

EMPOWERING WOMEN IN SCIENCE

Working in the labs at GlaxoSmithKline

By Rosie Thorogood

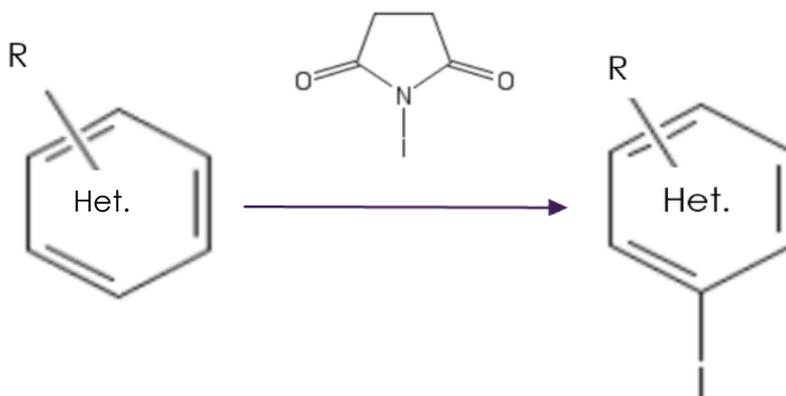
Over the half term week this February, I was lucky enough to be selected as one of 15 students out of over a 100 applicants to complete a week of lab work experience in the chemistry department at GlaxoSmithKline (GSK). GSK is a pharmaceuticals company focused on

developing drugs to combat a range of diseases. I worked at their Research & Development site in Stevenage, one of the two global hub sites for R & D in the company.



GSK supports women in science, with many female scientists and researchers across the company, and their CEO since April 2017 is Emma Walmsley, a strong female figurehead for the company.

During the week, I was set up in the lab working on a range of chemical reactions. The main reaction I worked on was an **aromatic iodination reaction**. The equation of this reaction I completed is shown on the right:



(the heteroaromatic rings represent the starting material, which I can't give the exact structure of due to GSK's privacy rules)

Explaining the Reaction

1. First we set up the reaction mixture containing the N-iodosuccinimide (NIS), heteroaromatic compound undergoing iodination, and acetonitrile solvent, in a round-bottom flask above a stirring hot plate. The reaction was conducted under nitrogen (connected by a needle into the flask), to stop compounds in air affecting the reaction.
2. We heated the reaction to reflux, with a findenser (special type of condenser) above and left this overnight.
3. The next morning we used Liquid Chromatography-Mass Spectrometry (LCMS) to monitor the conversion of starting material to product. The LCMS showed a small peak of product, and a higher starting material peak, so little had been converted.
4. To stimulate a greater conversion we added more NIS to our reaction mixture.
5. After further refluxing and after checking conversion was much higher with the LCMS, we used a rotary evaporator, which uses a vacuum to reduce the boiling point of a solvent so it can be evaporated off in a warm water bath. This removed the acetonitrile solvent in our reaction mixture, leaving solid around the round-bottomed flask.
6. We used normal phase chromatography to purify our product, so solid-loaded it onto Florisil (synthetic magnesium silicate). However to solid-load our product, we had to first remove it from the round-bottomed flask, and we did this by scraping it off first with a spatula, and then using a sonicator. A sonicator is an ultrasonic bath that helps remove the remains of the solid stuck to the bottom of the flask.
7. We had run a thin-layer chromatography (TLC) with a very small sample of our product which helped us determine a suitable solvent-gradient of 0-40% ethyl acetate : cyclohexane.
8. We therefore ran the normal phase chromatography with a normal phase silica column and the solvent gradient determined from the TLC.
9. The results of our chromatography showed we had successfully made a fairly pure sample of our desired product, as taking an LCMS of samples containing our product peak on the chromatography's spectrum showed they contained our product.
10. We combined test tubes 18-26 from the chromatograph, and then used the rotary evaporator to evaporate off the solvent, before taking an LCMS to check the purity of our crude product.
11. The LCMS showed a peak of 98% with our product, so we had successfully produced a fairly pure sample!

See details for GSK's Work Experience Placements with this link: <https://uk.gsk.com/en-gb/careers/school-work-experience/>

On the work experience week, there were 60 students, 15 of which were in the chemistry department. Of the 60 students, just 21 were female, and of the 15 chemistry students, just 5 were girls. Although these numbers show women were greatly outnumbered, during my week at GSK, I saw women working in a variety of leadership roles, and the fact that a third of the students were female, shows how GSK is trying to support young women in science.

I would strongly suggest applying for year 12 lab work experience at GSK to anyone considering a career in STEM, as GSK offer placements in chemistry, biology, qualitative sciences, working with animals, and computer & IT. The lab skills I learnt and the huge amount of chemistry I became a part of during the week was beyond anything I could have expected. Being in an industrial lab environment, working to produce life-changing drugs for a range of diseases, and conducting such complicated reactions allowed me to learn a huge amount in the week I was there. I was given a huge insight into the future I could hold, as an aspiring female scientist.

