

## 1. PERSONAL INFORMATION

**GREUB Gilbert, Daniel**  
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Neuchâtel, 6 August 1967  
Swiss  
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## 2. EDUCATION

### Certificate, exams and academic titles

April 2015	Director of the Institute of Microbiology of the University of Lausanne
September 2011	Full Professor of Bacteriology, Head of diagnostic microbiology
September 2006	Maître d'enseignement et de recherche (MER) et Privat Docent (PD)
December 2003	Doctor es Sciences (PhD), University of Marseille under supervision of Prof. D Raoult
July 2000	Specialist FMH in infectious diseases
May 2000	Specialist FMH in internal medicine
September 1999	Medical doctor (MD), University of Lausanne
October 1997	Specialist FAMH in medical microbiology
January 1992	Swiss federal medical doctor diploma, University of Geneva

## 3A. EMPLOYMENT HISTORY

From 01.04.2015	Director of the Institute of Microbiology and "Chef de Service"
From 01.09.2011	Head of the Laboratories of Clinical Diagnostic Microbiology
From 01.01.2004	Microbiology, Lausanne, Switzerland as a group leader
01.01.2001 to 31.12.2003	Microbiology, Marseille, France (postdoctoral fellowship)
01.07.1998 to 31.12.2000	Infectious diseases, Lausanne, Switzerland
01.04.1998 to 30.06.1998	Intensive care unit, Lausanne, Switzerland
01.04.1997 to 31.03.1998	Immunology, Lausanne, Switzerland
01.10.1996 to 31.03.1997	Internal Medicine, Lausanne, Switzerland
01.04.1995 to 30.09.1996	Microbiology, Lausanne, Switzerland
01.12.1994 to 31.03.1995	Internal medicine, Mbouda, Cameroon
27.06.1994 to 04.11.1994	Infectious diseases, Lausanne, Switzerland
23.03.1992 30.09.1994	Internal medicine, Neuchâtel, Switzerland

## 3B. CURRENT PROFESSIONAL POSITION

Full Professor of Bacteriology  
Director of the Institute of Microbiology of the University of Lausanne and  
Head of the Service of Medical Microbiology of the University Hospital (CHUV)  
Head of a group for research on Intracellular Bacteria (dedicated to *Chlamydia* & *Waddlia* research)  
Head of a group of research on giant viruses (Lausannevirus, Cedratvirus lausannensis)  
Head of the Laboratories of Clinical Diagnostic Microbiology (RT)  
Head of R&D program at the Institute of Microbiology of the University of Lausanne  
Head of the microbial genomics and metagenomics unit

## 4. MAIN CURRENT INSTITUTIONAL RESPONSABILITIES

Member of the faculty council of the Faculty of Biology of medicine (FBM)  
Member of the Antibiotic Commission of the University Hospital of Lausanne  
Coordinator of teaching modules at school of Medicine and at School of Biology of the University of Lausanne (UNIL)  
Steering Committee of the Proteomic Platform of FBM at UNIL

## 5. MAIN CURRENT RESEARCH GRANTS (APPROVED RESEARCH PROJECTS)

Grant from the Swiss National Science Foundation (SNSF) n°FN310030-162603, entitled: "Cell division mechanism and regulation of the *Chlamydia*-related pathogen *Waddlia chondrophila*" (about 600'000 Sfr for 3 years)

Grant from the Swiss National Science Foundation (SNSF) n°FN10531C-170280, entitled: "Evaluating scientific findings in cases where the defence says: it is my twin brother" (630'000 Sfr for 3 years)

Grant from SUEZ-ONDEO to investigate by metagenomics the impact of antibiotics on microbial composition and on the presence of antibiotic-resistance genes in various environmental samples (about 300'000 Sfr for 2 years)

