Approved by the Regents
May 21, 2020

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

Nicole Koropatkin, Ph.D., assistant professor of microbiology and immunology, Department of Microbiology and Immunology, Medical School, is recommended for promotion to associate professor of microbiology and immunology, with tenure, Department of Microbiology and Immunology, Medical School.

Academic Degrees:

Ph.D.	2004	University of Wisconsin
B.S.	1998	Pennsylvania State University

Professional Record:

2014 – present	Assistant Professor of Microbiology and Immunology, University of Michigan
2009 – 2013	Research Assistant Professor, Department of Microbiology and Immunology, University of Michigan
2006 – 2009	Research Scientist I, Donald Danforth Plant Science Center, St. Louis, Missouri

Summary of Evaluation:

Teaching: Dr. Koropatkin is an enthusiastic and valued educator in the Department of Microbiology and Immunology. As an assistant professor, she has taught microbiology to several different student cohorts, including undergraduates at the College of Literature, Science, and the Arts in Microbiology 430, masters students in the School of Public Health in Epidemiology 505, and first year medical students in the Infectious Diseases sequence. Dr. Koropatkin is the director of Microbiology 430. Students appreciate her dedication to education, and she is recognized as an effective communicator. In addition to her classroom teaching, she has mentored undergraduate students through her active participation in Undergraduate Research Opportunity Program, masters and Ph.D. graduate students, and post-doctoral fellows in her laboratory. All of those that have graduated from her laboratory, have continued to pursue academic research careers. Outside of her laboratory, Dr. Koropatkin has served on seventeen national and international thesis committees. Recently, she was appointed as the associate director of the Program in Biomedical Sciences (PIBS) of the Medical School. This appointment was in part based upon student recommendation, thus providing further evidence of the recognition by students of Dr. Koropatkin's commitment to graduate education.

Research: Dr. Koropatkin's research is focused on the molecular basis of bacterial nutrient uptake. Her research program investigates the molecular machinery employed by human gut bacteria to capture carbohydrates (glycans) that transit the colon. Her research group performs detailed biochemical and structure and function studies of the glycan uptake systems of *Bacteroides thetaiotaomicron* and other Bacteroidetes that define the ability of bacteria to thrive and persist in the host environment. Her work as a post-doctoral fellow and research assistant professor

collectively established the Sus-like paradigm for glycan uptake by Bacteroidetes. She has continued this line of study and uncovered different roles for the SusD-like and SusE/F-like proteins for the capture of glycans. This has led to the establishment of a model of how these glycan uptake systems coordinate glycan-binding and cellular uptake. Another research direction in her laboratory is focused on a mechanistic understanding of starch degradation by human gut bacteria. Starch resistant to human enzymatic digestion has many health benefits but requires specific combinations of bacteria for its breakdown. Her laboratory is working to reveal the molecular details of starch-degrading enzymes in these organisms. Dr. Koropatkin has published more than 45 peer-reviewed articles. Her research is supported by funding from the National Institutes of Health, the Department of Defense and institutional grants. She has been invited to present her research on 29 occasions regionally, nationally and internationally, and is the co-chair elect of the 2021 Gordon Research Conference on Carbohydrate-Active Enzymes for Glycan Conversions.

Recent and significant publications;

Cockburn DW, Orlovsky NI, Foley MH, Kwiatkowski KJ, Bahr CM, Maynard M, Demeler B, Koropatkin NM: Molecular details of a starch utilization pathway in the human gut symbiont *Eubacterium rectale*. *Mol. Microbiol.* 95(2): 209-30, 2015.

Tauzin AS, Kwiatkowski KJ, Orlovsky NI, Smith CJ, Creagh AL, Haynes CA, Wawrzak Z, Brumer H, Koropatkin NM: Molecular dissection of xyloglucan recognition in a prominent human gut symbiont. *mBio* 7(2): e02134-15, 2016.

Cockburn DW, Suh C, Medina KP, Duvall RM, Wawrzak Z, Henrissat B, Koropatkin NM: Novel carbohydrate binding modules in the surface anchored α-amylase of *Eubacterium rectale* provide a molecular rationale for the range of starches used by this organism in the human gut. *Mol Microbiol* 107(2): 249-264, 2018.

