Approved by the Regents
May 19, 2016

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF INTERNAL MEDICINE
MEDICAL SCHOOL AND COLLEGE OF ENGINEERING
DEPARTMENT OF BIOMEDICAL ENGINEERING

Muneesh Tewari, M.D., Ph.D., associate professor of internal medicine, with tenure, Department of Internal Medicine, Medical School, and associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, Medical School and College of Engineering, is recommended for promotion to professor of internal medicine, with tenure, Department of Internal Medicine, Medical School, and professor of biomedical engineering, without tenure, Department of Biomedical Engineering, Medical School and College of Engineering.

Academic Degrees:

M.D.	1997	University of Michigan
Ph.D.	1997	University of Michigan
B.A.	1990	Case Western Reserve University

Professional Record:

2014-present	Associate Professor of Internal Medicine and Associate Professor of Biomedical Engineering, University of Michigan
2012-2014	Associate Professor of Medicine, University of Washington, Seattle, WA
2008-2012	Assistant Professor of Medicine, University of Washington, Seattle, WA
2002-2005	Instructor in Medicine, Harvard Medical School

Summary of Evaluation:

Teaching: Dr. Tewari has a significant role instructing research trainees in his laboratory. His collaborations at the University of Michigan have provided opportunities to teach not only the fundamentals of conducting research but also how to conduct cross-disciplinary research. Dr. Tewari strives to impart the importance of communicating effectively with collaborators with drastically different academic backgrounds, scientific worldviews, and technical vocabularies. In addition to his teaching in the lab, Dr. Tewari presents local, national, and international invited lectures as well as providing clinical fellow and medical resident teaching at the Ann Arbor VA Hospital. He has given didactic lectures on systems biology for a graduate level course, serves on two thesis committees, and provides informal mentoring of junior faculty at the University of Michigan and at the University of Washington.

Research: Before joining the University of Michigan faculty, Dr. Tewari gained much recognition for his innovative and impactful research on the biology of circulating, cell-free

microRNAs and translational applications. This research spawned a new field of disease biomarker research and his move to the University of Michigan was inspired by his desire to pursue the cross-disciplinary research needed to develop a next generation, broadly transformative approach to disease detection and monitoring that will involve "real-time" disease monitoring in the home. During his first 18 months here, he has attracted diverse faculty collaborators for this program including researchers from the Medical School, College of Literature, Science, and the Arts, the School of Public Health, and the College of Engineering. These collaborations led to a recently published paper in *Nature Biotechnology*, one additional paper in press, and seven collaborative grant applications. Dr. Tewari currently serves as the principal investigator (PI) on two NIH grants, as well as a co-principal investigator on a grant from the Department of Defense and a Consortium PI on a third NIH grant. Since coming to the University of Michigan, he has published seven peer-reviewed publications, two as senior author. Dr. Tewari also provides peer-review for multiple journals including *Cancer Research*, *Cancer Discovery*, *Nature Medicine*, *Nature Reviews Cancer*, *Nature Methods*, and others. Additionally, Dr. Tewari was elected to the American Society for Clinical Investigation in 2015.

Recent and Significant Publications:

Wyman SK, Knouf EC, Parking RK, Fritz BR, Lin DW, Dennis LM, Krouse MA, Webster PJ, Tewari M: Post-transcriptional generation of miRNA variants by multiple nucleotidyl transferases contributes to miRNA transcriptome complexity. *Genome Res* 21:1450-1461, 2011.

Arroyo JD, Chevillet JR, Kroh EM, Ruf IK, Pritchard CC, Gibson DF, Mitchell PS, Bennett CF, Pogosova-Agadjanyan EL, Stirewalt DL, Tait JF, Tewari M: Argonaute2 complexes carry a population of circulating microRNAs independent of vesicles in human plasma. *Proc Natl Acad Sci U S A* 108:5003-5008, 2011.

Pritchard CC, Kroh E, Wood B, Arroyo JD, Dougherty KJ, Miyaji MM, Tait JF, Tewari M: Blood cell origin of circulating microRNAs: a cautionary note for cancer biomarker studies. *Cancer Prev Pres (Phila)* 5:492-497, 2012.

