Eric Bouhassira, Ph.D.

Positions:
Professor, Department of Cell Biology
Member, Ruth L. and David S. Gottesman Institute for Stem Cell and Regenerative Medicine Research
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Research interests:

One of the long term focus of the lab is the development of a cure or better treatment for the hemoglobinopathies and for other hematological disorders. One current project is the development of gene therapy for sickle cell disease based on knock-in of therapeutic transgenes between the Locus Control Region and the beta-globin gene.

Over the last 10 years, we have pioneered methods to differentiate adult hematopoietic stem cells and human pluripotent stem cells (ESCs and iPSCs) toward the erythroid lineage. We have also developed methods to genetically modify iPSCs prior to their differentiation, Another focus of the lab is tot ake advantage of these methods for the creation of panel of reagent RBCs for the identification of allo-antibodies specifically targeted to sickle cell disease patients.

In a long-running collaboration with Dr. Han-Mou Tsai, we have contributed to the understanding of the molecular basis of Thrombotic Thrombocytopenic Purpura (TTP). Recently, progress that we have made in our red blood cell program provided an opportunity to translate our work on ADAMTS13 into a new treatment for this devastating disease. We are currently attempting to provide a proof of principle for a cure of TTP in mouse models using therapeutic red blood cells expressing membrane bound version of ADAMTS13 that are resistant to most auto-antibodies.

Finally, we also have an interest in DNA replication in hematopoietic cells. The goal of these studies is to understand the basic mechanisms that control the timing of replication and the relationship between expression levels of genes and transgenes in relation to their replication timing.

Current grant funding:

R01HL130764 (NIH/NHLBI) Bouhassira E (PI)	09/31/2015-05/30/2024 ADAMTS13 cultured Red Blood cells
R01 DK046865 (NIH/NIDDK) Bieker J (PI)	07/01/21- 06/30/2026 Function of Putative Determinant in Hematopoiesis
MDS Discovery Res. Grant EP. Evans Foundation BOWMAN T (PI)	09/01/2021-08/31/2024 Delineating mechanisms of DDX41 insufficiency in MDS

Recent publications (selected):

1. Boulad F, Maggio A, Wang W, Moi P, Acuto S, Kogel F, Takpradit C, Prockop S, Mansilla-Soto J, Cabriolu A, Odak A, Qu J, Thummar K, Du F, Shen L, Raso S, Barone R, Di Maggio R, Pitrolo L, Giambona A, Mingoia M, Everett JK, Hokama P, Roche AM, Cantu VA, Adhikari H, Reddy S, Bouhassira EE, Mohandas N, Bushman FD, Rivière I & Sadelain M Lentiviral globin gene therapy with reduced-intensity conditioning in adults with β-thalassemia: a phase 1 trial. **Nature Medicine** 2022 Vol 28, pages63–70
2. Tolu SS, Reyes-Gil M, Ogu UO, Thomas M, Bouhassira EE, Minniti CP Hemoglobin F mitigation of sickle cell complications decreases with aging. **Am J Hematol. 2020** May;95(5):E122-E125. PMID: 32072665
3. Wang K, Yan Z, Zhang S, Bartholdy B, Eaves CJ, Bouhassira EE. Clonal origin in normal adults of all blood lineages and circulating hematopoietic stem cells. **Exp Hematol**. 2020 Mar;83:25-34.e2. PMID: 32007476
4. Olivier EN, Zhang S, Yan Z, Suzuka S, Roberts K, Wang K, Bouhassira EE. RED, an Albumin-Free Robust Erythroid Differentiation Method to Produce Enucleated Red Blood Cells from Human Pluripotent and Adult Stem Cells. **Exp Hematol**. 2019 Jul;75:31-52.e15 PMID: 31176681
5. Wang K, Guzman AK, Yan Z, Zhang S, Hu MY, Hamaneh MB, Yu YK, Tolu S, Zhang J, Kanavy HE, Ye K, Bartholdy B, Bouhassira EE. Ultra-High-Frequency Reprogramming of Individual Long-Term Hematopoietic Stem Cells Yields Low Somatic Variant Induced Pluripotent Stem Cells**. Cell Rep**. 2019 Mar 5;26(10):2580-2592.e7 PMID: 30840883