

Dr. Andreas Blennow

Research Center: Science Center for Carbohydrates, Innovation Center for Cereal Science and Carbohydrate Research

Research Field: Starch Bioengineering for Foods and Materials

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Personal Profile

Andreas Blennow's research involves bioengineering of starch to generate functional and health-promoting starch and nano-biocomposites. His main activities are within multilevel starch and glycan bioengineering including CRISPR/Cas9-based crop genome editing, clean enzyme-assisted and physical modification, plant-based foods and human nutrition, polysaccharide-based biocomposites/nanomaterials and fundamentals of starch structure and metabolism. He has close cooperation with industry and is cofounder of the spinoff company PlantCarb ApS for the design of amylose-only health-promoting starch crops. He has published more than 250 scientific articles and book chapters and contributed to more than 300 conferences.

Education Background

1988.04-1992.12 PhD, Doctor of Philosophy

1985.09-1988.03 Master of Science

1982.09-1985.06 Bachelor of Science

Work Experience

2026.03-present, Jiangnan University, School of Food Science and Technology, Professor

2025.10-2026.03, Guangdong Technion-Israel Institute of Technology, Professor

2024.07-2025.09 Plantcarb ApS and Blennow Holding AB (Sweden), Private Companies

2020.01-2024.06, University of Copenhagen, Research Group Leader, Professor

2000.12-2019.12, Royal Veterinary and Agricultural University of Denmark, Research Group Leader, Associate Professor

1998.09-2000.11, Royal Veterinary and Agricultural University of Denmark, Research Group Leader, Associate Professor

1996.05-1998.06, Royal Veterinary and Agricultural University of Denmark, Assistant Research Professor

Research Projects

2026.03-2029.02 Torch Grant, Ministry of Industry and Information Technology (MIIT) and Jiangnan University, (China), 4 million RMB

- 2024.01-2027.06 “BioMarch” Independent Research Grant (Denmark), 6.51 million RMB
- 2019.1-2021.12 “Safe Packaging with Responsive INTERface – SPRINTER” Independent Research Grant (Denmark), 5.54 million RMB)
- 2019.10-2021.09, “ Smart Starch” Danish Innobooster (Denmark) 1.6 million RMB)
- 2014.01-2017.12 Plant Factory Hybrid Biopolymers for Future Materials-Related Applications” Independent Research Grant (Denmark) (6.0 million RMB)
- 2008.01-2011.12 Safe Feed Grain: New starch composition to reduce mycotoxin, Independent Research Grant (Denmark) (5.6 million RMB)

Representative Publications

- Mikkelsen, R., Mutenda, K., Mant, A., Schürmann, P., and **Blennow, A.** (2005) α -glucan, water dikinase (GWD): A plastidic enzyme with redox-regulated and coordinated catalytic activity and binding affinity. *Proc. Natl. Acad. Sci.* 102/5, 1785-1790.
- Carciofi, M, **Blennow A.**, Jensen, S.L., Shaik, S.S, Henriksen, A., Buléon, A., Holm, P.B., Hebelstrup, K.H. (2012) Concerted suppression of all starch branching enzyme genes in barley produces amylose-only starch granules *BMC Plant Biol.* 12, 223, 1-16.
- Sorndech, W, Nakorn, KN, Tongta S, **Blennow A** (2018) Isomalto-oligosaccharides: recent insights in production technology and their use for food and medical applications. *Lebensmittel - Wissenschaft und Technologie*, 95, 135-142.
- Roager HM, ... **Blennow A**, ... Licht, TR (2019) et al. Whole grain-rich diet reduces body weight and systemic low-grade inflammation without inducing major changes of the gut microbiome: a randomised cross-over trial. *Gut*, doi: 0.1136/gutjnl-2017-314786
- Johansen, IE, Liu, Y, Jørgensen, B, Bennet, EP, Nielsen KL, **Blennow A**, Petersen, BL (2019) High efficacy full allelic CRISPR/Cas9 gene editing in tetraploid potato. *Sci Rep*, 9, 17715
- Keeratiburana T, Hansen AR, Soontaranon S, Tongta S, Blennow A (2020) Porous rice starch produced by combined ultrasound-assisted ice recrystallization and enzymatic hydrolysis. *Int J Biol Macromol*, 145, 100-107.
- Zhong Y, Qu JZ, Liu X, Ding LY Liu, Bertoft E, Petersen BL, Hamaker BR, Hebelstrup KH, **Blennow A** (2022) Different genetic strategies to generate high amylose starch mutants by engineering the starch biosynthetic pathways. *Carbohydrate Polymers*, 287, 119327, <https://doi.org/10.1016/j.carbpol.2022.119327>.
- Kou T, Faisal M, Song J, **Blennow A** (2023) Stabilization of emulsions by high-amylose-based 3D nanosystem. *Food Hydrocoll* 135, 108171
- Tian Y, Wang Y, Zhong Y, Møller MS, Westh P, Svensson B, **Blennow A** (2023) Interfacial enzyme kinetics reveals degradation mechanisms behind resistant starch. *Food Hydrocoll*, 140, 108621
- Tian Y, Liu X, Petersen BL, Li H, Kirkensgaard JJK, Enemark-Rasmussen K, Khakimov B, Hebelstrup KH, Zhong Y, **Blennow A** (2024) Characterization of different high amylose starch granules. Part II: structure evolution during digestion and distinct digestion mechanisms. *Food Hydrocoll* 149, 109593.
- Chen Y, Jiang, S, Wang, Y, Zhang F, Wang L, Zhao L, Liu S, Tan J, Persson S, Sun B, Chen J **Blennow A** (2024) Small-sized starch nanoparticles for efficient penetration of plant cells. *Chemical Communications*, 60, 14113-14116,

