

PROMOTION RECOMMENDATION  
THE UNIVERSITY OF MICHIGAN  
MEDICAL SCHOOL  
DEPARTMENT OF INTERNAL MEDICINE  
DEPARTMENT OF CELL AND DEVELOPMENTAL BIOLOGY

Jason R. Spence, Ph.D., assistant professor of internal medicine, Department of Internal Medicine, and assistant professor of cell and developmental biology, Department of Cell and Developmental Biology, Medical School, is recommended for promotion to associate professor of internal medicine, with tenure, Department of Internal Medicine, and associate professor of cell and developmental biology, without tenure, Department of Cell and Developmental Biology, Medical School.

Academic Degrees:

Ph.D.	2006	Miami University, Oxford, OH
B.S.	2001	Canisius College, Buffalo, NY

Professional Record:

2012-present	Assistant Professor of Cell and Developmental Biology, University of Michigan
2011-present	Assistant Professor of Internal Medicine, University of Michigan
3/2011-9/2011	Assistant Professor, Division of Gastroenterology, Hepatology and Nutrition, Cincinnati Children's Hospital

Summary of Evaluation:

Teaching: Dr. Spence is extremely active in teaching and mentoring. He has provided a number of didactic lectures in Cell and Developmental Biology courses and through the Center for Organogenesis. In 2013, he became the co-director for CDB 680, "Organogenesis of Complex Tissues," and was involved in extensive curriculum redesign resulting in the course CDB 582, "Stem Cells in Organogenesis and Regenerative Medicine," which now focuses on scientific writing and grant proposal development throughout the semester. Additionally, Dr. Spence provides extensive laboratory based research mentoring for undergraduate students, graduate students, and post-doctoral fellows. His trainees have been highly successful in obtaining fellowship funding, travel awards, publishing their work, and presenting at national and international meetings. Dr. Spence also serves on several dissertation committees, and interviews prospective graduate students for the PIBS Program, and candidates for the Medical Scientist Training Program. He is committed to the training of future generations of scientists, and serves on the Graduate Admissions Committee for Department of Cell and Developmental Biology, as a faculty member for the Program in Cellular and Molecular Biology, and as a faculty mentor for the NIH training grants "Training in Basic and Translational Digestive Sciences," "Training Program in Organogenesis," and "Tissue Engineering at Michigan (TEAM)."

Research: Dr. Spence's research focuses on the use of human pluripotent stem cells to generate novel human organoid models. Building on the techniques he developed as a post-doctoral fellow, he has used intestinal organoid models to study human development, tissue maturation and host-pathogen interactions. His laboratory has also been involved in the development of human lung organoids and stomach organoids, and has trained investigators from several laboratories in organoid

technology. Dr. Spence has an outstanding track record of funding, and is currently the PI on four NIH grants, including a K01, two R01s, a U01, and a U19. As his work is highly collaborative, he is also a co-investigator on four additional grants. He has 28 peer-reviewed publications, with 15 in the time he has been at the University of Michigan, and his work has been published in top-tier journals, including *Nature*, *Nature Medicine*, *Cell Reports* and *PNAS*. Evidence of Dr. Spence's national recognition can be seen in his extensive peer-review service for numerous journals and study sections, including the NIH-NIDDK Intestinal Stem Cell Consortium Special Review Panel, and his many invitations for extramural presentations. In 2013, he was named as an American Gastroenterological Association/Gastrointestinal Research Group Scholar.

#### Recent and Significant Publications:

Rockich BE, Hrycaj SM, Shih H-P, Nagy MS, Ferguson MAH, Kopp JL, Sander M, Wellik DM, Spence JR: Sox9 plays multiple roles in the lung epithelium during branching morphogenesis. *Proc Natl Acad Sci USA* 110:E4456-4464, 2013.

Chen Y-J, Finkbeiner SR, Weinblatt D, Emmett MJ, Tameire F, Yousefi M, Yang C, Maehr R, Zhou Q, Shemer R, Dor Y, Li C, Spence JR, Ben Z Stanger. De novo formation of insulin-producing "Neo- $\beta$  cell islets" from intestinal crypts. *Cell Rep* 6:1046-1058, 2014.

