

2016 Annual Balzan Lecture

**Pascale Cossart, Institut Pasteur,
2013 Balzan Prizewinner
for Infectious Diseases: basic and clinical aspects**

*"The bacterial pathogen *Listeria monocytogenes*: a unique model in biology"*

preceded by a short presentation by

Melanie Blokesch, Global Health Institute, EPFL
"Fighting for DNA – how the cholera-causing pathogen steals genes from its neighbors"

Wednesday, December 14, 2016, 17.00 h
Ecole Polytechnique Fédérale de Lausanne (EPFL)

Short Abstracts

Pascale Cossart

For three decades, we have been studying how *Listeria* interacts with mammalian cells and harnesses them during infection. *Listeria* is ubiquitous in the environment. It multiplies on decaying vegetation and can contaminate food products, thereby leading to gastroenteritis and also meningitis and abortions, with a mortality rate of 30%. The capacity of *Listeria* to produce an infection is due to its ability to cross three tight host body barriers: the intestinal barrier, the blood-brain barrier, and the placental barrier. Its virulence is due to an arsenal of virulence factors which allow *Listeria* to survive and persist in the intestinal lumen, to enter into cells and disseminate in the various tissues that it infects, exploiting cellular signaling pathways and components to its own profit in order to escape host defence mechanisms. We have used a combination of targeted and genome-wide approaches including genomic and post-genomic approaches, with cutting-edge technologies, e.g., fluorescence microscopy, live cell imaging, and mass spectrometry. Our picture of the infection and of the switch from saprophytism to virulence is becoming more and more precise. During the talk, we will show how the study of *Listeria* has led to general concepts in infection biology, cell biology and microbiology.

Melanie Blokesch

Vibrio cholerae, the causative agent of cholera, is considered to be an important model organism for studying infectious diseases. However, compared to its pathogenic potential in humans, much less is known about the bacterium's lifestyle in its primary habitat, the aquatic environment. Such environmental habitats often contribute to pathogen emergence, which is frequently accomplished through the acquisition of novel genetic information by means of horizontal gene transfer.

In this talk, I will show how *V. cholerae* actively steals DNA from neighboring bacteria. To do so, the pathogen uses a very sophisticated molecular spear, which ultimately results in the lysis of adjacent cells and the release of their genetic material. This deliberate killing of neighboring bacteria is followed by the absorption of the released DNA and the incorporation of new genes and gene clusters into the pathogen's own genome. These data therefore describe a novel mechanism that leads to the enhancement of horizontal gene transfer in *V. cholerae*.

Participants

Melanie Blokesch

Head of the Laboratory of Molecular Microbiology, Global Health Institute, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne (EPFL)

Maurice Campagna

President of the Swiss Academies of Arts and Sciences, Bern; Former Professor of Physics, Ecole Polytechnique Fédérale de Zurich (ETHZ)

Pascale Cossart

2013 Balzan Prizewinner; Head of the Laboratory Bacteria-Cell Interactions, Institut Pasteur, Paris; Secrétaire perpétuel de l'Académie des Sciences, Institut de France

Enrico Decleva

President of the International Balzan Foundation "Prize"; Former Full Professor of Contemporary History; Former Rector of the State University of Milan; Former President of the Conference of Italian University Rectors (CRUI)

Gisou van der Goot

Head of the Laboratory of Cell and Membrane Biology, Global Health Institute, and Dean of the School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne (EPFL)

Organisational Details

Registration

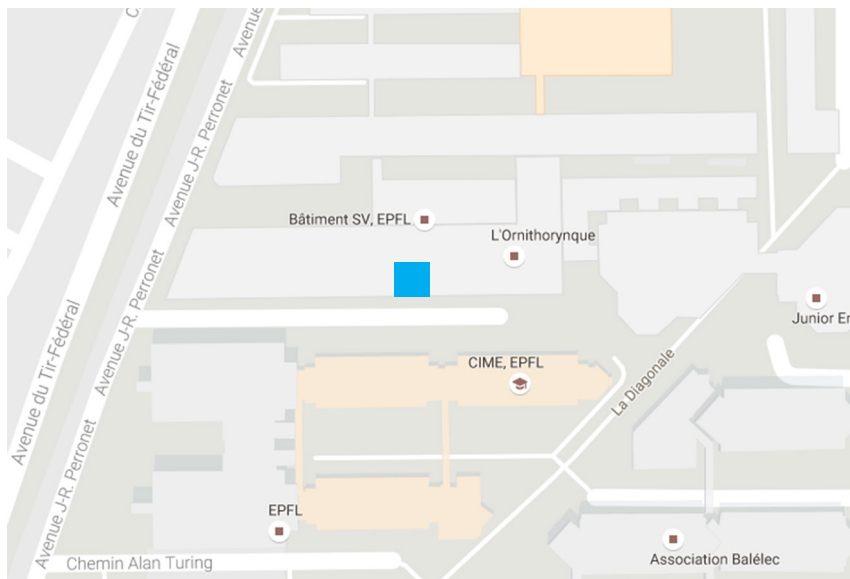
Please register online at www.akademien-schweiz.ch/balzan
by December 12th, 2016

Further Information

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Venue

Ecole Polytechnique Fédérale de Lausanne
[Bâtiment SV, room SV1717](#)