- Ding L, Yang J, Kirkensgaard JJK, Enemark-Rasmussen K, Chang J, Zhang L, Chen S, **Blennow A**, Zhong A (2025) Characterization of different high amylose starch granules. Part III: How starch fine structures affect retrogradation and formation of type 3 resistant starch. *Carbohydrate Polymers* 361, 123633
- Blennow A**, Hebelstrup KH, Petersen BL (2025) Starch biosynthesis and crop bioengineering. *Grain & Oil Science and Technology* 8/3, 235-245
- Liang W, Herburger K, Guo K, Kirkensgaard JJK, Hebelstrup KH, Persson S, Cheng S, Zhong Y, **Blennow A**, Ding L, (2025) The effects of supplemental irrigation on structure and digestion of normal barley starch and amylose-only barley starch *Carbohydrate Polymers*, 370, 124378
- Li Z, Yu Tian, Kirkensgaard JJK, Svensson B, **Blennow A**, Wang Y (2026) Fabrication of small-sized starch nanoparticles and their inhibition of interfacial enzymatic hydrolysis of granular starch. *Innovative Food Science and Emerging Technologies* 11010448

Selected Awards

- 1995:** Australian National University Postdoctoral Fellowship
- 2005:** Member, Expert Organizing Committee of the Moscow International Congress
- 2005-2008:** Member of expert panel National Research Council FORMAS, Sweden, 2005, (deputy chair 2006, Chair 2008)
- 2007:** EU CORE Organic, application assessment 2007, (Chair)
- 2011:** Member, Swedish Committee for Agricultural Sciences and Spatial Planning
- 2013:** Member, American Association of Cereal Chemists International (AACCI)
- 2016:** Member, Organizing Committee of the European Starch Round Table Conference
- 2020:** Nils Foss Excellence Award

Representative Patents

- Jensen, S.L., Sørensen, O.B. and **Blennow, A.** (2012) Patent application PA 2012 00261: “Stabilization of starch granules using branching enzyme (E.C. 2.4.1.18)” submission date April 14, 2012.
- Blennow A**, Ulvskov P, Jørgensen B, Faisal M Nanocellulose composites for fully compostable bioplastics. WO2022049254-A1, Publication date: 19 October 2023, Publication number: US 20230331961
- Dagmara Podzimska-Sroka, Kim Hebelstrup, Jan Mousing, **Andreas Blennow**, PCT/EP/2024/064828

Teaching Responsibilities

- Nanobiotechnology**, 240030 (7,5 ECTS, 2007-10, Initiator and Head of course, 45%) Univ. of Copenhagen
- Methods in Molecular Biology**, 240072 (15 ECTS, 2008-11, Initiator and Head of course, 30%) Univ. of Copenhagen
- Post Genomic Plant Biology Summer Course**, (6 ECTS, 2004-05, Head and contrib, 12,5%) Univ. of Copenhagen
- Naturstoffkemi**, lkeb10113 (3,75 ECTS, 2013-16, contributor, Head from 2014, 27,5%) Univ. of Copenhagen
- Wine Making and Beer Brewing**, 250009 (7,5 ECTS, 2011-18 contributor, 5%) Univ. of Copenhagen

Bioactive Components and Health, 270092 (7,5 ECTS, 2011-18 contributor, 5%) Univ. of Copenhagen