Hindson CM, Chevillet JR, Briggs HA, Gallichotte EN, Ruf IK, Hindson BJ, Vessella RL, Tewari M: Absolute quantification by droplet digital PCR versus analog real-time PCR. *Nat Methods* 10:1003-1005, 2013.

Chevillet JR, Kang Q, Ruf IK, Briggs HA, Vojtech LN, Hughes SM, Cheng HH, Arroyo JD, Meredith EK, Gallichotte EN, Pogosova-Agadjanyan EL, Morrissey C, Stirewalt DL, Hladik F, Yu EY, Higano CS, Tewari M: Quantitative and stoichiometric analysis of the microRNA content of exosomes. *Proc Natl Acad Sci U S A* 111:14888-14893, 2014.

Service: Dr. Tewari is involved in institutional service activities including the Hematology/Oncology Fellowship Selection Committee as well as the Biointerfaces Institute (BI) Marketing Committee. On the national level, Dr. Tewari is an active member of the American Association of Cancer Research as well as the American Society for Clinical Investigation. He is currently serving on the NIH Common Fund Extracellular RNA Consortium Steering Committee, and has served on numerous National and International Grant Review

Panels. In addition to his service, research, and teaching activities, Dr. Tewari serves as an attending physician at the Ann Arbor VA Medical Center on the Oncology consult service. While on service, he is responsible for providing subspecialty consultation in medical oncology for most solid tumor patients admitted to the hospital, as well as for many inpatients undergoing diagnostic workup for suspicion of cancer.

External Reviewers:

Reviewer A: "...he is an internationally recognized leader in the field of microRNA biology and specifically in circulating microRNAs....He is a giant in our field. I refer to Dr. Tewari's papers on the subject as the most outstanding contributions to the field at this time. Not only was he one of the first in the world to recognize the importance of these circulating molecules, he also has developed very elegant experiments to define their existence and their stability in plasma and serum....He is a leading authority worldwide on circulating microRNAs and is regarded to be among the best cancer biologists in the country."

Reviewer B: "He is in the search of new fields of investigation with clear translational implications for patients, and has developed a successful scientific career in his main areas of interest: extracellular microRNAs and other non-codingRNA and cancer. This is very innovative research and Dr. Tewari was able to generate outstanding scientific contributions, as he is a pioneer in microRNAs profiling in plasma samples."

Reviewer C: "...his work as a faculty member has been first-rate and high-impact and has garnered him a national and international reputation as an intellectual and scientific leader in the area of extracellular microRNAs in cancer....As an independent faculty member, Dr. Tewari has earned a reputation as an original thinker and innovator who publishes work of rigorously high-quality."

Reviewer D: "Based on his teaching duties, his participation in thesis committees, the number of trainees in his lab and the fact that several person [sic] from his lab have gone on to a professional career, I believe that he is doing very well in training and mentoring. He has also performed significant peer-review activities for journal and funding agencies and has arranged international meetings for organizations such as the American Association of Cancer Research."

Reviewer E: "He had strong training in fundamental cell, molecular, systems, and computational biology, a top-notch fellowship at Dana-Farber, substantial published productivity, an enviable record of intramural and extramural funding, a strong record of teaching and mentoring, recognition in the form of multiple invited presentations, and national and international service as a reviewer."

Reviewer F: "...the work of Dr. Muneesh Tewari has profoundly enhanced our knowledge of the microRNA content of exosomes and greatly assists those working in the fields of circulating RNAs as biomarkers of disease, basic exosome biology and drug delivery applications of exosomes. Dr. Tewari published thorough, clear and insightful papers on this subject. In addition to the novel hypothesis tested in his work, his studies also utilize technically difficult assays including conventional and digital droplet qPCR. Data generated from such assays often

requires careful scrutiny by the reader, however in the case of Dr. Tewari's work he is often setting the standard that others will use for their own work."

Summary of Recommendation:

Dr. Tewari is a dedicated teacher, passing on his enthusiasm for research to his mentees and students. He has an international reputation for his scholarly work and is seen by his peers as the expert on circulating microRNAs. I strongly support Muneesh Tewari, M.D., Ph.D. for promotion to professor of internal medicine, with tenure, Department of Internal Medicine, Medical School, and professor of biomedical engineering, without tenure, Department of Biomedical Engineering, Medical School and College of Engineering.

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

David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering

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