Programme

Wednesday, December 14, 2016

Ecole Polytechnique Fédérale de Lausanne (EPFL)

- 17.00 h **Welcome**
- **Gisou van der Goot**
Dean of the School of Life Sciences, EPFL
 - **Enrico Decleva**
President of the International Balzan Foundation "Prize"
 - **Maurice Campagna**
President of the Swiss Academies of Arts and Sciences
- 17.15 h **Introduction and presentation of Melanie Blokesch**
- **Gisou van der Goot**
Session chair
- 17.20 h **"Fighting for DNA – how the cholera-causing pathogen steals genes from its neighbors"**
- **Melanie Blokesch**
School of Life Sciences, Global Health Institute, EPFL
- 17.35 h **Presentation of **Pascale Cossart, 2013 Balzan Prizewinner** for Infectious Diseases: basic and clinical aspects**
- **Gisou van der Goot**
- 17.45 h **"The bacterial pathogen *Listeria monocytogenes*: a unique model in biology"**
- **Pascal Cossart**
Head of the "Unité des Interactions Bactéries-Cellules",
Institut Pasteur
- 18.25 h **Discussion**
- **Gisou van der Goot**
- 19.00 h **Cocktail dînatoire**

Profiles

The Swiss Academies of Arts and Sciences

The Swiss Academies of Arts and Sciences include the Swiss Academy of Sciences (SCNAT), the Swiss Academy of Humanities and Social Sciences (SAHS), the Swiss Academy of Medical Sciences (SAMS), and the Swiss Academy of Engineering Sciences (SATW) as well as the two Centres of Excellence TA-SWISS and Science et Cité. The Swiss Academies foster the network of scientists and facilitate the dialogue between science and society. Scientific excellence and a high quality educational system are two of the most important resources in Switzerland. The necessary investments in research depend on the confidence people have towards achievements particularly in the sciences and their benefits for society as a whole. Advances in science must be utilized for the common good. Society as a whole and its elected representatives need access to research results for developing a consensus and moving ahead. It is the aim of the Swiss Academies to promote a balanced dialogue between those carrying out research and society at large. An important responsibility is to advise politicians and relevant individuals in different spheres in society in regard to empirically and theoretically based solutions to the social questions they face. The Swiss Academies stand for an open and pluralistic understanding of science and research across all academic fields. Thus, they represent the Arts and Sciences comprehensively, both at an inter-institutional as well as inter-departmental level. A recognized authority in the research community, the Swiss Academies have access to expertise and excellence and therefore can contribute unique knowledge and understanding to important political questions. Over the long term, they mutually commit to resolving interdisciplinary questions in the following fields:

- They offer knowledge and expertise in relation to socially relevant subjects in the fields of Education, Research and Technology.
- They adhere to the concept of ethically-based responsibility in gaining and applying scientific and humanistic knowledge.
- They build bridges between Academia, Government and Society.

Profiles

The International Balzan Foundation

The International Balzan Foundation "Prize" aims to promote, throughout the world, culture, science, and the most meritorious initiatives in the cause of humanity, peace and fraternity among peoples, regardless of nationality, race or creed. This aim is attained through the annual award of prizes in two general academic categories: literature, the moral sciences and the arts; medicine and the physical, mathematical and natural sciences. Specific subjects for the awarding of Prizes are chosen on an annual basis.

Nominations for these prizes are received at the Foundation's request from the world's leading academic institutions. Candidates are selected by the General Prize Committee, composed of eminent European scholars and scientists. Prizewinners must allocate half of the Prize to research work, preferably involving young researchers.

At intervals of not less than three years, the Balzan Foundation also awards a prize of varying amounts for Humanity, Peace and Fraternity among Peoples.

The International Balzan Foundation "Prize" attains its financial means from the International Balzan Foundation "Fund", which administers Eugenio Balzan's estate.

EPFL – School of Life Sciences

EPFL is centered on three missions: education, research and technology transfer. The School of Life Sciences aims to foster a new generation of life scientists with strong expertise in quantitative and analytical biology. Its primary mission is to offer a pluri-disciplinary training to our students, providing them with the opportunity to study biology jointly with engineering, basic sciences, and computer sciences. The school's professors with their diverse backgrounds – biology, chemistry, physics, engineering, computer science, psychology and medicine, tackle fundamental questions in biological sciences and solve biomedical problems to increase human knowledge and address key societal issues.

The School's research laboratories are grouped into 4 institutes, with strong cross-institute connections: Brain Mind Institute; Institute of Bioengineering; Global Health Institute and the Swiss Institute for Experimental Cancer Research (ISREC).

In addition to the main Lausanne campus, the School is present at the Campus Biotech in Geneva, which hosts initiatives such as: the Human Brain Project, a project with a broad impact in the field of neuroscience; the EPFL Center for Neuroprosthetics, a joint effort of the School of Life Sciences and the School of Engineering.

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Fondazione
Internazionale Balzan
"Premio"

The International Balzan Foundation "Prize" has signed agreements with the Swiss Academies of Arts and Sciences and the Accademia Nazionale dei Lincei to spread knowledge of studies of international breadth in the sciences and the humanities. The protocol for collaboration upon which the agreements are based entails the periodical organization of forums and conferences on scientific themes and subjects that the Balzan Prize is concerned with, involving Balzan Prizewinners and members of the Academies, as well as the sharing of experience useful for the promotion of culture and science.

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