Foley MH, Martens EC, and Koropatkin NM: SusE facilitates starch uptake independent of starch binding in *B. thetaiotaomicron*. *Mol Microbiol.* 2018 Jun;108(5):551-566. doi: 10.1111/mmi.13949. PMID: 29528148

Baxter N, Lesniak NA, Sinani H, Schloss PD, Koropatkin NM: The glucoamylase inhibitor acarbose has a diet-dependent and reversible effect on the murine gut microbiome. *mSphere* 2019 Feb 6; 4(1) pii: e00528-18.

Service: Dr. Koropatkin is currently the co-chair and will take over as chair next year of the departmental graduate studies committee. She is serving on the departmental Diversity, Equity and Inclusion committee, administers the post-doctoral travel awards for the department, and is the departmental Graduate Program Mental Health Ally for trainees. Institutionally, she is the associate director of PIBS and serves on the Post-baccalaureate Research Experience Program (PREP) admissions committee. She has organized and participated in multiple science outreach activities on campus and in the state. Nationally and internationally, she has served on several different grant review panels as an ad hoc member, and she is serving on the editorial boards of three microbiological research journals and has performed ad hoc review service for numerous

other journals. Each of these activities provides further evidence of Dr. Koropatkin's standing in her field.

External Reviewers:
Reviewer A: "It is not at all an exaggeration to state that Dr. Koropatkin's work has contributed as much as anyone's if not more to our understanding of the structural basis of polysaccharide degradation and utilization by human gut symbionts and their environmental relatives… Dr. Koropatkin's research is of the highest quality and impact and all the pieces are in place for her career to continue on an upward trajectory. I have absolutely no hesitation in highly recommending her for the rank of Associate Professor with tenure and I am certain that she would be promoted to this rank at my institution."

Reviewer B: "…Dr. Koropatkin has successfully excelled as a faculty member with respect to scholarly output, NIH funding, and she has established both a national and international reputation. It is easy to foresee Nicole continuing an upward trajectory and continuing to establish herself and her lab as a leader in carbohydrate microbiology."

Reviewer C: "…Dr. Koropatkin's research into the gut microbes of great importance to human health. Her findings opening avenues for others to follow. She has made important contributions to the field and, based on her recent work, I predict that she will continue to push the field forward."

Reviewer D: "This interdisciplinary mindset and fluidity in scientific approaches is a signature of the high-quality work emerging from Dr. Koropatkin's laboratory…the package that Dr. Koropatkin has been able to assemble in her time at the University of Michigan is outstanding."

Reviewer E: "Already, at this early stage of her career, Professor Koropatkin has made critical contributions to the field of carbohydrate utilization by gut microorganisms…Professor Koropatkin's impressive publication record and successful track record securing competitive research grants is consistent with her strong international reputation."

Reviewer F: "In short, Dr. Koropatkin has demonstrated a truly exceptional track record of productivity with respect to her publications, and is the pioneer in her field…In summary, scientifically, Dr. Koropatkin is exceptional and is richly deserving of promotion to Associate Professor with tenure."

Reviewer G: "Her science is characterized by lucidity and novelty and is filling a significant gap in understanding the microbes that inhabit our gastrointestinal tract…Beyond the scientific brilliance, Nicole is a genuine, upbeat, and caring person – exactly the type of faculty that should be promoted and supported at top-tier universities."

Reviewer H: "The combination of her research productivity, teaching, and service make it clear that she has earned a national reputation as an exceptional scientist. She is highly respected by her peers and has a solid reputation in the international community. In comparison to others in Nicole's peer group who are working in the same field, I would say she readily surpasses her peers."

Summary of Recommendation:
Dr. Koropatkin has distinguished herself as an outstanding researcher who has earned the respect of her peers in the field and the admiration of her Michigan colleagues. She is a leader and internationally recognized and respected expert in a highly competitive and important field of research. She is clearly an internationally recognized and respected expert in her field. I am pleased, therefore, to recommend Nicole Koropatkin, Ph.D. for promotion to associate professor of microbiology and immunology, with tenure, Department of Microbiology and Immunology, Medical School.

Marschall S. Runge, M.D., Ph.D.
Executive Vice President of Medical Affairs
Dean, Medical School

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