



**Dr Clara O'Sullivan - Forensic Scientist
B.Sc. (Hons) Microbiology, PhD**

I was a budding scientist from a very early age. My questioning mind and love of science was definitely influenced and nurtured by my family. This nurturing continued when I joined UCD in 1993. The wide range of experiences (both in and out of the lecture theatre!) enriched my college years so that I always look back fondly on them.

I studied Microbiology (Industrial Microbiology as it was then called) and graduated in 1997. In second year I took Zoology and Chemistry, and in third year I studied Chemistry and Biostatistics as my minor subject.

In final year of Microbiology, we undertook our final year project in an industrial placement. I carried out my work in Wyeth Medica. After I graduated, I undertook a PhD in Molecular Microbiology on Virulence Gene Regulation in *Rhodococcus equi*.

This led very nicely to a postdoc on the molecular detection of *Chlamydia trachomatis* and human papilloma virus as a detection method for Cervical Cancer. I currently work as a Forensic Scientist at the Forensic Science Laboratory at Garda Headquarters. It is an extremely interesting and challenging job involving practical science, logical thinking, report writing and giving evidence in court as an expert witness.



**How do I find out more about
this degree programme?**

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BSc in Microbiology

www.ucd.ie/sbbs/

Image: overnight growth of an *E. Coli* colony
b Pablo Rojas



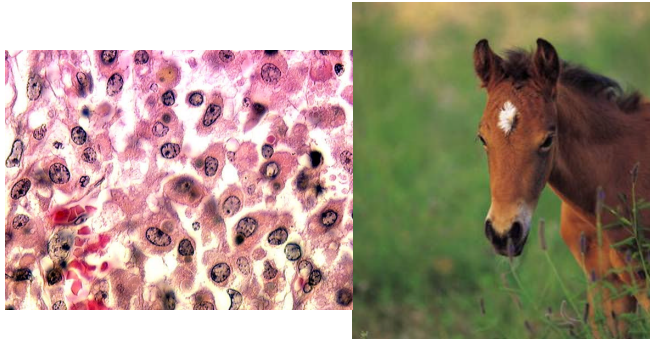
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The bacterium Rhodococcus equi is an important pathogen of young foals and an opportunistic human pathogen

What is Microbiology?

Microbiology is the study of microscopic organisms known as micro-organisms or microbes. They represent the oldest and most abundant life form on earth. Microbes are encountered everywhere, from kilometres deep within the earth's crust to the upper atmosphere, under sometimes extreme conditions. If life exists elsewhere in the solar system it will be as microbial life.

Microbes play a key role in every facet of life on this planet. For example, the development of an oxygen atmosphere depended on the emergence of cyanobacteria. Today, microbes play a critical role in the cycling of nutrients and have a major impact the earth's climate by their metabolism of green house gases like carbon dioxide and methane. They are essential for our well being in that they protect us from colonisation by disease causing microbes, assist in our metabolism of food and are responsible for the production of essential nutrients and vitamins. We would not survive without these microbes. However, some microbes cause disease, for example MRSA, and these can have a catastrophic impact on individuals and indeed entire societies.

What will I study as part of my degree?

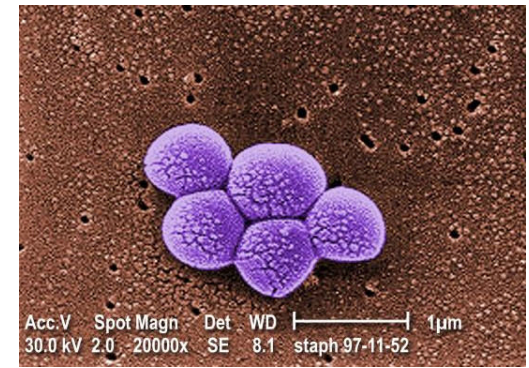
The programme begins with a general overview of Microbiology; the workings of the microbial cell from both a metabolic and genetic perspective. The impact microbes have on our society and environment is also demonstrated. Students have the opportunity to take modules from other disciplines.

The later stages of the programme explore the various disciplines within Microbiology; how the cell works, how microbes interact with their environment, their industrial and environmental applications, and their role in medicine, in particular relating to infectious diseases. In the final stage of the programme, students have the opportunity to participate in a research project which gives first hand experience of the cutting-edge nature of microbiology.

We have learned to harness the enormous potential of microbes. For example, we use and engineer fungi and bacteria to produce a vast array of compounds, ranging from antibiotics and hormones to washing powder and bioplastics. The production of many foodstuffs is dependent on microbial activity, such bread, wine, yoghurt and cheese. We rely on microbes to provide us with clean drinking water and to remove contaminants from polluted soils.



SBBS microbiologists are leading the way in the manufacture of biodegradable plastics using different organisms



Magnified 20,000X, this scanning electron micrograph (SEM) depicts a grouping of methicillin resistant Staphylococcus aureus (MRSA) bacteria.

Image: www.cdc.gov

What are the opportunities for graduates in Microbiology?

In Ireland, microbiologists are employed principally in the healthcare/pharmaceutical, fine chemical, brewing and distilling, food and food related industries, where they are involved in research and development, in process design and control, in management and in the important area of quality control.

Graduates in Microbiology also find jobs in research in universities and research institutes, in teaching at second and third level, in hospitals and public health laboratories and in many other areas of the public and private sectors.

Research in Microbiology

Research interests of staff include:

- Molecular Microbiology;
- Infectious diseases;
- Food Microbiology;
- Microbial Biohalogenation;
- Biocatalysis and Protein engineering;
- Microbial Bioprocessing;
- Environmental Microbiology