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Education and Professional Experience

1977 – 1984	graduate studies in Biology, major in Animal Physiology, Technical Highschool (RWTH) Aachen and University of Freiburg (ALU): **Dipl. Biol.**
1984 – 1988	doctoral studies in Plant Physiology at RWTH Aachen and Max Planck Institute for Plant Breeding (MPIZ) Cologne: **Dr. rer. nat.** (Land NRW fellow)
1988	research visit at Oklahoma State University (OSU), Stillwater, USA (DAAD fellow)
1988 – 1989	post-doctoral research in Plant Pathology, RWTH Aachen
1989 – 1990	post-doctoral research in Biochemistry and Molecular Biology, OSU Stillwater, USA (NATO fellow)
1990 – 1994	Group Leader, Plant Physiology, RWTH Aachen
1993	Habilitation in Plant Physiology, RWTH Aachen: **Dr. rer. nat. habil.**
1994 – 1995	Professor of Biochemistry, RWTH Aachen
1995 – 2025	Professor of Plant Biochemistry, Univ. Münster
2000 – 2005	Dean of Studies, Department of Biology, Univ. Münster
2000 – 2007	Managing Director, Inst. Plant Biochem. Biotechnol., Univ. Münster
2017 – 2024	Deputy Managing Director, Inst. Plant Biol. Biotechnol., Univ. Münster
2025 – 2026	Senior Professor of Plant Biochemistry, Univ. Münster
since 2025	associated member of the Fraunhofer Institute for Molecular Biology and Applied Ecology Münster (IME)

Honors and Awards

1984	Springorum Dipl. Award of Technical Highschool Aachen (“best 10 %”)
1984 – 1988	doctoral fellow of Land Nordrhein-Westfalen and DAAD
1988	Borchers PhD Award of Technical Highschool Aachen (“summa cum laude”)
1989 – 1990	post-doctoral fellow of NATO
1990	Research Award of Land Nordrhein-Westfalen
2002	Teaching Award of University of Münster
2003	Best Practice Award “Reform-Studiengang” for BSc in Bio-Sciences
2005 – 2013	Member of DAAD Selection Committee South and South East Asia
2005	“Goldener Hans“ for Best Teacher at Faculty of Biology, Univ. Münster
2005 – 2013	Member of DAAD Selection Committee South and South East Asia
since 2005	Member of the Board of the European Chitin Society
since 2006	Member of the Ph.D. Examination Board of Fac. Biology of Univ. Münster
2009 – 2013	Vice-President of the European Chitin Society
2009 – 2014	Member of the Accreditation Commission of ASIIN e.V.
2011 – 2013	Member of the Indo-German Intergov. Steering Committee Biotechnology
2011 – 2017	Member of the Teaching Board of University of Münster
since 2015	Head of the Ph.D. Examination Board of Fac. Biology of Univ. Münster
2017	“Goldener Hans“ for Best Teacher at Faculty of Biology, Univ. Münster
2017	“Sybille Hahne” award for best biotech start-up “Evorion Biotechnologies”
2017 – 2023	President of the European Chitin Society
since 2023	International Relations Advisor of the European Chitin Society
2024	“Goldener Hans“ for Best Teacher at Faculty of Biology, Univ. Münster

Coordination of Large International Research Projects

2000 – 2005	European research project **CARAPAX**
2005 – 2008	European research project **NanoBioSaccharides**
2006 – 2008	European/International research project **NBS-TTC**
2009 – 2013	European research project **PolyModE**
2009 – 2015	first Indo-German International Research Training Group (IRTG) **MCGS**
2011 – 2014	European research project **ChitoBioEngineering**
2011 – 2015	first Indo-German Public Private Partnership “2+2” project **CuChi-BCA**
2013 – 2017	European research project **Nano3Bio**
2016 – 2019	European research project **funCHI**
2017 – 2020	Indo-German research project **smartBioS**
2020 – 2023	Indo-German research project **Bio-Fun**
2024 – 2026	Board member of the National Priority Program **Codeχ**

Achievements (as of 2025)

Student Supervision

total BSc students supervised	ca. 60
total MSc/Dipl.Biol./LA students supervised	ca. 120
total PhD candidates supervised	ca. 60

Publications and Patents

peer-reviewed original articles	184
reviews and book chapters	26
contributions to curricular reform (‘Bologna’ transition)	8
patents	11
total citations (without self citations)	ca. 5200
H-index	43

