



Curriculum Vitae Prof. Dr. Ulla Bonas



Image: Markus Scholz | Leopoldina

Name: Ulla Bonas
Born: 12 December 1955

Main research interests: plant pathogens, *Xanthomonas campestris* pv. *vesicatoria*, defense mechanisms in plants, Bacterial Spot Disease, type III effectors, avirulence genes

Ulla Bonas is a plant geneticist. Her research focuses on the interaction between pathogenic bacteria and plants. She studies the molecular mechanisms of the disease germ *Xanthomonas* and the plant's reaction after infection with the germ. Her works significantly contributed to the understanding of plant–microbe interactions and allowed for novel therapy and plant protection concepts.

Academic and Professional Career

- 2018 - 2023 Scientific Director of the Alfried Krupp Wissenschaftskolleg Greifswald
- since 1998 Full Professor of genetics at the Martin Luther University Halle-Wittenberg
- 1993 - 1998 CNRS position (Directeur de Recherche; permanent)
Group leader at the CNRS Institut des Sciences Végétales; Gif-sur-Yvette, France
- 1992 Habilitation in genetics at the Free University of Berlin
- 1988 - 1993 Leader of an independent research group, Genbiologische Forschung Berlin GmbH
- 1985 - 1987 Postdoctoral research fellow, University of California Berkeley, USA
- 1984 Doctorate, University of Cologne
- 1981 - 1985 Graduate student, Max-Planck-Institut für Züchtungsforschung, Cologne
- 1981 Diploma in Biology, University of Cologne
- 1974 - 1981 Studies of Biology, University of Cologne

Functions in Scientific Societies and Committees

- since 2015 Vice President of the German National Academy of Sciences Leopoldina
- since 2013 Member, Scientific Advisory Board, LabEx Saclay Plant Sciences, France
- 2005 - 2016 Speaker of the DFG special research project SFB 648 "Molecular mechanisms of informational processing in plants"
- 1999 - 2004 Speaker of the DFG special research project SFB 363 "Molecular cell biology in plant systems"

Project Coordination, Membership in Collaborative Research Projects

- 2007 - 2015 DFG project "Characterization of small regulatory RNAs with a putative function in the virulence of *Xanthomonas campestris* pv. *vesicatoria*", subproject in SPP 1258 "Sensory and regulatory RNAs in Prokaryotes"
- 2005 - 2016 DFG project "Analysis of the virulence function of type III effector proteins from *Xanthomonas*", subproject in SFB 648 "Molecular mechanisms of informational processing in plants"
- 2005 - 2016 DFG project "Functional characterization of the effector protein AvrBs3 from *Xanthomonas*", subproject in SFB 648
- 2001 - 2012 DFG project "Genetische und biochemische Analyse von Genprodukten des hrp-Genclusters von *Xanthomonas campestris* pv. *vesicatoria*"
- 1999 - 2004 DFG project "Funktionsanalyse der Effektorproteine phytopathogener Bakterien", subproject in SFB 363 "Molekulare Zellbiologie pflanzlicher Systeme"
- 1997 - 2004 DFG project "Avirulenz- und Virulenzaktivität des AvrBs3 Proteins aus *Xanthomonas*", subproject in SFB 363

Honours and Awarded Memberships

- 2019 Order of Merit (Verdienstkreuz am Bande) of the Federal Republic of Germany
- 2011 Gottfried Wilhelm Leibniz award of the Deutsche Forschungsgemeinschaft (DFG)
- since 2008 Member of the German National Academy of Sciences Leopoldina
- since 2000 Member of the European Molecular Biology Organization (EMBO)
- 1993 - 1996 ATIPE of the French research organisation CNRS
- 1993 - 1994 Heisenberg stipend of the DFG
- 1986 - 1987 Postdoctoral fellowship of the DFG
- 1985 - 1986 Postdoctoral fellowship of the DAAD

1985 Otto Hahn Medal of the Max Planck Society

1984 - 1985 Postdoctoral fellowship of the Max Planck Society

Main research interests

Ulla Bonas' research focuses on the interaction between pathogenic bacteria and plants. She studies the molecular mechanisms of the disease germ *Xanthomonas* and the plant's reaction after infection with the germ. Her works significantly contributed to the understanding of plant-microbe interactions and allowed for novel therapy and plant protection concepts.

The bacterial germ *Xanthomonas campestris* pv. *vesicatoria* (Xcv) mainly infects crop plants such as bell pepper and tomatoes. Xcv causes the Bacterial Spot Disease, leading to heavy crop losses. To infect the host plant, the bacteria applies sophisticated strategies. By a protein complex (type III secretion system, T3S system), it introduces effector proteins into the plant cell. These effector proteins manipulate the plant's genes. Cell signaling and metabolism are impaired for the benefit of the germ, and the plant's defense is suppressed.

Ulla Bonas studies the mechanisms of information transfer between plants and pathogens during recognition phase, virulence (degree of pathogenic properties) and defense. She wants to learn how the germ succeeds in shutting down the plant's defense and propagating in the plant tissue.

In her research, she unveiled how the bacteria are incapacitated in resistant plants. In various host plants, *Xanthomonas* causes no disease symptoms, but leads to a programmed cell death within the infected plant tissue (local necrosis). Thus, a further propagation of the germ in the plant is prevented.

However, necrosis is only initiated if avirulent genes of the bacteria and a matching resistance gene (R-gene) are present in the plant. Ulla Bonas and her team have cloned and characterized one of the first avirulence genes (*avrBs3*-gene) and elucidated its function. Moreover, they isolated the resistance gene corresponding to *AvrBs3* in resistant bell pepper plants, i.e., the *Bs3*-gene. *AvrBs3* binds to certain DNA-sequences in genetic switches of *Bs3*, thus triggering the plant's defense reaction, i.e., cell death.

During their researches, the scientists discovered a novel and modularly built protein area in *AvrBs3*, which is able to bind specific locations of genetic material.