This week was successful. Our animal facility access cards have been processed and are available for pickup. All that needs to be done now is finish practicing and order medications for the mice. I ordered two surgical dressings for oral surgeries, Collasate and Vetbond Tissue Adhesive, which will expedite the healing process. The other medications, however, are prescription products. Therefore, we will probably need to get these through the animal facility. If not, then Dr. Kotha may need to get them for us.

I worked a great deal on the circuit this week as well. We decided to use a 60V Current Mode Synchronous Step-Up Controller from Linear Technology. Matt and I spoke to Dr. Ayers again regarding this choice, and he agreed that this is what we should do. Its 60V capability allows for a margin of safety of 1.5, based on our desired output of 40V. He recommended that we try and get our circuit working with an internal frequency of 100-200 kHz. We are currently in the process of designing a circuit with 121.6 kHz. According to Dr. Ayers, keeping the final design at this frequency should make the conversion from the protoboard design to the final printed circuit board an easier transition, and with less potential for error. He also told us that we may need to increase our filtering with a filter capacitor (proportional to the output current the circuit will be drawing). He suggested using electrolytic capacitors (using a combination of large and small capacitors) to accommodate the frequency in the load.
Figure 1 shows a typical application of the Step-Up Controller we purchased. We will be changing some of the component values.

![Figure 1](image)

**Figure 1. Typical Application of Circuit Component**

The next two figures, Figure 2 and Figure 3, are the results of a circuit simulation. This was done with a sample simulation program from Linear Technology (LTSpice) that allows for the simulation of a select number of their products. The product we purchased did not have a simulation program. However, there was a similar product available, LT3489, which we tested. Our results were successful. With a 9V input, we were able to achieve a 48V, 20mA output. This will output approximately 1 Watt of power, which is exactly what we need. The only reason we are unable to use this part is that it is only rated for 40V of output. Therefore, this load will most likely burn out the components. It also does not allow for a margin of safety.

This week I worked eleven hours. In the future I will continue working on the circuit and practicing on the mice. Soon, we will be able to start experiments.
Figure 2. Simulation showing 48V output from LT3489.
Figure 3. Simulation showing 20mA output from LT3489.