Leopoldina
Nationale Akademie
der Wissenschaften

Curriculum Vitae Prof. Dr. Brenda A. Schulman

Image: Ausserhofer | MPI für Biochemie

Name: **Brenda A. Schulman**
Born: **18 June 1967**

Research priorities: Biochemistry, structural biology, post-translational modifications, ubiquitin, protein degradation, cell cycle, autophagy

Brenda A. Schulman is a biochemist, structural biologist, and cell biologist. Her lab elucidates fundamental principles underlying cellular regulation by small proteins known as ubiquitin and ubiquitin-like proteins. Because this regulation is associated with numerous diseases - including cancers, neurodegenerative disorders, and viral infections - Schulman's research enables deciphering physiologically important signaling pathways and their roles in diseases.

Academic and professional career

since 2018	Honorary Professor, Department of Chemistry, Technical University of Munich, Germany
since 2017	Director and Scientific Member at the Max Planck Institute of Biochemistry (primary appointment) Martinsried, Germany
since 2017	Adjunct Faculty, St. Jude Children's Research Hospital, Memphis, USA
2016	Director, Department of Molecular Machines and Signaling, Max-Planck-Institute of Biochemistry, Martinsried/Munich, Germany (secondary appointment)
2005 - 2017	Investigator, Howard Hughes Medical Institute, Chevy Chase, USA
2001 - 2017	Faculty, St. Jude Children's Research Hospital, Memphis, USA
1998 - 2001	Postdoctoral fellow, Memorial Sloan-Kettering Cancer Center, New York, USA (Advisor: Nikola P. Pavletich)
1996 - 1998	Postdoctoral fellow, Massachusetts General Hospital Cancer Center, Boston, USA (Advisor: Ed Harlow)

1989 - 1996	PhD in Biology, Massachusetts Institute of Technology (MIT), Cambridge, USA (Advisor: Peter S. Kim)
1993, 1996	Internship with Christopher M. Dobson, Oxford, UK
1985 - 1989	Bachelor's degree in Biology, The Johns Hopkins University, Baltimore, USA

Functions in scientific societies and committees

2019	Co-Organizer, EMBO Conference on Ubiquitin
2018	Scientific Review Board, Walter and Eliza Hall Institute of Medical Research, Parkville Victoria, Australia
since 2018	Scientific Advisory Board, The HARC Center, University of California, San Francisco, USA
2017	Co-Organizer, EMBO Conference on Ubiquitin
since 2016	Scientific Advisory Board, The Jane Coffin Childs memorial Fund for Medical Research, New Haven, USA
2016	Co-Organizer, 30th Anniversary Symposium of the Protein Society
2015	Co-Organizer, EMBO Conference on Ubiquitin
since 2015	Editorial Board, Proceedings of the National Academy of Sciences
2013	Co-Organizer, EMBO Conference on Ubiquitin
since 2011	Editorial Board, The Protein Science
2011 - 2016	Scientific Review Board, Starr Cancer Consortium
2011 - 2013	Nominating Committee, The Protein Society
2009 - 2013	Co-Organizer, Cold Spring Harbor meeting on The Ubiquitin Family
2007	Co-Organizer, Keystone Symposium on Ubiquitin and Signaling

Project coordination, memberships in collabrative projects

since 2019	Co-Principal Investigator R01CA247365 „Chemical biology of the control of neddylation by DCN1", National Cancer Institute, National Institutes of Health (NIH), Bethesda, USA
since 2018	Principal Investigator Nedd8Activate „How does the ubiquitin-like protein NEDD8 activate ubiquitin ligase machineries?", European Research Council Advanced Grant
since 2017	Subproject leader SFB 1035 "Control of protein function by conformational switching"

2003 - 2019 Principal Investigator (lab at St. Jude Children's Research Hospital), R37GM069530 „E3-mediated Ubiquitin-Like Protein Ligation", National Institute of General Medical Sciences (NIGMS), NIH, Bethesda, USA

2006 - 2016 Principal Investigator R01GM077053 „Structures/Mechanisms In A Noncanonical Ubiquitin-Like Protein Transfer Cascade", NIGMS

2005 - 2017 Investigator, Howard Hughes Medical Institute

Honours and awarded memberships

2023 Louis-Jeantet Prize for Medicine of the Louis-Jeantet Foundation

since 2019 Member of the German National Academy of Sciences Leopoldina

2019 Gottfried Wilhelm Leibniz Prize

2019 Ernst Jung Prize for Medicine

since 2018 Member of the European Molecular Biology Organization (EMBO)

2018 ERC Advanced Grant

2016 Vallee Visiting Professorship Award

2014 MERIT Award, National Institute of general Medical Sciences

since 2014 Member of the US-National Academy of Sciences

since 2012 Member of the American Academy of Arts and Sciences

2011 Dorothy Crowfoot Hodgkin Award, The Protein Society

2005 Investigator, Howard Hughes Medical Institute

2004 United States Presidential Early Career Award for Scientists and Engineers

2004 Beckman Young Investigator Award

2004 Pew Scholar in Biomedical Sciences

Research Priorities

Brenda A. Schulman is a biochemist, structural biologist, and cell biologist. Her lab elucidates fundamental principles underlying cellular regulation by small proteins known as ubiquitin and ubiquitin-like proteins. Because this regulation is associated with numerous diseases - including cancers, neurodegenerative disorders, and viral infections - Schulman's research enables deciphering physiologically important signaling pathways and their roles in diseases.

Brenda Schulman elucidates biochemical pathways and structural mechanisms underlying how protein functions are dynamically switched to drive crucial biological regulatory pathways. In

eukaryotes, a major form of regulation involves covalent protein modification by a diverse array of ubiquitin (UB) and ubiquitin-like proteins (UBLs). This is mediated by cascades of enzymes in classes known as E1, E2 and E3. It is estimated that the human genome encodes 500-1000 E1, E2, and E3 enzymes, rivaling the numbers of kinases. The vast numbers of these enzymes underscores their widespread roles in regulation. The foundation of Schulman's work is a persistent drive to visualize dynamic protein complexes in their functional forms.

The Schulman lab biochemically reconstitutes intricate regulation, devises new chemical or protein-design methods for trapping transient massive multiprotein assemblies in conformations representing fleeting ubiquitylation reaction intermediates, and in conjunction with structural techniques and genetics, defines the structural mechanisms underlying UB and UBL conjugation.

Schulman's group determined numerous structures (originally by X-ray crystallography, but more recently by cryo electron microscopy) that defined fundamental principles by which major classes of E1, E2 and E3 enzymes transfer UB and UBLs to specific targets. Schulman has also identified several previously unrecognized cellular pathways regulating ubiquitylation.