Degrees in Microbiology and Immunology

Professor Olwyn Byron
(Deputy Head of Learning & Teaching for Microbiology and Immunology)
will be available today from 16:00-17:00 to answer any questions you may have about our degree programs
In this talk…. 

- Why study *Immunology* or *Microbiology*?  
- Why the University of Glasgow?  
- What are our courses like?  
- What are the career prospects?
Degrees in **Microbiology & Immunology**

- 60-80 graduates each year
- Overall satisfaction: 93-100% - National Student Survey (NSS)
Disease and the struggle for survival

Microbiology & Immunology graduates can change the world!

Immunology
Our immune system provides protection…
…but also contributes to non-infectious diseases.
**Immunology**: Protection from infection

- ‘Green’ white blood cells
- Hair follicle
- Bacterial infection
- Neutrophil chasing a bacterium!
Vaccination / immunisation

Requires an understanding of the microbe and of immunology

1979: WHO declared that smallpox virus eradicated

WHO estimated smallpox killed 500 million people

Smallpox virus

Edward Jenner (1749-1823)
Vaccination: greatest medical advance of 20th century

- Measles
- Mumps
- Rubella (German measles)
- Polio
- Tuberculosis (TB)
- Chickenpox
- Thymophoid
- Yellow Fever
- Whooping cough
- Influenza
- Meningitis
- Cholera
- Plague
- Anthrax
- Tetanus
- Diphtheria
- Bacterial pneumonia
- Cervical cancer (caused by HPV virus)
- Mumps
- Hepatitis
- Rabies
When white blood cells turn nasty

Key part of Immunology programme:
To understand how immune cells contribute to non-infectious diseases

Rheumatoid arthritis
Type 1 diabetes
Asthma

Heart disease
Cancer
Some infectious organisms are visible to the human eye.....
...some are HUGE!...

9 metre long tapeworm!
…but most are ‘micro’-organisms – the focus of Microbiology

- Microbiology covers Virology, Bacteriology & Parasitology
- Opportunity to specialise in Final Year

~200,000 viruses per mm...

Bacteria on a pinhead
Microbiology: Virology

Virology includes the study of:
- transmission & infection strategies
- immune evasion
- molecular virology
- medical virology
- animal health
- vaccines
- emerging viruses

HIV
- 35 M people infected
- 1.6 M deaths in 2012
  - (3 per minute)

Influenza virus
- 0.5 M deaths in 2012
  - 1918: 500 M people infected
  - 50-100 M died
Emerging viruses: SARS-CoV-2 (2019-20)

One British laboratory's race to track the coronavirus

TOM CLARKE SCIENCE EDITOR

Vide report by ITV News Science Editor Tom Clarke

Today, the government pledged £20m towards COVID-19 research including a new network of leading genetic institutions to trace the evolution of the pandemic in real time.

At the Medical Research Council's Centre for Virus Research (CVR) in Glasgow, each new sample of coronavirus they receive is another fragment of evidence in their effort to end the COVID-19 pandemic.
Microbiology: Bacteriology

Mycobacterium Tuberculosis (TB)
1.5 million deaths in 2018 (>2 per minute)
1 in 4 HIV+ patients dies of TB

Pseudomonas aeruginosa
WHO priority pathogens list for R&D of new antibiotics: Priority 1: CRITICAL
Bacteriology: the post-antibiotic apocalypse

GLOBAL

A failure to address the problem of antibiotic resistance could result in:

10m deaths by 2050

Costing £66 trillion
Bacteriology: Friendly and useful bacteria

Gut bacteria & human health

Biotechnology & industrial microbiology e.g. biofuels
Microbiology: Parasitology

Malaria
2012: 207 million infected
630,000 deaths (1 a minute)

Filarial worm
120 million currently infected
40 million disfigured

Mosquito

Elephantiasis
Prevention and treatment: malaria

"World's first malaria vaccine could be available very soon."