Conferences

invited, key note, or plenary speaker, and member of the International Advisory Board of most international chitin/chitosan-related conferences since ca. 15 years

Organizer and Chair of International Chitin and Chitosan Conference ICCC 2015

Start-ups

supported/supporting the founding of start-up biotech companies:

- Evorion Biotechnologies (2017)
  multiparametric analysis of complex cell populations at single-cell resolution
- Bex-Biotec (2018)
  microscale assaying of novel plant biostimulant activities
- greEnCAP technologies (2025)
  chitosan-based formulations for sustainable plant disease protectants
- CARAPAX biotechnologies (2025)
  next-generation chitosans for agriculture and beyond

Third-Party Funding

German Research Council DFG (Normal, Schwerpunkt, IRTG)	4 / 6 / 1
European Union Research Framework Programme (FP 5 / 6 / 7)	1 / 2 / 2
European Research Area (IB - BMBF / IB2 - BMEL)	1 / 1
Federal Ministries (BMBF / BMWi)	5 / 5
Regional Ministries NRW (MWIDE)	4
German Academic Exchange Service DAAD	3
Industry	2

Research

The main research interest of Prof. Moerschbacher and his team is in elucidating molecular structure-function relationships and cellular modes of action of functional biopolymers, in particular of partially acetylated chitosans. Over the past thirty years, the research of the team has contributed significantly to the availability of today's well-defined second-generation 2G-chitosans which are currently invigorating chitosan-based applications and industries. Recently, the team is pioneering the biotechnological production and enzymatic modification of chitosans, leading to the development of structurally and functionally even better characterized third-generation 3G-chitosans. A prerequisite for this research is the development of ever more sophisticated and sensitive analytical tools to quantify the structures and functions of chitin and chitosan polymers and oligomers, including enzymatic-mass spectrometric fingerprinting. In this way, they keep improving – where appropriate, in national and international collaborations with expert partners in different fields, such as nanotechnology or biomedicine – the performance of bioactive chitosans for applications in agriculture, biomedicine, and beyond. The team aims to bridge the gap between fundamental research to gain knowledge on the one hand, and applied development of knowledge-based products on the other hand, to support the transition of today's petrol-based economy to tomorrow's bio-based economy. The research projects of Prof. Moerschbacher' team are always interdisciplinary and, most of the time, international and intersectorial, involving partners from Academia and Industry in Europe and beyond.

Transfer

In order to ease transfer of research results into marketable products, members of the group have recently begun to set up their own start-up biotech companies such as *Evorion Biotechnologies* and *Bex-Biotech*, *greEnCAP technologies* and *CARAPAX biotechnologies*. In addition, the team's service unit, *ChitoProf*, offers structural analyses of chitosans to researchers in Academia and Industry, to support the use of well-characterized chitosans, a prerequisite for achieving reproducible results and for developing reliable products. Beyond the end of his academic career at the University in Münster, Prof. Moerschbacher and his team will continue their successful work in the framework of the Fraunhofer Institute for Molecular Biology and Applied Ecology (IME). This will provide an excellent environment for application-oriented research, including in close collaboration with the start-ups and established industry.

Teaching

His teaching 'duties' as a university professor have always been a source of inspiration, joy and pride for Prof. Moerschbacher. He was the driving force behind the transition from the former system of Diploma studies to the new Bologna system of Bachelor and Master studies at the Faculty of Biology of the University of Münster, as well as for the development of Structured Doctoral Programs which are now offering networking and career development opportunities to all of our doctoral candidates. These award-winning efforts led to numerous invitations nationally and internationally, as far as Brazil or Brunei, to present the teaching and learning philosophies underlying our new programs which – with continuous careful updating – have proudly stood the test of time for many years. Prof. Moerschbacher was, i.a., in charge of the first five weeks of lecturing "Basics of Biology" to the first year's Bachelor students, aiming to convey the central needs to understand biomolecules and their potential. And – even more importantly – to understand that our brains are evolution's most sophisticated and creative learning machines, building a unique universe in every human head – the realization of which is each person's most noble and entirely unique task! If you don't do it, this potential universe in your head will never become reality!

