An Organic II Course-Based Research Experience: Synthesis of Neurolenins Analogs

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Overview

This lab will focus on applying your base of chemical knowledge to actual transformations from the literature. Working with a partner, you will isolate and purify the natural products najasine and najaflavone. You will then verify their structures and carry out collaborative research on these sesquiterpenoids, using tandem mass spectrometry analysis.

Course Design

Grading

- Project Proposal
- Lab Report
- Poster
- Dataset
- Reaction images/Technique/Notebook

Learning Goals

Beyond the specific chemistry related goals mentioned above, there are numerous broader goals that I hope each year will achieve. If successful, you should be able to utilize these skills after you have forgotten the specific details of the reactions and techniques we will study.

- Think like a chemist
- Work productively, as a member of a team
- Learn how to effectively perform database and literature searches
- Evaluate records of chemical and biological science
- Properly and safely conduct laboratory experiments
- Write clear and concise scientific papers
- Learn some new first hand books and papers

General Goals

The general goal for this lab is to develop an understanding of how research plans, runs, purifies, analyzes, and reports major research with a focus on practical applications in the laboratory. We will apply all our knowledge from Organic Chemistry 420 and help address a real world problem, namely the development of new molecules to fight the tropical disease lymphatic filariasis.

Reactions Attempted

- Course designed by Dr. Edelhoch
- Course materials developed by Dr. Edelhoch
- Course is designed to introduce students to the research experience

Formal Course Evaluations

1. How would you describe your own efforts in this course?

2. In what ways can this course be improved?

3. What features of this course are the most valuable to you?

4. How can the course be changed to better meet your needs?

Conclusions

- Very successful
- Repeated as a teaching experience
- Sustainable model
- Student feedback leading to future lab sections in 2016-2018

Funding

- Clark Science Center
- Chemistry Department
- NSSE
- Scholarly Foundation

Informal Course Evaluations

Looking back, would you choose to take this lab section if you were starting Organic II ever again?

- All students said yes.

What will you take from this experience as you move forward?

- Helping me get me stand out as a candidate for a lab internship over the summer
- Future job
- This course was the best thing that happened during my junior year of college

Post-Test: Course Expectations

I was exposed to novel ideas.

N=42

I found this course will be personally enriching.

N=68

I will be able to take what I learn from this course and apply it in my future career.

N=48

I was taught new things that I didn’t necessarily know before.

N=13

I think that I will be really helpful moving on to this in general.

N=8

Course Evaluation Results

[Detailed results presented in the form of tables and graphs]

Traditional Labs vs. Experimental Lab Surveys and Grades

[Graphs comparing traditional vs. experimental lab experiences, showing grades and survey responses]

Comments on the impact of integrating a novel problem into your lab experience in Organic II:

- This lab experience has served as a unique research opportunity for my group, as it allows us to develop our research skills as well as our writing and presentation skills.

- Students have felt that they were able to develop their research skills through this lab experience.

- The lab has been well received by students, with positive feedback on the level of challenge and the integration of real-world problems.

- Several students have commented on the importance of the lab for their future research careers.

- The lab has been a valuable addition to the course, providing a hands-on experience that enhances the learning experience.