## 6. SUPERVISION OF JUNIOR RESEARCHERS

### Supervision of MD & PhD thesis<sup>o</sup>

1. Nicola Casson, 2005-2008, PhD thesis entitled: «Biology and pathogenicity of *Parachlamydia acanthamoebae*»
2. Geneviève Goy, 2006-2009, PhD thesis entitled: «Biology and pathogenicity of *Waddlia chondrophila*»
3. Claire Bertelli, 2007-2010, PhD thesis entitled: «Genomics and pathogenesis of *Chlamydia*-related bacteria»
4. Julia Lienard, 2009-2012, PhD thesis entitled: «Evaluation of risk associated to amoebae-resisting bacteria in water networks»
5. Brigida Rusconi, 2010-2012, PhD thesis entitled: «Phagocyte response and signaling upon Chlamydiae infection»
6. Line Dornmond, 2010-2012, MD thesis entitled: «diagnosis of malaria: parasite load quantification and species identification»
7. Linda Mueller, 2012-2016, PhD thesis entitled: « Evolution and Biology of the Lausannevirus, a giant virus »
8. Ludovic Pilloux 2012-2017, PhD thesis entitled: « Interactions of the T3SS of *Waddlia & Parachlamydia* with the inflammasome»
9. Manon Vouga 2015-2017, PhD thesis entitled : “*Simkania* : a new pathogen associated with adverse pregnancy outcomes”
10. Trestan Pillonel 2013-2017, PhD thesis entitled : “Comparative genomics of the *Chlamydiae*”
- \*11. Florian Tagini, 2016-2019, MD-PhD thesis entitled: “Genomics of medical importance: insights in mycobacterial biology”
- \*12. Firuza Bayramova, 2016-2019, PhD thesis entitled: “Cell division mechanisms and transcriptional regulation in the chlamydia-related bacterial pathogen *Waddlia chondrophila*”
- \*13. Aurélie Scherler, 2016-2019, PhD thesis entitled: “Enlarged reticulate bodies: triggers and medical importance”
- \*14. Valentin Scherz, 2017-2020, MD-PhD thesis entitled: “Forensic microbiology: metagenomics as a new tool to identify individuals”

\* ongoing: PhD thesis (n=2) and MD PhD thesis (n=2);

<sup>o</sup> only the MD, MD-PhD and Phd Thesis are listed here; in addition, 18 master projects have been completed under the supervision of Prof G. Greub and 5 masters projects are ongoing (3 masters from the School of Biology and 2 masters from the school of Medicine)

## 7. TEACHING ACTIVITIES

Teaching at the school of Medicine of the University of Lausanne (24 hours), at the school of Biology of the University of Lausanne (38 hours) and at the school of Laboratory Technician (Ecole supérieure de la Santé de Lausanne; 2 hours)

## 8. MEMBERSHIP IN PANELS, BOARDS, COMMITTEE, ...

2009 - 2018 Chairman of the International Taxonomy subcommittee of Chlamydiae ;

2017 – 2020 Chairman of the European Society for the Study of, Chlamydiae, Coxiella, Anaplasma, Rickettsia & other strict intracellular bacteria (ESCCAR)

2016-2020 Chairman of the European Board of chlamydiology (in charge of the organization of the next European Chlamydia meeting)

2015 - 2018 Member of the Scientific Affairs Subcommittee of European Society of Clin.Microbiology and Infect. Diseases (ESCMID), being responsible of the “Diagnostics” section

2009 - 2018 Associate Editor in the Journal « Clinical Microbiology and Infection » (Ass-Editor in Chief since April 2016)

## 9. ACTIVE MEMBERSHIPS IN SCIENTIFIC SOCIETIES

2016 - 2018 President of the Swiss Society of Microbiology (Member of the STAR steering committee since 2017)

2016 - 2020 President of the Board of the European Chlamydia Society (ECS);

2017- 2020 President of the European Society for the study of Chlamydiae, Coxiella, Anaplasma and Rickettsia (ESCCAR);

## 10. ORGANIZATION OF CONFERENCES

Co-organization of the meeting of the Swiss Society of Microbiology 2014 (Fribourg), 2016 (Bern), 2017 (Basel) & 2018 (Lausanne)

Organization of ESCCAR meetings in 2013 (Villars) & in 2015 (Lausanne); Organization of ESGMD Workshop in 2018 (Lausanne)

