

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF MICROBIOLOGY AND IMMUNOLGY

Maria B. Sandkvist, Ph.D., associate professor of microbiology and immunology, with tenure, Department of Microbiology and Immunology, Medical School, is recommended for promotion to professor of microbiology and immunology, with tenure, Department of Microbiology and Immunology, Medical School.

Academic Degrees:

Ph.D.	1992	Umea University, Sweden
B.S.	1984	Umea University, Sweden

Professional Record:

2011 – present	Associate Professor of Microbiology and Immunology, University of Michigan
2005 – 2011	Assistant Professor of Microbiology and Immunology, University of Michigan
2004 – 2005	Assistant Professor of Internal Medicine, University of Maryland
2000 – 2005	Adjunct Assistant Professor, George Washington University
1999 – 2004	Scientist I, American Red Cross
1997 – 1999	Research Scientist, American Red Cross

Summary of Evaluation:

Teaching: Dr. Sandkvist has been involved in numerous classroom teaching activities at the University of Michigan. Most significantly, she has acted as the director of the instruction of microbiology courses to undergraduate, graduate and medical students since 2014. Since taking on this role, Dr. Sandkvist reorganized undergraduate microbiology teaching to accommodate the different interests of dental hygiene students and Literature Science and the Arts students. She has engaged in extensive teaching of microbiology in the courses she directs and has received strong scores on student evaluations. In recognition of her efforts in the teaching of undergraduate microbiology, Dr. Sandkvist received the Endowment for the Basic Sciences Teaching Award from the Medical School in 2018. In addition to her classroom teaching, Dr. Sandkvist has functioned as a research mentor for a number of trainees in her laboratory including one research investigator, two post-doctoral fellows, four Ph.D. students, three master's students and seven undergraduate students. As a testament to Dr. Sandkvist's mentoring skills, the majority of trainees from her laboratory currently hold academic positions at universities and government organizations or are involved in related health care industries. Dr. Sandkvist has also actively participated in the training of graduate students in other laboratories at the Medical School. Most notably, she has served on sixteen graduate student thesis committees and is currently a member of the operating committee of the Molecular Mechanisms of Microbial Pathogenesis training program in the Department of Microbiology and Immunology.

Research: Dr. Sandkvist's research is focused on the structure and function of the type II secretion system in gram-negative bacteria. This multi-protein complex is responsible for the secretion of multiple bacterial effector proteins that contribute to bacterial virulence and pathogenicity in host organisms. Her studies have concentrated mostly on the type II secretion system of *V. cholerae* that is the causative agent of cholera. She has been engaged in this research since her post-doctoral training period, and she is now widely considered a world authority on this system. Her studies of the type II secretion system in *V. cholerae* are considered seminal and they have provided a template for the understanding of the structure and function of type II secretion systems in other gram-negative bacterial

species. Most recently, Dr. Sandkvist has extended her studies of type II secretion in *V. cholerae* to another gram-negative bacterial pathogen, *A. baumannii*. Her work on type II secretion in *V. cholerae* and *A. baumannii* holds promise for the development of drugs that could be used for the treatment of infections caused by these species as well as by other gram-negative bacteria. Dr. Sandkvist has published more than 50 peer-reviewed articles, and a book on the topic of bacterial secretion systems. Her publications have been cited more than 3,700 times in the literature and she has an impressive h-factor citation index of 32. She holds one patent. Currently her research is supported by a National Institutes of Health R01 grant and a Department of Defense grant. Dr. Sandkvist has been invited to present her research on 14 occasions regionally, nationally and internationally.

Recent and significant publications:

Gadwal, S., Johnson, T.L., Remmer, H., and Sandkvist, M. C-terminal processing of GlyGly CTERM containing proteins by rhombosortase in *Vibrio cholerae*. *PLoS Pathogens* 14: e1007341, 2018.

Waack, U., Warnock, M., Yee, A., Huttinger, Z., Smith, S., Kumar, A., Deroux, A., Ginsburg, D., Mobley, H.L.T., Lawrence, D.A., and Sandkvist, M. CpaA is a Glycan-Specific Adamalysin-like Protease Secreted by *Acinetobacter baumannii* that Inactivates Coagulation Factor XII. *mBio* 9:e01606-18, 2018.