Advanced Plant Polysaccharides, 240084 (7,5 ECTS, 2011-18, contributor, 15%) Univ. of Copenhagen

From Plants to Bioenergy, 250075 (7,5 ECTS, 2008-18, contributor, 9%) Univ. of Copenhagen

Biochemistry 2, 230003 (7,5 ECTS, 2007-18, contributor, 12,5%) Univ. of Copenhagen

Bioinformatics 1, 240007 (7,5 ECTS, 2006-07, contributor, 10%) Univ. of Copenhagen

Bioinformatics 2, 240007 (7,5 ECTS, 2008-09, contributor, 5%) Univ. of Copenhagen

Molecular Biophysics, 220004 (7,5 ECTS, 2007, contributor, 5%) Univ. of Copenhagen

Plant Biotechnology, 240038 (7,5 ECTS, 2009, contributor, 8%) Univ. of Copenhagen

Molecular Plant Biochemistry and Physiology, 240028 (7,5 ECTS, 2006-11, contrib, 4%) Univ. of Copenhagen

Plant Ecophysiology, 250030 (7,5 ECTS, 2002, contributor, 5%) Univ. of Copenhagen

Thematic Course Plant Science, 250042 (15 ECTS, 2005, 2007, contributor, 5%) Univ. of Copenhagen

Thematic Course Biotechnology, (15 ECTS, 2006, contributor, 5%) Univ. of Copenhagen

Plantebiologi, (12 ECTS, 2003-05, contributor, 12,5%) Univ. of Copenhagen

Advances in Plant Biology, (12 ECTS PhD course, 2005-11, contributor, 5%) Univ. of Copenhagen

Bio-resource Technologies, (7,5 ECTS, 2010, KU-NAT, contributor, 2%) Univ. of Copenhagen

Biochemistry for Natural Resource Education, NPLB16000U (7.5 ECTS, Head from 2017, 40%) Univ. of Copenhagen

Technology of winemaking, Course 066226, 2 credits, Initiator and Head of course, 2025-2026, Guangdong Technion Israeli Institute of Technology

Micro-nano encapsulation for controlled release, Course 066334, 3 credits, Initiator and Head of course, 2025-2026, Guangdong Technion Israeli Institute of Technology

Advanced Carbohydrate Technology, Jiangnan University (2027, contributor, 10%)

Starch Biosynthesis and Bioengineering, Jiangnan University (2027, Initiator and Head of course, 100%)

Postgraduate Training

PhD students (main supervisor)

René Mikkelsen, Sept 2004:

Function and regulation of α -glucan, water dikinase (GWD), the starch phosphorylating enzyme.

Mikkel A. Glaring, March 2006:

The function of glucan water dikinase (GWD homologues in *Arabidopsis thaliana*.

Henrik Lütken, February 23, 2007:

New key points in starch degradation. The role of the Glucan Water Dikinases and Disproportionating Enzymes

Camilla Christiansen, 19 March 2009:

Investigation of Starch Binding Domains for Improvement of Starch degradation

Susanne Langgård Jensen, 3 March 2013:

Enzymatic Modification of Starch - Stabilization of granular starch using branching enzyme under extreme conditions

Shahnoor Sultana Shaik, December 2013:

Starch Bioengineering in Barley: Effects on Grain Quality, Metabolism and Physiology

Vanja Tanackovic, April 2014:

Brachypodium distachyon: the new cereal model plant for the characterization and biosynthesis of starch

Katsyarina Skryhan, November 21 2014:

Redox impact on starch biosynthetic enzymes in Arabidopsis thaliana

Waraporn Sorndeck, May 10 2016:

Structural and digestion properties of soluble-, slowly digestible and resistant maltodextrin from cassava starch by enzymatic modification

Domenico Sagnelli, March 23 2017:

Characterization of GMO grains for the production of new bioplastics and food.

Thewika Keeratiburana, January 2018

Structural and physicochemical properties of granular rice starch modified by physical and enzymatic methods.

Yuyue Zhong, May 2021

Improving functional properties of normal maize starch granules by transglucosidase and branching enzyme.

Marwa Faisal, November 2022

Fabrication of colorimetric pH-indicator based on bioplastic support matrix and anthocyanins extracted from red cabbage

Wenxin Liang, October 2023

Supplemental Irrigation: A Critical Strategy for Boosting Crop Productivity and Starch Functionality.

Yu Tian, January 2024

Improving Resistant Starch – High Amylose Starch Multilevel Structure and Mechanism of Digestion.