## 11. HONOURS AND AWARDS

### Personal awards

- 2018 Lausanne Teaching Award 2018 intitulé pour le « Professeur le plus dévoué aux étudiants » décernés par les étudiants en médecine de l’université de Lausanne pour les cours dispensés en 3<sup>ème</sup> année de médecine
- 2017 Appointed ESCMID Fellow for outstanding to the profession and the ESCMID society
- 2016 Prix Fonds Carlo 2016 received from the Fondation Philanthropia for alternative methods for the study of infectious diseases.
- 2012 Excellence award for teaching in Biology received from UNIL (FBM) for the practical course entitled, sequence a genome
- 2011 Foundation Leenaards award for a project on the division of Chlamydiae (with Prof Viollier, Genève)
- 2011 Foundation NAEF award for „amoebal co-culture approach to discover new chlamydiae“
- 2010 Viollier award received from the Swiss Society for Internal Medicine
- 2007 Career award entitled “Bourse de relève académique à l’Université de Lausanne” received from the Leenaards foundation
- 2006 European ESCMID Young Investigator Award received from ESCMID
- 2001 Wyeth-Lederle award from the Swiss Society for Infectious Diseases for my work on HCV-HIV published in the Lancet

### Awards to person for work done under my supervision

- 2018 ECCMID Travel award to Florian Tagini, delivered by the European Society for Clinical Microbiology & Infectious diseases
- 2017 Award for best reviewer of “Clinical Microbiology and Infection Journal” (CMI) to Dr Onya Opota
- 2017 ESCCAR award to Ludovic Pilloux for its work on T3SS and tick-borne Chlamydiae presented at the ASR-ESCCAR meeting
- 2017 Award of the Swiss Society of Microbiology to Florian Tagini for a poster on “*Mycobacterium kansasii* virulence”
- 2015 Award of the Swiss Society of Microbiology to Nicolas Jacquier for his work published in Nature Communication 2014

- 2015 ESCCAR award to Marie de Barsy (postdoc of Greub's group) for her oral presentation at the international meeting on Intracellular Bacteria on the transcription factors of *W. chondrophila* (work later published in the ISME J 2016)
- 2015 Award of the Swiss Society of Gynecology & Obstetrics to Manon Vouga (PhD student)
- 2014 Award of the "Revue médicale Suisse" to Olivier Clerc for article entitled "Parasitic infections: when to think about it?"
- 2014 Prix de Faculté de Biologie et Médecine to Brigida Rusconi for her Phd thesis: "Catalase of Chlamydiae and oxidative stress"
- 2013 FBM award to Trestan Pillonel for the best master in bioinformatics, for his work on taxogenomics of chlamydiae
- 2011 Prix de la Faculté de Biologie et Médecine to Claire Bertelli for her Phd thesis on "Chlamydial genomics".
- 2010 Award of the Swiss Society of Microbiology to Julia Lienard for her work on *Estrella lausannensis*
- 2010 Award of the Swiss Society of Gynecology & Obstetrics to Baud David (former postdoc of Greub's group) for his work supporting a role of *W. chondrophila* in miscarriage.
- 2009 Prix de la Faculté de Biologie et Médecine to Nicola Casson for the quality of her Phd thesis on *P. acanthamoebae*.
- 2007 AMS award to Sébastien Aeby for the development of new molecular tools to detect *Chlamydia*-related bacteria we discovered
- 2007 Award of the "Revue médicale Suisse" to Noémie Boillat for the article entitled, "Approche clinique des rickettsioses" written under my supervision.

## MAJOR SCIENTIFIC ACHIEVEMENTS

### To understand the biology of *Chlamydia* and *Chlamydia*-related bacteria

Although research on *Chlamydia* and *Chlamydia*-related bacteria is impaired by the difficulty to grow these strict intracellular bacteria, by the lack of a genetic system and by the difficulty to obtain large amounts of purified bacteria, my group intends to decipher the biology of *Chlamydia*-related bacteria using genomic, transcriptomic, proteomic, chemical genetic and cell biology and use these novel *Chlamydiae* as model organisms to understand *Chlamydia*, by studying some attributes conserved among all members of the *Chlamydiales* order. Below, a few major topics that we covered so far are presented :

#### 1. Genomics of *Chlamydia*-related bacteria and their Type Three Secretion System

Practically, given the recently recognized medical importance of *Parachlamydia acanthamoebae* and *Waddlia chondrophila*, these two strict intracellular bacteria were chosen for full genome sequencing. Analyses of their genomes indicated that *P. acanthamoebae*, *W. chondrophila*, *Estrella lausannensis* and *Criblamydia sequanensis* like *Chlamydia* spp., possesses a Type Three Secretion System (T3SS). Interestingly, *Parachlamydia* growth within amoebae and human macrophages is prohibited by specific T3SS inhibitors indicating that this virulence mechanism is a core component of the pathogenic machinery of these bacteria. We recently identified new effector components of the T3SS of *P. acanthamoebae*.

