

Henriette Elisabeth Autzen

Curriculum Vitae



PERSONAL DETAILS

Birth: November 1987
Email: [henriette.autzen\(at\)bio.ku.dk](mailto:henriette.autzen(at)bio.ku.dk)
Website: <https://www.autzenlab.com/>

EDUCATION

PhD in Molecular Biology January 28, 2015
Dept of Molecular Biology and Genetics, Aarhus University (AU), DK
Advisor: Professor Poul Nissen

MSc in Medicinal Chemistry October 14, 2011
Department of Chemistry, AU, DK
Advisor: Professor Birgit Schiøtt

BSc in Medicinal Chemistry August 28, 2009
Department of Chemistry, AU, DK
Advisor: Professor Birgit Schiøtt

ACADEMIC POSITIONS AND RESEARCH EXPERIENCES

Associate Professor, University of Copenhagen (UCPH), DK February 1, 2020 - present
Section for Biomolecular Sciences, Department of Biology

My current research and scientific focus areas are centered on structural and functional characterization of mammalian membrane bound receptors and ion channels involved in sweet, umami and bitter taste signaling, using single particle cryo-electron microscopy (cryo-EM) and complimentary biophysical and biochemical techniques. My aim is to delineate the molecular details of taste and the therapeutic and diagnostic potential of the proteins involved within. In line with my research on membrane proteins, I am also developing and utilizing amphiphilic copolymers as tools for directly extracting mammalian membrane proteins in nanodiscs composed by their native membrane lipids, facilitating a shorter, and likely a gentler purification procedure. This will become a powerful tool for all areas of research centered on membrane protein biochemistry.

Postdoc, Cheng lab, University of California, San Francisco (UCSF), US March 1, 2016 - January 31, 2020
Advisor: Professor Yifan Cheng

Characterized the human ion channels (hTRPM4, hTRPM5 and mTMEM16F) with single particle cryo-EM. Developed and characterized amphiphilic copolymers (AASTY) for extracting membrane proteins in native nanodiscs. Led to four publications. Another two manuscripts are currently in preparation.

Postdoc, Gourdon lab, UCPH, DK November 1, 2014 - January 2016
Advisor: Associate Professor Pontus Gourdon

Characterized a bacterial Cu(I) P-type ATPase with biochemistry and crystallization to capture new conformational states. Led to one co-authored publication.

PhD Fellow, Nissen lab, AU, DK November 1, 2011 - October 31, 2014
Advisor: Professor Poul Nissen

Characterized several P-type ATPases with biochemistry, crystallography and molecular modelling techniques. Led to seven publications, four first author.

BSc and MSc student, Biomodelling Group, AU, DK January 1, 2009 - August 31, 2011
Advisor: Professor Birgit Schiøtt

Mapped structure-activity relationships of psychoactive drugs binding to the serotonin transporter with molecular modelling. Led to two publications, one co-first author.

EXTERNAL FUNDING

Inge Lehmann Research Project 1, DFF NS <i>Structure and function of NHE6: The subcellular shipping lane in the brain</i>	2021-
Hallas-Møller Emerging Investigator – Bioscience and Basic Biomedicine The Novo Nordisk Foundation <i>A spoon full of sugar makes the medicine go down: Decoding the molecular mechanisms of sweet and savory taste signaling</i>	2020-
Postdoc Fellowship, The Lundbeck Foundation <i>Cryo-Electron Microscopy of Ion Channels in Native Bilayers</i>	2018-
Postdoc Fellowship, DFF NS <i>Structural studies of the TRPM4 cation channel</i>	2015
Postdoc Fellowship, The Lundbeck Foundation <i>Structural studies of the TRPM4 cation channel (Declined in favor of DFF NS)</i>	2015
Postdoc Fellowship, The Carlsberg Foundation <i>Heavy-metal transporting P-type ATPases: Deciphering the structural groundwork of copper transport and regulation</i>	2014

ACADEMIC AWARDS

Protein Society Young Investigator Talk and Travel Award	2018
EMBO Short Term Fellowship	2013
Margrethe Møller Fonden Travel Stipend	2012

SCIENTIFIC DISSEMINATION

Talks:	9 (5 invited)
Posters:	14 (8 presented at international conferences)

MANAGEMENT AND LEADERSHIP EXPERIENCE

With more than a decade in structural biology, I have extensive experience in project -and lab management, including management of a mammalian membrane protein biochemistry laboratory, managing external grants while doing research and teaching. I am currently leading a 4-person research group (2 postdocs, 1 PhD student and 1 MSc student) and enrolled in a leadership development program through the Novo Nordisk Foundation and completed a leadership course at UCPH in 2020.

COLLABORATIONS

<i>Development of novel copolymers for native nanodiscs</i>	Ongoing
<ul style="list-style-type: none"> ▪ Group leader Anton A. A. Smith (Technical University of Denmark, DK) ▪ Aashish Manglik (UCSF) 	
<i>The Human Na⁺/H⁺ exchangers</i>	Ongoing
<ul style="list-style-type: none"> ▪ Professors Birthe B. Kragelund (UCPH, DK) ▪ Professor Stine H. Falsig Pedersen (UCPH, DK) 	
<i>Development of SMA-like copolymers for native nanodiscs</i>	March 2017- January 2020
<ul style="list-style-type: none"> ▪ Professor Yifan Cheng (UCSF, US) ▪ Assistant Professor Eric A. Appel (Stanford University, US) ▪ Postdoc Anton A. A. Smith (Stanford University, US) 	
<i>Structural studies of TRP channels</i>	March 2016- January 2020
<ul style="list-style-type: none"> ▪ Professor Yifan Cheng (UCSF, US) ▪ Professor David Julius (UCSF, US) 	

