



## Dr Laura Waters Research Chemist

*Laura has used chemistry to find out how much medicine will get from a cream into the body.*

A PhD is a higher degree which is usually completed after a first degree; to be awarded a PhD you need to write a thesis which is usually around 100 000 words about research you have carried out.

When I was sixteen I knew I loved learning about chemistry and understanding why reactions happened, even after burning my skin with some strong acid during an experiment at school one day! After completing my A-Levels, I studied Pharmaceutical Chemistry at university so I could understand how to make new medicines, thinking that my career was to be in industry helping develop new products. Then, whilst sitting in a lecture one day I thought that perhaps it would be fun to stay at university forever, teach others how to design medicines and also do my own research on topics I could choose.



*Laura preparing to explain her work to the TV cameras*

To be a lecturer I needed a PhD so I headed off to London for three years and worked hard to complete my thesis on a combination of environmental and pharmaceutical chemistry. Being young and brave I applied for a lectureship at the University of Huddersfield and managed to persuade them I could be their newest recruit. So began my career as a lecturer and researcher but the main question was: What should I research?

## Making a difference

The most important part for me was to feel that my research was relevant and makes a real difference in the world so now I focus on two things – firstly to make medicines that work better for patients suffering from all sorts of diseases and secondly to replace animal testing with other experiments that don't need animals to get the same answers.

Redesigning medicines is interesting as you can take a compound that does not work and turn it into a fantastic product that people can take to cure a disease or relieve unpleasant symptoms, and it can all be done using chemistry.

Replacing animal testing is just as complicated as redesigning medicines as the pharmaceutical industry insists all new products are tested on animals before they can be given to human volunteers in clinical trials. However, I'd argue that testing medicines on animals doesn't help predict what will happen when you give the same chemical to a human as they react very differently and perhaps we can obtain more relevant data by not using animals but using other options instead.

## Work in progress

At the moment I have several research projects in progress. They tend to take several years to complete and require very specialised equipment. One project that I have worked on over the last few years has been to see if we can predict how much medicine will get through your skin, from something like a cream or gel, but using chemicals and computers rather than animal skin. In the end I wrote a paper that was published in a journal to show that we can predict how much will get through human skin and into your body using chemical methods only. Other on-going projects include trying to predict how much compound will be absorbed in your intestine when you swallow a tablet and again, not using animals but chemical methods.

Another aspect of my work is to communicate science to a wider audience and engage with the general public to help people understand science and appreciate why we all need to take an interest in the science around us. There are lots of ways that scientists engage with a wider audience, such as the work of STEM ambassadors, public lectures, science cafés and media work. I try to do as many of these events as I can as I enjoy inspiring others and hoping they share my passion for science. Several times I have been asked to be an expert scientist for

radio programmes and more recently on television, including BBC1, BBC3 and Channel 4. The topics that I am asked to comment on range from the chemicals you would find in coffee through to ways to measure how good a moisturiser is.



Laura working in her lab at the University of Huddersfield



Coffee chemistry: in media appearances, Laura has commented on the chemicals in coffee.

## Chemistry career

I honestly believe that being a chemist is a fantastic career, particularly as a university lecturer as there is so much variety in my work. One moment I may be teaching students how to design a new type of tablet, the next I'm working on research to understand how a cancer drug works, and then I'm filming for television.

*Dr Laura Waters is a lecturer and Principal Enterprise Fellow at the University of Huddersfield.*

### Look here!

See Laura speak about her work on her Youtube channel: <http://tinyurl.com/lgvn2be>