Teresa V. Bowman, Ph.D.

Positions:
Associate Professor, Department of Developmental and Molecular Biology
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Research interests:

Hematopoietic stem cells (HSCs) are one of the most widely utilized stem cell populations in the clinic today. Defects in HSCs result in numerous hematologic diseases such as myelodysplastic syndromes (MDS). My lab explores how HSCs form, how these cells function to maintain healthy hematopoiesis and how dysfunction in them leads to hematologic malignancies. The lab currently has three main projects: i) Defining regulators critical for de novo HSC production using innovative genomics approaches and genetic screening in embryonic zebrafish, ii) Deciphering how mutations found in human MDS alter stem cell traits and influence differentiation choices, and iii) Understanding how RNA binding proteins that are mutated in MDS affect R-loop structures in the nucleus. Our studies combine the advantages of zebrafish and human cells to explore the development and genetic regulation of HSC biology. Zebrafish offer powerful genetic pliability, easily accessible in vivo imaging, numerous transplantation assays, and screening capabilities. Human cells allow us to decipher the conservation of our novel zebrafish findings to relevant human diseases and treatments. Through these studies, we anticipate identifying factors that are critical in HSC formation and function, which can be used to inform therapeutic strategies to improve human health.

Current grant funding:

R01DK121738 (BOWMAN PI) (NIH/NIDDK)	09/01/20 – 06/30/24 Crosstalk of Splicing and Signaling during HSPC Fate Choices
1R01DK131445 (BOWMAN PI) (NIH/NIDDK)	09/01/21 – 08/31/24 Identification of novel regulators of HSC specification and maturation
Research Discovery Grant (BOWMAN PI) (Edward P. Evans Foundation)	09/01/21 – 08/31/24 Delineating mechanisms of DDX41 insufficiency in MDS
Idea Award (BOWMAN PI) (DOD/BMFRP)	09/01/19 – 08/31/22 Unraveling the Role of DDX41 in Hematopoiesis and MDS

Recent publications (selected):

1. Ulloa BA, Habbsa S, Potts KP, Lewis A, McKinstry M, Payne SG, Flores J, Nizhnik A, Feliz Norberto M, Mosimann C, and Bowman TV. Definitive Hematopoietic Stem Cells Minimally Contribute to Embryonic Hematopoiesis. Cell Reports, 2021; 36(11): 109703. doi: 10.1016/j.celrep.2021.109703.PMID:34525360.
2. Weinreb JT, Ghazale N, Pradhan K, Gupta V, Potts KS, Tricomi B, Daniels NJ, Padgett RA, De Oliveira S, Verma AK, and Bowman TV. Excessive R-loops Trigger an Inflammatory Cascade Leading to Aberrant HSPC Expansion. Developmental Cell, 2021; 56(5):627-640 e5. PMID: 33651979.
3. Weinreb JT, Gupta V, Sharvit E, Weil R, and Bowman TV. Ddx41 inhibition of DNA damage signaling permits erythroid progenitor expansion in zebrafish. Haematologica, 2021; doi:10.3324/haematol.2020.257246. PMID: 33763998.
4. De La Garza A, Cameron RC, Gupta V, Fraint E, Nik S, and Bowman TV. The Splicing Factor Sf3b1 Regulates Erythroid Maturation and Proliferation via TGFβ signaling. Blood Advances, 2019; 3(14): 2093-3104. PMCID: PMC6650725.
5. Sorrells S*, Nik S*, Casey M, Cameron RC, Truong H, Toruno C, Gulfo M, Lowe A, Jette C, Stewart RA#, Bowman TV#. Spliceosomal components protect embryonic neurons from R-loop-mediated DNA damage and apoptosis. Disease Models and Mechanisms, 2018; 11(2): dmm031583. PMID: 29419415. PMCID: PMC5894942.