

Marion Bichet

PhD Student in Microbiology

PERSONAL INFORMATION

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Language: English (TOEFL 102) and French

Other: International driving licence and Responsible Service of Alcohol



CAREER SUMMARY

I am a French PhD student with a master degree in microbiology from Pasteur Institute and Sorbonne University in Paris. Previously, I worked on the interaction between host and pathogens. In the Barr Lab, I am investigating the interactions between bacteriophages and eukaryotic cells. Using cutting-edge technology, like confocal microscopy and ddPCR, I will attempt to understand how bacteriophages influence epithelial cells and delineate the mechanisms by which these cells transcytose phage particles.

Outside of the lab I like to go hiking and enjoy the incredible Australian landscapes, I also like to spend times with my friends around a fresh drink.

TECHNICAL SKILLS

Lab Skills

Cell culture
Bacterial culture
Molecular work
CRISPR Cas-9
ddPCR
Transwells

Microscopes

Confocal
Leica SP8 HyD
Epi-fluorescence
Widefield
FRET
STORM

Microscopy Software

FIJI/ICY
Metamorph
NIS-Element
Imaris

Software

PRISM
Office 365
Adobe Suite
Mathematica-9
Matlab

SCIENTIFIC PUBLICATIONS

“Genetic impairment of parasite myosin motors uncovers the contribution of host cell membrane dynamics to Toxoplasma invasion forces.”

Bichet et al. BMC Biol. 2016 Nov 9;14(1):97.

“The toxoplasma-host cell junction is anchored to the cell cortex to sustain parasite invasive force”

Bichet et al. BMC Biol. 2014 Dec 31;12:773.

SCIENTIFIC CAREER

02/2018 – Current

Interaction between bacteriophages and eukaryotic cells

Ongoing PhD with **the Barr Lab**, Monash University - Melbourne, Australia

Team of Jeremy Barr

Key technics:

Confocal microscopy, ddPCR, MicroArray, Transwells, immunology and cell culture

My project focuses on the interactions between bacteriophages and epithelial cells using microscopy to follow in real-time the entry of phages into the cells as well as ddPCR to have an absolute quantification of the number of phages present in the cells and how many were able to cross the epithelial cell barrier. I am also interested in the influence of phages in the immune response of eukaryotic cells. The purpose of these researches is to fight the antibiotic resistance as well as promoting phage therapy.

Key findings:

Cells are massively inactivating phages very rapidly before macropinocytosing them in large numbers. Phage size influences the uptake of phages and the cell type also influences the rate of entry of phages inside of cells.

2017

Role of Rab11 in Shigella's vacuolar rupture

Six months internship for my master's degree at **Institut Pasteur** - Paris, France

Team of Dr. Jost Enninga within 'Dynamique des interactions hôtes pathogènes' unit

Key technics:

Epi-fluorescence, video-microscopy, bacteria culture, cell culture and infections

My project in the Pasteur Institute was to understand the role of the protein Rab11 in the vacuolar rupture of the bacterial pathogen Shigella. To answer this question, I used real-

time microscopy to measure the time of vacuolar rupture and monitor the macropinocytosis formation as well as the Rab11 recruitment at the entry site. By understanding the role of Rab11 in the vacuolar rupture of Shigella we will be able to develop new therapies against this pathogen.

Key findings:

Rab11 protein plays a key role in the macropinocytosis of the *Shigella* inside human cells.

2016

Invasion process of the motor deficient toxoplasmosis parasite in the host cell

Two months internship in at **Institut for Advance Bioscience** - Grenoble, France
Team 'Membrane Dynamics of Host-Parasite Interactions' of Dr. Isabelle Tardieux

Key technics:

Confocal microscopy, cell culture, imaging, video-microscopy and CRISPR/Cas9

My research was focusing on role of the myosin motors of the pathogenic parasite Toxoplasma and how it influences the infection process by slowing down the entry set. To understand this process, we used confocal microscopy to follow in real-time engineered phages lacking myosin motors. The discoveries made about the role of myosin and the role of the host cells is fundamental to be able to develop new therapies against the Toxoplasma parasite.

Key findings:

"Genetic impairment of parasite myosin motors uncovers the contribution of host cell membrane dynamics to Toxoplasma invasion forces."

Bichet et al. BMC Biol. 2016 Nov 9;14(1):97.

2016

Study of cancer cells filopodia

Three months internship, "Inverstissements d'avenir" fellowship, for my master's degree at **The Scripps Research Institute** - San Diego, USA

Team of Dr. Céline Der Mardirossian in the Immunology department

Key technics:

Epi-fluorescence, STORM and FRET microscopy, cell culture and analysis

At the Scripps Institute, I studied the interaction between two proteins in the filopodia of cancerous cells. Using FRET and STORM microscopy I followed the interaction of these two proteins at the tip of filopodia. These researches will help understand the cancer cells migration and the metastasis formation in cancers.

Key findings:

Two proteins interact at the tip of the cell filopodia and help the cell to move increasing the risks of metastasis in cancer.

2014-2015

Invasion process of the toxoplasmosis parasite in the host cell

One year internship at **Institut Cochin**, Inserm U1016 - Paris, France
Team 'Barrier and pathogenic' of Dr. Isabelle Tardieux

Key technics:

Confocal microscopy, cell culture, imaging and video-microscopy

With Isabelle Tardieux's team we looked at the kinetic of invasion of the Toxoplasma parasite into host cells. We used confocal microscopy and stains to labelled the parasite and follow their entry into the cells. We were able to classified the main entry movement that the parasite uses to enter the cells. These fundamental discoveries will help further research on the development of the parasite infection.

Key findings:

"The toxoplasma-host cell junction is anchored to the cell cortex to sustain parasite invasive force"

Bichet et al. BMC Biol. 2014 Dec 31;12:773.

2012

One month internship in a pharmacy

1 rue des Châteaux Rentiers - Paris (13), France

Key responsibility:

Management of the stock and the computing flows in the direction of the administrations

2012

One month linguistic internship of English

Oxford Regent School - Oxford, United Kingdom

ADDITIONAL ACHIEVEMENTS

February 2020

Winner of Nancy Millis Student Award ASM Victorian Branch

I will be presenting my research at the ASM (Australia) in Melbourne on the 5-8th of July 2020 with the winners of the other ASM branches.

December 2019

Organisation of the GEMMZ Student Conference

Monash University, Melbourne Australia

Student conference, around 100 people attending, Neil Gemmell as the Main Speaker from Otago University NZ, prizes for best presentation and best poster.

February 2019 – August 2020

Participation at the GUT FEELINGS exhibition at the Melbourne Museum

Melbourne Museum, Melbourne Victoria, February 2019 – August 2020

Video of Eukaryotic cells uptaking phages under confocal microscope has been selected to represent the interactions between cells and bacteriophages within the human body.

2018 – Current

Teaching associate

In Genetic third year and Microbiology first, second and third year of Bachelor degree. Monash University, Melbourne Australia

GRADUATE EDUCATION

2017

Second year of master's degree in microbiology (completed: June 2017) **Pasteur Institute** and **Sorbonne University** (University Pierre and Marie Curie, Paris VI)

2016

First year of master's degree in cellular and molecular biology (completed: June 2016) **Sorbonne University** (University Pierre and Marie Curie, Paris VI)

2015

Bachelor degree of Science and Technology, in life sciences (completed: Sept 2015) **Sorbonne University** (University Pierre and Marie Curie, Paris VI)

2011

Scientific High School Diploma, Specialty life and Earth Sciences - St Cyr l'Ecole