LEAVE

Maternity leave: Full-time: February – April, 2021, Part-time: April – December, 2021

SUMMARY OF PUBLICATION ACTIVITIES

Peer reviewed: 14 (5 sole first author, 3 shared first author, 1 co-corresponding author)
 Preprints: 1 (corresponding)
 h-index: 9 (Including self-citations, Google Scholar, November 2020)
 Citations: 566 citations on 14 publications (Google Scholar, November 2020)
 Patents: 1

PUBLICATIONS

- 1 A. A. A. Smith[±], **H. E. Autzen**[±], B. Faust, J. L. Mann, B. W. Muir, S. Howard, A. Postma, A. J. Spakowitz, Y. Cheng, E. A. Appel. Lipid Nanodiscs via Ordered Copolymers, *Chem*, 6(10): 2782–2795, 2020
- 2 **H. E. Autzen**, D. Julius, and Y. Cheng. Membrane mimetic systems in cryo-em: Keeping membrane proteins in their native environment. *Current Opinion in Structural Biology*, 203(3):125–131, 2019
- 3 **H. E. Autzen**, H. Koldso, P. J. Stansfeld, P. Gourdon, M. S. P. Sansom, and P. Nissen. Interactions of a bacterial cu(i)-atpase with a complex lipid environment. *Biochemistry*, 57(28):4063–4073, 2018
- 4 **H. E. Autzen**, A. G. Myasnikov, M. G. Campbell, D. Asarnow, D. Julius, and Y. Cheng. Structure of the human trpm4 ion channel in a lipid nanodisc. *Science*, 359(6372):228–232, 2018
- 5 A. A. A. Smith, **H. E. Autzen**, T. Laursen, V. Wu, M. Yen, A. Hall, S. D. Hansen, Y. Cheng, and T. Xu. Controlling styrene maleic acid lipid particles through raft. *Biomacromolecules*, 18(11):3706–3713, 2017
- 6 **H. E. Autzen** and M. Musgaard. Md simulations of p-type atpases in a lipid bilayer system. *Methods in Molecular Biology*, 1377:459–92, 2016
- 7 **H. E. Autzen**, I. Siuda, Y. Sonntag, P. Nissen, J. V. Moller, and L. Thogersen. Regulation of the ca(2+)-atpase by cholesterol: a specific or non-specific effect? *Molecular Membrane Biology*, 32(3):75–87, 2015
- 8 O. Sitsel, C. Gronberg, **H. E. Autzen**, K. Wang, G. Meloni, P. Nissen, and P. Gourdon. Structure and function of cu(i)- and zn(ii)-atpases. *Biochemistry*, 54(37):5673–83, 2015
- 9 K. Wang, O. Sitsel, G. Meloni, **H. E. Autzen**, M. Andersson, T. Klymchuk, A. M. Nielsen, D. C. Rees, P. Nissen, and P. Gourdon. Structure and mechanism of zn2+-transporting p-type atpases. *Nature*, 514(7523):518–22, 2014
- 10 H. Koldso[±], **H. E. Autzen**[±], J. Grouleff, and B. Schiott. Ligand induced conformational changes of the human serotonin transporter revealed by molecular dynamics simulations. *PLoS One*, 8(6):e63635, 2013
- 11 E. S. Paulsen, J. Villadsen, E. Tenori, H. Liu, D. F. Bonde, M. A. Lie, M. Bublitz, C. Olesen, **H. E. Autzen**, I. Dach, P. Sehgal, P. Nissen, J. V. Moller, B. Schiott, and S. B. Christensen. Watermediated interactions influence the binding of thapsigargin to sarco/endoplasmic reticulum calcium adenosinetriphosphatase. *Journal of Medicinal Chemistry*, 56(9):3609–19, 2013
- 12 D. Mattle, O. Sitsel, **H. E. Autzen**, G. Meloni, P. Gourdon, and P. Nissen. On allosteric modulation of p-type cu(+)-atpases. *Journal of Molecular Biology*, 425(13):2299–308, 2013
- 13 H. Qian[±] and **H. E. Autzen**[±]. A little engine that could: Atp-powered electrical battery and heater inside cells. *Biophysical Journal*, 103(7):1409–10, 2012
- 14 H. Koldso, P. Noer, J. Grouleff, **H. E. Autzen**, S. Sinning, and B. Schiott. Unbiased simulations reveal the inward-facing conformation of the human serotonin transporter and na(+) ion release. *PLoS Computational Biology*, 7(10):e1002246, 2011

PATENTS

Improved lipid nanodisc for studies of membrane proteins

Inventors: E. A. Appel, A. A. A. Smith, **H. E. Autzen**, Y. Cheng

SUPERVISION OF STUDENTS AND POSTDOCS

Supervision of two postdocs, one PhD student and one MSc student
Supervision of two rotation students in the Cheng Lab

October 2020-present
October 2018 - December 2019

TEACHING ACTIVITIES

Department of Biology, UCPH

Protein Chemistry & Enzymology I (BSc)
Protein Science & Enzyme Technology (BSc)
Protein Science A/C (BSc)
Principal Subjects in Protein Chemistry (MSc)

Lecturer
February 2020
- present

Department of Molecular Biology and Genetics, AU

Experimental Molecular Biology (BSc)
General Biochemistry (BSc)
General Molecular Biology (BSc)
Biomodelling (BSc)
Introduction to Medicinal Chemistry (BSc)

Teaching Assistant
January 2012
- May 2014

PERSONAL INTERESTS

Powerlifting: 3-lift total of 697 lbs (squat, bench and deadlift)