Waack, U., Johnson, T.L., Chedid, K., Xi, C., Simmons, L.A., Mobley, H.L.T., and Sandkvist, M. Targeting the Type II Secretion System: Development, Optimization, and Validation of a High-Throughput Screen for the Identification of Small Molecule Inhibitors. *Frontiers in Cellular and Infection Microbiology* 7:380, 2017.

Rule, C.S., Patrick, M., Camberg, J.L., Maricic, N., Hol, W.G., and Sandkvist, M. Zinc coordination is essential for the function and activity of the type II secretion ATPase EpsE. *Microbiologyopen*. 5:870-882, 2016.

Korotkov, K.V., Sandkvist, M., and Hol, W.G.J. The type II secretion system: biogenesis, molecular architecture and mechanism. *Nature Review Microbiology*, 10:336-351, 2012.

Service: Dr. Sandkvist has been an active member of the departmental graduate studies committee and has organized the departmental seminar series. At the institutional level, she served on the Biomedical Research Council. At national and international levels, she has served on the Tier 1 Canada Research Chair grant committee, is a grant reviewer for the French National Research Agency, the Swiss National Science Foundation, and the Royal Society of New Zealand. Dr. Sandkvist is a study section reviewer for the NIH and National Science Foundation. She has been a member of the review panel and program panel for Discovery applications for the Congressionally Directed Medical Research Program in 2017 and 2019. Dr. Sandkvist is an editorial board member of the *Journal of Bacteriology* and is an ad hoc reviewer for 30 journals.

External Reviewers:

Reviewer A: "In considering the criteria that the University of Michigan uses in the appointment of faculty members to the position of Professor, I should emphasize that Maria not only made outstanding discoveries early in her career, but has continued to make important contributions to our understanding of type II secretion (and performed some of her best work) since she received tenure. ... Based on her sustained record of success and strong commitment to microbiology research, I am confident that she will continue on an upward trajectory and will continue to make major contributions to the field for many years to come."

Reviewer B: "...I find that she has excelled in the areas of research, teaching, and organization commitment, consistent with the instructional track with ongoing achievement since she was promoted to Associate Professor with Tenure in 2011. She has both national and international recognition for her research accomplishments and is well deserving of promotion to Professor...Dr. Sandkvist is the recognized world leader in T2SS in *Vibrio cholerae* and her name is synonymous with the field. Her work across three decades in this system has defined the field."

Reviewer C: "In reviewing the record of a candidate for promotion to full professor, it is always important to see that they have maintained their level of productivity since their previous promotion to associate professor. I am very pleased to see that Maria has maintained and increased her productivity since her last promotion. She currently holds two large grants, an R01 from NIH and a grant from the DOD. Since her last promotion she also held an R21 and an R56 as PI."

Reviewer D: "In brief, she is an outstanding candidate for this promotion, surpassing the requirements set forth by the University of Michigan Medical School...In short, Dr. Sandkvist is truly deserving of this promotion."

Reviewer E: "The field of microbial pathogenesis acknowledges her as a successful, motivated and creative colleague and I concur with this thinking. Dr. Sandkvist serves as an ideal example of an accomplished and productive scientist that deserves to be recognized as full professor at a prestigious institute, such as University of Michigan Medical School."

Reviewer F: "Dr. Sandkvist is an outstanding scientist who has had a sustained impact on the field and is fully deserving of promotion...In conclusion, Dr. Sandkvist is an outstanding scientist and internationally recognized researcher with an impressive and impactful scientific record. She is well regarded, collaborative, and a leader in the field...I am certain that Dr. Sandkvist will maintain her strong record of scientific discovery and innovation, and will continue to attract recognition to the Department of Microbiology and Immunology at the University of Michigan."

Summary of Recommendations:

Dr. Sandkvist has distinguished herself as an outstanding researcher on Type II secretion from *Vibrio cholerae*, which is important for its pathogenicity. She has achieved international renown for her advances in this field. I am please, therefore, to recommend Maria B. Sandkvist, Ph.D. for promotion to professor of microbiology and immunology, with tenure, Department of Microbiology and Immunology, Medical School.



Marschall A. Runge, M.D., Ph.D.
Executive Vice President for Academic Affairs
Dean, Medical School

May 2020