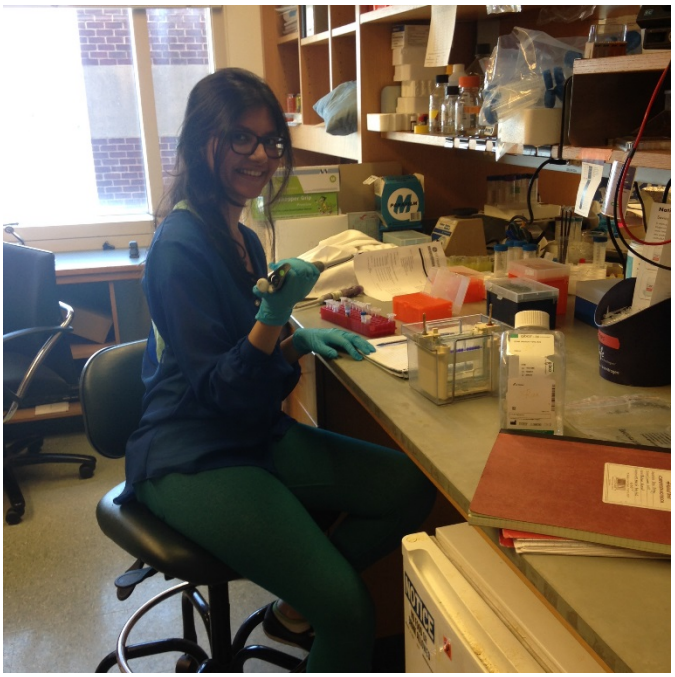

Regulation of IDH1/2 by p53 via Chaperone Mediated Autophagy
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This past summer I had the opportunity to spend ten weeks working in a cancer biology laboratory run by Dr. Xiaolu Yang. It is well-known that the tumor suppressor p53 plays an important role in DNA repair, cell cycle arrest, and apoptosis, preventing many of the factors that lead to cancer. But even with the breadth of research conducted to understand this tumor suppressor, little is known about the metabolic changes underlying much of these processes. The project that I worked on dealt with this mystery, and the goal was to learn more about the exact role that p53 plays in both autophagy and the reprogramming the metabolism of the cell, and in particular seeing if there is a link between these two processes.

My mentor Yi Xu and I have learned that p53 inhibits the proteins IDH1 and IDH2, which are both involved in the metabolism of isocitrate in the cell. After establishing that the loss of p53 induces the expression of these two proteins, the next step was to try to figure out how the cell signals this process. Since p53 also induces autophagy, the so-called “self-eating” of the cell, perhaps p53 induces the degradation of IDH1 and IDH2 through autophagy. Western blots helped determine that this seems to be the case: when cells were treated with drugs that inhibited a step in autophagy, or when specific genes required for autophagy were knocked down, there was a marked increase in IDH1 and IDH2. Furthermore, inducing autophagy, specifically chaperone-mediated autophagy, decreased the amount of these proteins in the cell in a dose dependent manner.

I learned many techniques while working on this project. I learned how to perform western blots, culture cells, and stain cells for cell cycle analysis. I also learned how to analyze data obtained from real time PCR and induce the expression of certain genes using drugs or viruses. Beyond the lab techniques, however, I learned so much about research in general—both about the thought

process required in order to solve a given problem and about how important it is for everyone to be working as a team. Students and staff from other lab benches were always around to lend a hand or a beaker. Furthermore, I had a chance to really delve into a specific topic in biology and grasp a deeper understanding of the complicated machinery that controls the cells in our body. For years I have always been interested in cancer research, and this summer I got the chance to contribute to this exciting field.