Leopoldina
Nationale Akademie
der Wissenschaften

Curriculum Vitae Prof. Dr. Emmanuelle Charpentier

Picture: Hallbauer&Fioretti

Name: **Emanuelle Charpentier**
Born: **1968**

Main Research Interests: Molecular infection biology; molecular mechanisms governing physiology and infection-associated processes in Gram-positive bacterial pathogens; research on CRISPR-Cas, the adaptive immune system that protects bacteria against invading genetic elements; small regulatory RNAs that interfere with bacterial pathogenicity; protein quality-control that regulates bacterial adaptation, physiology and virulence; mechanisms of bacterial recognition by immune cells

Emmanuelle Charpentier is a French microbiologist and biochemist. She is an expert in regulatory mechanisms underlying processes of infection and immunity in bacterial pathogens. With her recent groundbreaking findings in the field of RNA-mediated regulation based on the CRISPR-Cas9 system, Emmanuelle Charpentier has laid the foundation for the development of a novel, highly versatile and specific genome editing technology that is revolutionizing life sciences research and could open up whole new opportunities in biomedical gene therapies.

Academic and Professional Career

since 2018	Acting and Founding Director of the Max Planck Unit for the Science of Pathogens
2015 - 2018	Scientific Member of the Max Planck Society, Director at the Max Planck Institute for Infection Biology, Department of Regulation in Infection Biology, Berlin
since 2014	Alexander von Humboldt Professor
since 2014	Lab Head, Visiting Professor, Laboratory for Molecular Infection Medicine Sweden (MIMS), Umeå Centre for Microbial Research (UCMR), Department of Molecular Biology, Faculty of Medicine, Umeå University, Sweden

2013 - 2015	Department Head, W3 Professor, Helmholtz Centre for Infection Research (HZI), Braunschweig, Department of Regulation in Infection Biology, Hannover Medical School (MHH)
2013	Docent (Medical Microbiology), Faculty of Medicine, Umeå University
2009 - 2014	Lab Head, Associate Professor, Laboratory for Molecular Infection Medicine Sweden (MIMS), Umeå Centre for Microbial Research (UCMR), Department of Molecular Biology, Faculty of Medicine, Umeå University
2006 - 2009	Lab Head, Associate Professor, Max F. Perutz Laboratories, University of Vienna, Austria
2006	Private Docent (Microbiology), Habilitation Dissertation, Centre of Molecular Biology, Vienna BioCenter, University of Vienna
2004 - 2006	Lab Head, Assistant Professor, Department of Microbiology and Immunobiology, University of Vienna
2002 - 2004	Lab Head, Guest Professor, Institute of Microbiology and Genetics, University of Vienna
1999 - 2002	Research Associate, Skirball Institute of Biomolecular Medicine, New York, US
1999	Research Associate, St. Jude Children's Research Hospital, Memphis, Tennessee, USA
1997 - 1999	Assistant Research Scientist, New York University Medical Center, New York, USA
1996 - 1997	Post-Doctoral Associate, The Rockefeller University, New York, USA
1995 - 1996	Post-Doctoral Assistant, Pasteur Institute, Paris, France
1993 - 1995	University Teaching Assistant, University Pierre and Marie Curie, Paris
1992 - 1995	Graduate student, Pasteur Institute, Paris; PhD degree in Microbiology, University Pierre and Marie Curie, Paris
1986 - 1992	Studies of Biology, Microbiology, Biochemistry and Genetics, University Pierre and Marie Curie, Paris

Project Coordination, Membership in Collaborative Research Projects

since 2014	DFG Project „Gentherapie angeborener metabolischer Lebererkrankungen durch gezielte Genommodifikation“