**High throughput sequencing and proteomics to identify immunogenic proteins of a new pathogen: the dirty genome approach.**

Greub G, Kebbi-Beghdadi C, Bertelli C, Collyn F, Riederer BM, Yersin C, Croxatto A, Raoult D.

*PLoS One*. 2009 Dec 23;4(12):e8423.

**The *Waddlia* genome: a window into chlamydial biology.**

Bertelli C, Collyn F, Croxatto A, Rückert C, Polkinghorne A, Kebbi-Beghdadi C, Goesmann A, Vaughan L, Greub G.

*PLoS One*. 2010 May 28;5(5):e10890.

**Early expression of the type III secretion system of *Parachlamydia acanthamoebae* during a replicative cycle within its natural host cell *Acanthamoeba castellanii*.** Croxatto A, Murset V, Chassot B, Greub G. *Pathog Dis*. 2013 Dec;69(3):159-75.

**Sequencing and characterizing the genome of *Estrella lausannensis* as an undergraduate project: training students and biological insights.** Bertelli C, Aeby S, Chassot B, Clulow J, Hilfiker O, Rappo S, Ritzmann S, Schumacher P, Terrettaz C, Benaglio P, Falquet L, Farinelli L, Gharib WH, Goesmann A, Harshman K, Linke B, Miyazaki R, Rivolta C, Robinson-Rechavi M, van der Meer JR, Greub G. *Front Microbiol*. 2015 Feb 19;6:101

***Criblamydia sequanensis* Harbors a Megaplasmid Encoding Arsenite Resistance.** Bertelli C, Goesmann A, Greub G. *Genome Announc*. 2014 Oct 23;2(5).

**Multiple Approaches To Discover New T3ss Effectors Of *Chlamydiales* Bacteria.** LP Pilloux, CK Kebbi-beghdadi, AC Croxatto, GG Greub. *Clinical Chemistry and Laboratory Medicine* 54 (7), eA109 2016 (abstract of SSM meeting)

**Identification And Characterization Of A *W. Chondrophila* Effector Secreted In The Host Cytoplasm** C Kebbi-beghdadi, L Pilloux, G Greub *Clinical Chemistry and Laboratory Medicine* 54 (7), eA67–eA68 (abstract of SSM meeting)

#### 2. Intracellular traffic of *Chlamydia*-related bacteria in macrophages and their recognition by macrophages

*Waddlia chondrophila*, *Parachlamydia acanthamoebae*, *Simkania negevensis*, *Estrella lausannensis* and *Chlamydia pneumoniae* use completely different strategies to survive to macrophages: *Waddlia* recruit mitochondria and escape to endoplasmic reticulum vacuoles, *Parachlamydia* resist to degradation in the endocytic pathway by preventing the acquisition of lysosomal hydrolases, *Simkania* exit the endocytic pathway in vacuoles expressing endoplasmic reticulum markers whereas *Estrella* exit the endocytic pathway by trafficking to Golgi-associated vacuoles.

**Trafficking of *Estrella lausannensis* in human macrophages.** Rusconi B, Kebbi-Beghdadi C, Greub G. *Pathog Dis*. 2015 Jul;73(5).

**Discovery of catalases in members of the *Chlamydiales* order.** Rusconi B, Greub G. *J Bacteriol*. 2013 Aug;195(16):3543-51.

*Role of MyD88 and Toll-like receptors 2 and 4 in the sensing of Parachlamydia acanthamoebae.* Roger T, Casson N, Croxatto A, Enterza JM, Puzstaszeri M, Akira S, Reymond MK, Le Roy D, Calandra T, Greub G. *Infect Immun.* 2010 Dec;78(12):5195-201

*Waddlia chondrophila enters and multiplies within human macrophages.* Goy G, Croxatto A, Greub G. *Microbes Infect.* 2008 Apr;10(5):556-62.

*Lack of microbicidal response in human macrophages infected with Parachlamydia acanthamoebae.* Greub G, Desnues B, Raoult D, Mege JL. *Microbes Infect.* 2005 Apr;7(4):714-9.

*Intracellular trafficking of Parachlamydia acanthamoebae.* Greub G, Mege JL, Gorvel JP, Raoult D, Méresse S. *Cell Microbiol.* 2005 Apr;7(4):581-9.