$1.3 billion for malaria

David Livingstone
Born 1813 in Blantyre Scotland
Died 1873 in Zambia, of malaria
‘The Livingstone Rouser’
Why the University of Glagsow?
Our research informs our teaching

• A good deal of teaching is delivered by staff from the Institute of Infection, Immunity & Inflammation
• Home to 5 research centres in 2 buildings on 2 campuses
  • Sir Graeme Davies Building (Gilmorehill campus)
    • Wellcome Centre for Integrative Parasitology
    • Centre for Immunobiology
    • GLAZgo Discovery Centre
    • RACE
  • MRC University of Glasgow Centre for Virus Research (CVR) (Garscube Campus)
Our students work like real scientists

3rd year Microbiology lab

Final year project talks

International Women’s Day!
Degree structure: Microbiology

Year 1
- Biology 1A
- Biology 1B
- Chemistry 1 OR Science Fundamentals 1X & 1Y
- Other courses

Year 2
- Fundamental Topics in Biology
- Key Skills in Biology
- One of three other courses
- Microbiology & Immunology

Year 3
- Medical Microbiology 3A
- Medical Microbiology 3B

Year 4: Microbiology

120 ‘credits’ awarded each year
Degree structure: Immunology

Year 1
- Biology 1A
- Biology 1B
- Chemistry 1 OR Science Fundamentals 1X & 1Y
- Other courses

Year 2
- Fundamental Topics in Biology
- Key Skills in Biology
- One of three other courses
  - Microbiology & Immunology

Year 3
- Immunology 3A
- Immunology 3B

Year 4: Immunology

120 ‘credits’ awarded each year
Third year Immunology retreat

SCENE
The Scottish Centre for Ecology & the Natural Environment
Rowardenan, Loch Lomond

http://www.gla.ac.uk/researchinstitutes/bahcm/research/researchfacilities/scene/
Third year Microbiology field trip

FSC Millport
Isle of Cumbrae
Host-parasite interactions studied in the field

https://www.field-studies-council.org/locations/millport/
Final Year

Mix of in-course assessment and examinations

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<th>Semester 2</th>
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<tbody>
<tr>
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<tr>
<td>Option A</td>
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<td>Research Project</td>
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All in-course assessment

Some option courses compulsory, but also some choice

10 three-hour teaching sessions in each 10-week Option

25-30% ‘in course’ assessment in each Option

70-75% by 2-3 hour exam

25% of final degree grade based on Level 3 performance
Final Year

10 week project in a lab at the forefront of Immunology or Microbiology research

Outreach & Dissertation projects also available

Assessment: report, talk, & supervisor’s grade
Masters in Science (MSci) degree with Work Placement

• One year academic or industrial work placement between Years 3 & 5
• Decision at start of Year 3
• Students have done work placement all over the world, including
  JP Osaka
  NL Nijmegen
  IT Milan
  IS Reykjavik
  CHETH Zurich, Bern
  BE Ghent
  NZ Auckland
  FR Pasteur Institute (Paris), Marseille,
  FI Tampere
  DE Max Planck Institutes, Saarland, Bonn
  AT Vienna
  SE Stockholm, Uppsala
  US Seattle
  GB London, Stevenage, Pirbright Institute, Cambridge,
    Weymouth, Dundee, Edinburgh, Aberdeen, Glasgow

Tampere
Tampere Ice Bar!
Graduation & Prizes

Increasing number of Firsts and 2:1s! (75-80%)
Careers in Immunology

- Immunology Graduate Professions & Higher Degrees (182 graduates (2006 & 2013))
  - PhD studies & research science (UK & abroad)
  - Masters studies
  - Medicine
  - Unknown
  - University teaching
  - Pharmaceutical Company
  - School Teaching
  - Business (non-scientific)
  - Business (scientific)
  - Service Industry
  - Dentistry
  - Vet
  - Pharmacy
  - Health Board
  - Nursing
  - Speech Therapy
  - Law
  - Banking
  - Army
  - Mining

Active alumni groups and a Facebook page for sharing information and making contacts
Careers in **Microbiology**

**Industry!**
Development of new products
- Food, pharmaceutical, agrochemical & pollution control companies

**Medicine & health care!**
Diagnosis, prevention & treatment of illness
- Hospitals, public health labs

**Local government, water companies & industry!**
Monitor & control pollution
- Biological treatment of waste
- Agriculture, environment & health specialists

**Education!**
Universities, colleges, medical, dental & veterinary schools
- Teachers & researchers
Degrees in **Microbiology & Immunology**

- **Professor Olwyn Byron**
  - Deputy Head of Learning & Teaching for Microbiology and Immunology
  
  will be **available today from 16:00-17:00** to answer any questions you may have about our degree programs

  Also contactable by email afterwards
  
  olwyn.byron@glasgow.ac.uk

- We hope to welcome you to one of our degree programs in the coming years

- Best of luck with your academic career!