Honours and Awarded Memberships

2020	Nobel Prize in Chemistry (together with Jennifer Doudna)
2020	Wolf Prize in Medicine

2020	Carl Friedrich Gauß Medal
2019	Order of Merit of the Federal Republic of Germany
2019	Richard-Ernst-Medaille, ETH Zürich
2018	Berliner Wissenschaftspreis
2018	Kavli Prize in the field of nanoscience
2016	Human Frontier Science Program Nakasone Award (with Jennifer Doudna)
2016	BBVA Foundation Frontiers of Knowledge Award for Biomedicine
2016	Meyenburg Prize
2016	Gottfried Wilhelm Leibniz Prize of the German Research Foundation (DFG)
2016	L'Oréal-Unesco "For Women in Science" Award
2016	Otto Warburg Medal
2015	Wissenschaftspreis Niedersachsen
since 2015	Member of the German National Academy of Sciences Leopoldina
2015	Carus Medal of the German National Academy of Sciences Leopoldina
2015	Excellence by Choice Jubilee Award, Umeå University, Sweden
2015	Gruber Prize in Genetics
2015	The Hansen Family Award
2015	Princess of Asturias Award for Technical and Scientific Research
2015	The 11th International Society for Transgenic Technologies Prize
2015	Elected Fellow of the American Academy of Microbiology
2015	Louis Jeantet Prize for Medicine
2015	Ernst Jung Prize for Medicine
2015	Breakthrough Prize in Life Sciences
2014	Grand Prix Jean-Pierre Lecocq of the French Academy of Sciences
2014	Dr. Paul Janssen Award for Biomedical Research
2014	Elected Member of the European Molecular Biology Organization (EMBO)
2014	Jacob Heskel Gabbay Award in Biotechnology and Medicine
2014	Göran Gustafsson Prize in Molecular Biology, Royal Swedish Academy of Sciences
2013	Alexander von Humboldt Professorship
2011	Eric K. Fernström Prize, Sweden

2010 Umeå Biotech Incubator Business Idea Award

2009 Prize of the City of Vienna: Theodor Körner Prize for Science and Culture

Main Research Interests

Emmanuelle Charpentier is a French microbiologist and biochemist. She is an expert in regulatory mechanisms underlying processes of infection and immunity in bacterial pathogens. With her recent groundbreaking findings in the field of RNA-mediated regulation based on the CRISPR-Cas9 system, Emmanuelle Charpentier has laid the foundation for the development of a novel, highly versatile and specific genome editing technology that is revolutionizing life sciences research and could open up whole new opportunities in biomedical gene therapies.

Emmanuelle Charpentier investigates fundamental mechanisms of regulation in processes of infection and immunity with a focus on Gram-positive bacterial pathogens. She is interested in understanding how RNAs and proteins coordinate to modulate gene expression at the transcriptional, post-transcriptional and post-translational level. Her research group studies regulatory RNAs and proteins in various biological pathways such as horizontal gene transfer, adaptation to stress, physiology, persistence, virulence, infection and immunity. In particular, they do research on interference systems in the defense against genetic elements (CRISPR-Cas), small regulatory RNAs that interfere with pathogenic processes, protein quality control that regulates bacterial adaptation, physiology and virulence, and the mechanisms of bacterial recognition by immune cells.

The laboratory of Emmanuelle Charpentier employs a combination of -omics, genetic, molecular, biochemical, physiological and cell infection approaches to identify new molecules and decipher their origins, functions and modes of action at the molecular and cellular level. A pathogen mostly studied in the laboratory is Streptococcus pyogenes also called Group A streptococcus that can cause highly aggressive invasive infections such as toxic shock and necrotizing diseases. In the past years, they have also investigated the genetics and biology of Listeria monocytogenes, Staphylococcus aureus and Streptococcus pneumoniae.

The understanding of fundamental mechanisms of regulation in pathogens is critical to generate new findings in basic science and possibly translate them into novel biotechnological and biomedical applications (e.g. genome editing tools, anti-infective strategies). A successful example of the application of the basic research in biotechnology and medicine is the recent discovery by Emmanuelle Charpentier and her group of an RNA-guided DNA cleavage mechanism that has been harnessed as an RNA programmable genome engineering technology and that stems from their analysis of the adaptive immune CRISPR-Cas9 system in bacterial pathogens.

Additional affiliations: Helmholtz-Zentrum für Infektionsforschung in Braunschweig and The Laboratory for Molecular Infection Medicine Sweden (MIMS), Umeå University, Sweden.