utilized during the creation of my final product was the ability to understand complex medical terminology and concepts. Another was the expertise I gained during my first semester in ISM and while creating my original work.

- ***Methodology***
  - **Materials**

    For the materials I used for my final product, I mainly used secondary studies and research articles. Specifically, I mainly used case studies that used experiments to test how each anesthetic affects the brain specially in relation to neurons, cell membrane and nerves. I also used information and advice I got from my mentor, Dr.Laferney through our interview, phone call and emails.
  - **Description of Process and Procedures:**

    To begin, I started my paper by researching how anesthesia affects the brain. I then chose the anesthetics that I would research, which I chose through Dr. Lafeney's advice and also through a list of the most common general anesthetics used. I then studied how each of these anesthetics individually affect the brain with a focus on brain dysfunction. I then researched deeper into emotional delirium as an extra factor that I was interested in. Finally, I used some articles sent to me by Dr. Laferney to look further into preventive action.
- ***Utilization of Higher-Level Thinking Skills***

  I used problem solving when I came across an issue with narrowing my focus. I was originally too broad with my final product idea, but that was when Dr. Laferney suggested narrowing my focus. So that was when I decided to expand my original work by continuing to look at how anesthesia affects the brain. Another time I utilized higher level thinking was when I analyzed different case studies that experiments with the anesthetics I was examining. It took some rereading, but I was able to end my notes on those studies satisfied with my understanding of their discussion and results.
- ***Results***

  As for my results, they were as I expected. Going into my final product, I expected to see how these general anesthetics affect the brain in different ways. While I did expect the

anesthetics to affect neurons and nerves, I was still surprised to find that they also impacted the cell membrane. Furthermore, I was overall surprised that I found so much evidence that pointed to how anesthetics can seriously affect the brain.

- ***Conclusions/Interpretations***

  The conclusion of my research is that anesthesia can affect the brain in a multitude of ways. Ketamine can potentially damage neurons by causing ultrastructural abnormalities. Etomidate injection is an intravenous anesthetic that enhances GABA which decreases brain and nervous system activity, a prolonging of this may lead to difficulties in stabilizing. Finally, propofol reduces the amount of blood flowing into the brain and may also act as a nerve block that cuts the connection between the thalamus, hippocampus and cerebral cortex. These findings suggest that anesthetics can be potentially harmful to the human brain, despite its many positives.

  Application/Meaning

  The meaning of my study is to bring awareness to all the ways in which anesthesia can harm the brain. By looking at how exposure to anesthesia can lead to an increased risk for developing brain dysfunction, researchers can look at this data and come up with new ways to improve current anesthetics.