### Mentor's Name
Dr. Christopher Farrell

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### Research Subject Area
Chemotherapy Resistance in Chemotherapy Naïve Esophageal Cancer Cells

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**A. Briefly describe overall research program at your laboratory.** Multi-drug resistance (MDR) is a serious complication in the treatment of cancer patients. MDR can become an obstacle to chemotherapy treatment in tumors of any stage but is more common in late stage and/or aggressive tumors. Patients whose tumor cells develop MDR have a poor prognosis compared to patients whose cells are responsive to chemotherapy because the chemotherapy agents are ineffective in killing the all of the tumor cells including cells which have become metastatic. The overall survival rate for patients with MDR-positive tumors is markedly decreased.

A patient’s tumor can develop MDR before or after the initiation of chemotherapy treatment. The cause of MDR after the initiation of chemotherapy is well understood, but it is not known how tumors develop MDR before chemotherapy treatment. The most common mechanism of MDR in cells is the activation on transporter proteins. Increased expression of the transporter proteins is associated with MDR in cells that have been subjected to chemotherapeutic drugs. However, researchers have not been able identify how this mechanism is induced in the chemotherapy-naïve cancer cells. We are exploring the connection between chemotherapy resistance tumors in chemotherapy-naïve cancer patients who are taking non-chemotherapy agents.

We are interested in identifying how patients who may be chemotherapy resistant prior to chemotherapy treatment.

**B. Briefly describe specific project(s) for your teacher:** The major focus for all studied chemical systems will be determine the link between non-chemotherapy drugs and how these drugs can cause chemotherapy drug resistance in a cancer cell. The teacher will be involved with laboratory techniques such as polymerase chain reaction and cytotoxicity assays to show this relationship between non-chemotherapy drugs and MDR cancer cells.

**C. Will any other people (post docs, grad students, undergraduate students, colleagues, etc.) be involved directly with your teacher?** The teacher would be working with me and one undergraduate/pharmacy research student.

**D. Will you require any advanced reading/preparation for the teacher? No**