### 3. Deciphering the mysterious mechanism of division and differentiation of the *Chlamydiales*

The mechanism by which *Chlamydia* divide has puzzled cell biologists since the first chlamydial genome sequence was determined. While eukaryotic cells rely on the actin cytoskeleton for division, prokaryotes generally use the conserved tubulin homologue (FtsZ) to organize the division machine at midcell. Interestingly, an *ftsZ* gene is not present in *Chlamydia*. Thus, binary fission must occur by a yet unknown FtsZ-independent mechanism in these bacteria. We have thus investigated the molecular mechanism of division of *Chlamydia* and discovered that it use a serie of proteins including MreB and RodZ. We also studied the transcription machinery by chromatin immunoprecipitation-deep sequencing (ChIP-SEQ) experiments.

*Regulatory (pan-)genome of an obligate intracellular pathogen in the PVC superphylum.* de Barsey M, Frandi A, Panis G, Théraulaz L, Pillonel T, Greub G, Viollier PH. *ISME J.* 2016 Sep;10(9):2129-44.

*Disassembly of a Medial Transenvelope Structure by Antibiotics during Intracellular Division.* Jacquier N, Frandi A, Viollier PH, Greub G. *Chem Biol.* 2015 Sep 17;22(9):1217-27.

*The role of peptidoglycan in chlamydial cell division: towards resolving the chlamydial anomaly.* Jacquier N, Viollier PH, Greub G. *FEMS Microbiol Rev.* 2015 Mar;39(2):262-75.

*FtsZ-independent septal recruitment and function of cell wall remodelling enzymes in chlamydial pathogens.* Frandi A, Jacquier N, Théraulaz L, Greub G, Viollier PH. *Nat Commun.* 2014 Jun 23;5:4200.

*Cell wall precursors are required to organize the chlamydial division septum.* Jacquier N, Frandi A, Pillonel T, Viollier PH, Greub G. *Nat Commun.* 2014 Apr 8;5:3578.

## Giant viruses

Please note that we also discovered two giant viruses that we named Lausannevirus and Cedratvirus lausannensis, respectively. We sequenced their genomes and we identified histones-like proteins in the genome of Lausannevirus. We also studied the evolution of Lausannevirus, whether humans are exposed to this virus and whether inhibitor of DHFR might be used as antiviral drugs.

*Cedratvirus lausannensis - digging into Pithoviridae diversity.* Bertelli C, Mueller L, Thomas V, Pillonel T, Jacquier N, Greub G. *Environ Microbiol.* 2017 Jun 15

*One year genome evolution of Lausannevirus in allopatric versus sympatric conditions.* Mueller L, Bertelli C, Pillonel T, Salamin N, Greub G. *Genome Biol Evol.* 2017 May 19.

*Lausannevirus Encodes a Functional Dihydrofolate Reductase Susceptible to Proguanil.* Mueller L, Hauser PM, Gauye F, Greub G. *Antimicrob Agents Chemother.* 2017 Mar 24;61(4).

*Lausannevirus seroprevalence among asymptomatic young adults.* Mueller L, Baud D, Bertelli C, Greub G. *Intervirology.* 2013;56(6):430-3.

*Lausannevirus, a giant amoebal virus encoding histone doublets.* Thomas V, Bertelli C, Collyn F, Casson N, Telenti A, Goesmann A, Croxatto A, Greub G. *Environ Microbiol.* 2011 Jun;13(6):1454-66..

## PUBLICATIONS AND BIBLIOMETRY

The list of all publications is available on the following website :

[http://www.chuv.ch/microbiologie/imu\\_home/imu-recherche/imu-research-groups/imu-research-greub.htm](http://www.chuv.ch/microbiologie/imu_home/imu-recherche/imu-research-groups/imu-research-greub.htm)

h-index = **60** (done on Google Scholar on 13<sup>th</sup> May 2018)

h10-index = **203** (number of publications with more than 10 citations)

number of citations = **14'786** (on Google Scholar)

total number of publications on Pubmed = **353**

Estimated average of citations per publication = **41.88**

Total of 215 original articles (total of **371** publications, including book chapters & articles not on Pubmed, see complete list of publications).

	Toutes	Depuis 2013
Citations	14786	8412
indice h	60	44
indice i10	203	184

