

GK-12 Graduate Fellows Program

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I am an Organic/Medicinal chemist interested in making organic molecules that have biological and medicinal applications. Organic chemistry is the chemistry of carbon compounds, and Medicinal chemistry involves the development of organic compounds for use as drugs in the treatment of disease.

Our research group is interested in making molecules that kill particular cells, such as breast-cancer cells, pancreatic cells, bacterial cells, etc. Our technique for doing this is to start with a molecule that can target a particular cell, and attach to this molecule a DNA-damaging compound that can inflict the kind of damage that results in cell-death. In other words, we are trying to make "magic bullets".

All the work in our laboratory is done by students, and revolves around the synthesis (making) of organic compounds and investigation of the interaction of these compounds with DNA. The synthesis of organic compounds is just like cooking. You put various ingredients in a solvent (water), mix them together, and heat the mixture. If you have planned well, added the right ingredients, and used the right conditions, the desired product is formed.



By studying the interactions of our compounds with DNA, we improve our understanding of the chemical properties of DNA and the factors that control the kind of damage that we can inflict on the DNA. By studying the effect of the DNA-damage on cells, we understand how to design compounds to destroy unwanted cells (like cancer cells). This kind of research can help improve the design of drugs in the future.

I have always been interested in the treatment of diseases, though I did not have an interest in (and aptitude for) becoming a doctor. However, by doing the kind of basic research outlined above, I still get to contribute to this field. Additionally, I find it very rewarding to train students in conducting research, which may influence them to become teachers, doctors, and scientists in the future, and also contribute to the field.

