

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF PEDIATRICS
DEPARTMENT OF MOLECULAR AND INTEGRATIVE PHYSIOLOGY

Kanakadurga V.N. Singer, M.D., assistant professor of pediatrics, Department of Pediatrics, and assistant professor of molecular and integrative physiology, Department of Molecular and Integrative Physiology, Medical School, is recommended for promotion to associate professor of pediatrics, with tenure, Department of Pediatrics, and associate professor of molecular and integrative physiology, without tenure, Department of Molecular and Integrative Physiology, Medical School.

Academic Degrees:

M.D.	2006	University of Michigan
M.A.	2002	Johns Hopkins University
B.A.	2002	Johns Hopkins University

Professional Record:

2019-present	Assistant Professor of Molecular & Integrative Physiology, University of Michigan
2014-present	Assistant Professor of Pediatrics, University of Michigan
2012-2014	Clinical Lecturer of Pediatrics, University of Michigan

Summary of Evaluation:

Teaching: Dr. Singer serves as teacher and mentor to individuals at all levels across the University. She has given a variety of lectures to pediatric residents, pediatric and adult endocrinology fellows, and within the larger local pediatric community. She has taught medical students, pediatric residents and pediatric endocrinology fellows in both formal and informal settings. Her instruction focuses on diagnosis, management, and care of children with diabetes and other endocrinopathies. She also provides education on ethical issues in medicine. Dr. Singer has mentored 15 undergraduate students, three graduate students, one resident and four fellows. She has served on five dissertation committees. She has served on several educational committees for faculty, including the Advancing Inclusive Leadership Committee, and has participated in Diversity, Equity and Inclusion peer mentoring and sessions on career development. She has developed a session on Identity and Authority in conjunction with the Center for Research on Learning and Teaching. She is the associate director for the graduate program in Immunology.

Research: Dr. Singer's area of research focuses on how high fat diets alter the production of pro-inflammatory leukocytes that drive tissue dysfunction in obesity and the implications of this immune system activation in obese children. The three main areas of her work include hematopoiesis and the generation of activated myeloid cells in obesity, sex differences in obesity responses, and the impact of obesity on inflammation, bone density and metabolic risk in children. Dr. Singer has developed critical and novel paradigm-shifting insights into

myelopoiesis and sex-differences in inflammation and obesity for which she has gained national recognition. She has been well funded through the American Heart Association, the National Institutes of Health, foundation and institutional grants. She is establishing herself as a translational researcher with projects focusing on the impact of childhood obesity on inflammation and diabetes induced inflammation on complications such as retinopathy. She served on the National Institutes of Health Early Career Reviewer Program, Molecular and Cellular Endocrinology Study Section, and currently serves as an editorial board member for *Clinical Medicine Insights: Endocrinology and Diabetes*. She is a review editor for *Frontiers in Endocrinology*, and is a consulting editor for *JCI Insight*. Dr. Singer is also actively engaged in research collaborations with several members of the Department of Molecular and Integrative Physiology as well as the reproductive physiology program. She has published more than 40 peer-reviewed articles in premier journals of endocrinology including the *Journal of Biological Sciences*, *Endocrinology*, and *Diabetes*. Dr. Singer has been invited to present her research on 25 occasions regionally, nationally and internationally.

Recent and Significant Publications:

Griffin C, Hutch CR, Abrishami S, Stelmak D, Eter L, Li Z, Chang E, Agarwal D, Zamarron B, Varghese M, Subbaiah P, MacDougald OA, Sandoval DA, Singer K: Inflammatory responses to dietary and surgical weight loss in male and female mice. *Biol Sex Differ* 10(1): 16, 2019.

Griffin C, Eter L, Lanzetta N, Abrishami S, Varghese M, McKernan K, Muir L, Lane J, Lumeng CN, Singer K: TLR4, TRIF, and MyD88 are essential for myelopoiesis and CD11c⁺ adipose tissue macrophage production in obese mice. *J Biol Chem* 293(23): 8775-8786, 2018.

Varghese M, Griffin C, McKernan K, Eter L, Lanzetta N, Agarwal D, Abrishami S, Singer K: Sex differences in inflammatory responses to adipose tissue lipolysis in diet-induced obesity. *Endocrinology* 160(2): 293-312, 2018.

Singer K, Maley N, Mergian T, DelProposto J, Cho KW, Zamarron BF, Martinez-Santibanez G, Geletka L, Muir L, Wachowiak P, Demirjian C, Lumeng CN: Differences in hematopoietic stem cells contribute to sexually dimorphic inflammatory responses to high fat diet-induced obesity *Journal of Biological Chemistry* 290(21): 13250-13262, 2015.

Singer K, DelProposto J, Morris DL, Zamarron B, Mergian T, Maley N, Cho KW, Geletka L, Subbaiah P, Muir L, Martinez-Santibanez G, Lumeng CN. Diet-Induced Obesity Promotes Myelopoiesis in Hematopoietic Stem Cells. *Molecular Metabolism*. September 3 (6) 664-675, 2014.