Some Important Peer-Reviewed Publications

1 Moerschbacher B. M., U. Noll, L. Gorrichon, H. J. Reisener (**1990**)
Specific inhibition of lignification breaks hypersensitive resistance of wheat to stem rust.
Plant Physiol. **93**: 465-470 (doi: 10.1104/pp.93.2.465)

2 Vander P., K. M. Vårum, A. Domard, N. E. El Gueddari, B. M. Moerschbacher (**1998**)
Comparison of the ability of partially N-acetylated chitosans and chitooligosaccharides to elicit resistance reactions in wheat leaves.
Plant Physiol. **118**: 1353-1359 (doi: 10.1104/pp.118.4.1353)

3 El Gueddari N. E., U. Rauchhaus, B. M. Moerschbacher, H. B. Deising (**2002**)
Developmentally regulated conversion of surface-exposed chitin to chitosan in cell walls of plant pathogenic fungi.
New Phytol. **156**: 103-112 (doi: 10.1046/j.1469-8137.2002.00487.x)

4 Cord-Landwehr S., P. Ihmor, A. Niehues, H. Luftmann, B. M. Moerschbacher, M. Mormann (**2017**)
Quantitative mass-spectrometric sequencing of chitosan oligomers reveals cleavage sites of chitosan hydrolases.
Anal. Chem. **89**: 2893-2900 (doi: 10.1021/acs.analchem.6b04183)

5 Weikert T., A. Niehues, S. Cord-Landwehr, M. J. Hellmann, B. M. Moerschbacher (**2017**)
Reassessment of chitosanase substrate specificities and classification.
Nat. Commun. **8**: 1698 (doi: 10.1038/s41467-017-01667-1)

6 Wattjes J., A. Niehues, S. Cord-Landwehr, J. Hoßbach, L. David, T. Delair, B. M. Moerschbacher (**2019**)
Enzymatic production and enzymatic-mass spectrometric fingerprinting analysis of chitosan polymers with different non-random patterns of acetylation.
J. Am. Chem. Soc. **141**: 3137-3145 (doi: 10.1021/jacs.8b12561)

7 Basa S. M. Nampally, T. Honorato, S. N. Das, A. R. Podile, N. E. El Gueddari, B. M. Moerschbacher (**2020**)
The pattern of acetylation defines the priming activity of chitosan tetramers.
J. Am. Chem. Soc. **142**: 1975-1986 (doi: 10.1021/jacs.9b11466)

8 Hembach L., M. Bonin, C. Gorzelanny, B. M. Moerschbacher (**2020**)
Unique subsite specificity and potential natural function of a chitosan deacetylase from the human pathogen *Cryptococcus neoformans*.
Proc. Natl. Acad. Sci. U.S.A. **117**: 3551-3559 (doi: 10.1073/pnas.1915798117)

9 Linhorst, M., J. Wattjes, B. M. Moerschbacher (**2021**)
A chitin deacetylase as biocatalyst for the selective *N*-acylation of chitosan oligo- and polymers.
ACS Catalysis **11**: 14456-14466 (doi: 10.1021/acscatal.1c04472)

10 Sreekumar, S., J. Wattjes, A. Niehues, T. Mengoni, A. C. Mendes, E. R. Morris, F. M. Goycoolea, B. M. Moerschbacher (**2022**)
Biotechnologically produced chitosans with nonrandom acetylation patterns differ from conventional chitosans in properties and activities.
Nat. Commun. **13**: 7125 (doi: 10.1038/s41467-022-34483-3)

11 Hellmann, M. J., D. Gillet, S. Trombotto, S. Raetz, B. M. Moerschbacher, S. Cord-Landwehr (**2024**)
Heterogeneously deacetylated chitosans possess an unexpected regular pattern favoring acetylation at every third position.
Nat. Commun. **15**: 6695 (doi: 10.1038/s41467-024-50857-1)

12 Lindner, S., M. Bonin, M. J. Hellmann, B. M. Moerschbacher (**2025**)
Three intertwining effects guide the mode of action of chitin deacetylase de- and *N*-acetylation reactions.
Carbohydr. Polym. **347**: 122725 (doi: 10.1016/j.carbpol.2024.122725)

13 Richter, C., S. Cord-Landwehr, R. Singh, J. Ryll, B. M. Moerschbacher (**2025**)
Dissecting and optimizing bioactivities of chitosans by enzymatic modification.
Carbohydr. Polym. **349**: 122958 (doi: 10.1016/j.carbpol.2024.122958)