Leslie JL, Huang S, Opp JS, Nagy MS, Kobayashi M, Young VB, Spence JR: Persistence and toxin production by *Clostridium difficile* within human intestinal organoids results in disruption of epithelial paracellular barrier function. *Infect Immun* 83:138-145, 2015.

Finkbeiner SR, Hill DH, Altheim CH, Dedhia PH, Taylor MJ, Tsai YH, Chin AM, Mahe MM, Watson CL, Freeman JJ, Nattiv R, Thomson M, Klein OD, Shroyer NF, Helmuth MA, Teitelbaum DH, Dempsey PJ, Spence JR: Transcriptome-wide analysis reveals hallmarks of human intestine development and maturation *in vitro* and *in vivo*. *Stem Cell Rep* 4:1140-1155, 2015.

Dye BR, Hill DR, Ferguson MAH, Nagy MS, Tsai YH, Dyal R, Wells JM, Mayhew CN, Nattiv R, Klein OD, White ES, Deutsch GH, Spence JR: *In vitro* generation of human pluripotent stem cell derived lung organoids. *eLife* 4:doi:10.7554/eLife.05098., 2015.

Service: Dr. Spence serves as the director of the University of Michigan Center for Gastrointestinal Research Organoid Technology Core, and as a member of the Human Pluripotent System Cell Research Oversight Committee. He was a member of the Organizing Committee for the Center for Organogenesis 9<sup>th</sup> Annual International Symposium in 2013, and for the Department of Cell and Developmental Biology, he served on the Graduate Admissions Committee (2014-2015), the Awards Committee (2013-2014) and the Seminar Organizing Committee (2012-2013). Extramurally, he was a member of the Organizing Committee for the 2015 Society for Developmental Biology Midwest Regional Meeting. Dr. Spence is also active both nationally and internationally in peer-review service, and has been an ad hoc grant reviewer for the French National Research Agency, the Wellcome Trust (United Kingdom), the Science Foundation of Ireland, and the European Research Council.

#### External Reviewers:

Reviewer A: "Jason is, without a doubt, an emerging international leader in human pluripotent stem cell biology applying the principles of developmental biology to the directed differentiation of these

cells to derivative tissues, specifically lung and intestine....I am convinced that Jason will have a very successful academic career and establish himself as a leader in modeling human development and disease with stem cell biology.”

Reviewer B: “...it looks as though Jason is doing exceedingly well at Michigan, increasing his stature from his incredibly strong start in 2011 and building a strong, independent, well-funded research program that is a credit to the institution. He is the unrivaled expert in iPSC-derived intestine organoids and is a world expert in organoids from lungs as well...”

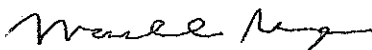
Reviewer C: “Jason is a highly innovative stem cell researcher and has made multiple seminal contributions to the intestinal stem cell field. I would certainly put him in the top 5% of all GI/stem cell researchers and feel that his current trajectory will move him further towards the top of his field.”

Reviewer D: “Dr. Spence continued to collaborate with a number of other groups that use the intestinal organoid technique that he pioneered as a postdoc, which led to a number of high profile publications for which he is a co-author. I expect that these publications will keep Dr. Spence at the forefront of intestinal organoid research.”

Reviewer E: “He is certain to have real impact in advancing our understanding of these processes which are critically important to fundamental understanding that is necessary if we are to develop artificial organs, including but not limited to lungs, from inducible pluripotential stem cells...Dr. Spence is an outstanding investigator with incredible upside potential despite his already significant accomplishments. I expect that he would easily be promoted to Associate Professor with tenure at any leading institution in the world...”

Summary of Recommendation:

Dr. Spence is recognized as an expert in the area of the use of human pluripotent stem cells to generate novel human organoid models. He is also a committed teacher and mentor, and is active in service at both the institutional and extramural levels. Therefore, I enthusiastically recommend Jason R. Spence, Ph.D. for promotion to associate professor of internal medicine, with tenure, Department of Internal Medicine, and associate professor of cell and developmental biology, without tenure, Department of Cell and Developmental Biology, Medical School.



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

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