Service: Dr. Singer provides excellent clinical care focused on improved management for her patients living with obesity, diabetes and endocrine complications. Her commitment to the fields of pediatrics and endocrinology, and her support for women and minorities in biomedical science, have led to her involvement with national committees including as a committee member of the Endocrine Society Hormone Health Network and as member of the Pediatric Endocrine Society Research Affairs Committee. Dr. Singer received the Endocrine Society Early Investigators Award, Women in Endocrinology Young Investigator Award, and the Women's Interprofessional Network of the American Diabetes Association Abstract Award for her

research on sex as a biological variable in diabetes. Institutionally, she serves on the Women's Interprofessional Network for the American Diabetes Association and is a board member for ADVANCE. Dr. Singer is a member of the Dean's Task Team on Professional Development and the Research Strategic Planning People Group.

External Reviewers:

Reviewer A: "There are very few [junior] scientists working in the field of meta-inflammation at the basic and translational level in pediatrics as exceptional as Dr. Singer. In my view, Dr. Singer is among the top 5% of pediatric scientist working in the field of the inflammation and metabolism."

Reviewer B: "Dr. Singer's research has revolved around the role of obesity-induced inflammation on myelopoiesis and the sexual dimorphism of metabolic disease in animal models as well as in humans. She is considered an expert in this niche area of obesity investigation that has critical implications for public health. Her work has been innovative, focused, prolific and impactful. In recognition of her excellent scientific trajectory, she was awarded an R01 to continue her research in the area of the role of androgens in obesity-induced inflammation."

Reviewer C: "Furthermore, it [sic] was clear to me that Dr.[.] Singer had the intellectual drive and tenacity to emerge as an independent investigator. Indeed, her CV provides clear evidence of her consistent record of publication in high quality journals and success in winning both career development and NIH RO1 funding in her time as a fellow and Assistant Professor. Dr. Singer's research has made consistent and substantial achievements expected of a creative and dedicated clinician-scientist... In fact, I believe that Dr. Singer is one of the top adipose biology/obesity researchers in her cohort. Few of the others that come to mind also actively engage in translational research and also take leadership positions in the pediatric clinic. Dr. Singer Iso [sic] actively participates in peer review on the local and national levels."

Reviewer D: "Durga is a pioneer in research involving sex differences in metabolism and obesity and is nationally known as a leader in this area. She has published in excellent journals including, Molecular Metabolism, Endocrinology, Journal of Biological Chemistry, and Journal of Pediatrics. Durga's research at the forefront of this field has led to invitations to present her work at meetings of the Pediatric Endocrine Society, and the Endocrine Society and several top tier institutions in addition to Vanderbilt including Johns Hopkins, Columbia, Indiana University and Baylor. I anticipate that Durga will continue to be a leader in our understanding of sex as a biological variable in obesity and metabolism. I look forward to her becoming even more of a driving force nationally and internationally."

Reviewer E: "Her research has been innovative and impactful, and she has combined her laboratory and clinical research with service work supporting women scientists...Durga's work has been recognized as she now serves on a medical school committee for Advancing Inclusive Leadership and is her Departmental lead for gender focused diversity, equity and inclusion activities. Most recently, she was recognized for this work with a nomination to the American Diabetes Association Women's Interprofessional Network Advisory Board. This national recognition by researchers in our field demonstrates the quality of this service work that she is engaged in."

Reviewer F: “In reviewing Dr. Singer’s curriculum vitae, I am also very impressed with her success with grants, her superb productivity, and the extent of mentoring she has been able to achieve at this early stage of her career (as well as the success of her mentees in their careers). It is to her credit that she has been able to smoothly make the K-to-R transition without any gap in funding... Her findings have been published in high impact journals including Endocrinology, Journal of Biological Chemistry, Molecular Metabolism, Journal of Clinical Endocrinology and Metabolism, PLoS One, Diabetes and others. She has published 40 peer reviewed papers, of which 10 are first authored and 10 are senior authored. She has written two book chapters and one non-peer reviewed paper. This is a very reasonable body of work at this stage of her career.”

Reviewer G: “Her work demonstrated the role of obesity on inflammation and highlighted the sex differences in metabolic inflammation associated with obesity, findings that are the bases of her R-01 aimed at studying the role of androgens in driving the sex differences in obesity induced hematopoiesis. These findings are especially important considering the growing epidemic of obesity. In addition to NIH funding, Dr. Singer is the Taubman Emerging Scholar, and has successfully competed for and has completed many grants... Of note, she received the Women in Endocrinology Young Investigator Award in 2018.”

Reviewer H: “Research impact and innovation: Dr[.] Singer is an impeccably trained and highly productive and innovative translational physician scientist. Her accomplishments are robust and sustained including 40 publication [sic] since 2005, 21 as first or senior author, 30 since promotion to Assistant Professor in 2014. She has clearly developed her own niche with expertise on sex and gender differences in adipose inflammation in obesity.”

Summary of Recommendations:

Dr. Singer is a well-balanced physician scientist with clear and documented strengths in all areas of teaching, research and service. In teaching, she is well respected by trainees in both the clinical and research settings. In research, she has demonstrated her transition to independence in moving from mentored to independent national research support and is making important contributions in the field of childhood obesity, diabetes and related inflammation, with a strongly upward trajectory. I am pleased, therefore to recommend Kanakadurga V.N. Singer, M.D. for promotion to associate professor of pediatrics, with tenure, Department of Pediatrics, and associate professor of molecular and integrative physiology, without tenure, Department of Molecular and Integrative Physiology, Medical School.



Marschall S. Runge, MD, PhD
Executive Vice President for Medical Affairs
Dean, Medical School

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