“Determining Methods to Quantify and Remove Pharmaceutical Drugs from Water Sources”

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Each year 1.5 million people are diagnosed with cancer and at this very moment there are millions of people undergoing chemotherapy, each receiving around ten treatments per year. A large percentage of cytotoxicants used in chemotherapy pass through a person’s body unabsorbed. Recently there has been speculation in the scientific literature that secondary exposure to excreted chemotherapy agents may have substantial adverse impacts on public health. It is also acknowledged that little is known about this issue.

This summer, I will be addressing this issue of secondary exposure to pharmaceutical drugs. More specifically I will be looking at the presence of these drugs in water. Currently two of the drugs I will be focusing on are 5-fluorouracil and doxorubicin. To begin my project I will be developing and testing an analytical method which can be used to determine the presence and quantity of the drugs of interest. In order to learn more about previously used methods a literature review will be done. Once this analytical method is secure I will be using it to determine the occurrence of pharmaceutical drugs in water and waste water sources. Some possible sources I may use include the Amherst wastewater treatment plant as well as the Blackstone River; however, more sources may be used.

The final step of my project will be to assess if there are dangerous amounts of pharmaceutical drugs in the water sources and if so determine a method to remove or control these toxic substances. There are many different processes to use for the substance removal. Some methods I may pursue include chlorination, ozonation, and advanced oxidation. I may also pursue a larger scale test on a set of septic tank systems in Cape Cod. This test is dependent on if I am able to obtain a larger quantity of a specific anticancer drug.