Nov 14, 2025

# Epi Multiome ATAC + Gene Expression – Stanford Bone Marrow TMC

DOI
https://dx.doi.org/10.17504/protocols.io.j8nlkyjw5g5r/v1

Patricia Favaro[1], Jumana Afaghani[1], Sean Bendall[1]

[1]Stanford University

Human BioMolecular Atlas Program (HuBMAP) Method Development Community
Tech. support email: **Jeff.spraggins@vanderbilt.edu**

Patricia Favaro
Stanford University





**DOI:** https://dx.doi.org/10.17504/protocols.io.j8nlkyjw5g5r/v1

**Protocol Citation:** Patricia Favaro, Jumana Afaghani, Sean Bendall 2025. Epi Multiome ATAC + Gene Expression – Stanford Bone Marrow TMC. **protocols.io** https://dx.doi.org/10.17504/protocols.io.j8nlkyjw5g5r/v1

**Protocol status:** Working
**We use this protocol and it's working**

**Created:** November 12, 2025

**Last Modified:** November 16, 2025

**Protocol Integer ID:** 232249

**Keywords:** ATAC, HuBMAP, Tissue Map Center (TMC), Multiome, Gene Expression, bone Marrow, 10x genomics single cell multiome nuclei isolation protocol, 10x genomics single cell multiome, epi multiome atac, quality nuclei suitable for downstream atac, stanford bone marrow tmc fresh, human whole bone marrow aspirate, gene expression multimodal profiling, gene expression, mononuclear cell, downstream atac, nuclei isolation protocol

**Funders Acknowledgements:**
**HuBMAP NIH**
Grant ID: U54HL165445

## Abstract

Fresh human whole bone marrow aspirates (25 mL; AllCells) were collected and processed on the same day. Mononuclear cells were isolated by Ficoll density gradient centrifugation followed by red blood cell lysis. $CD34^+$ hematopoietic stem and progenitor cells were enriched by magnetic selection (STEMCELL Technologies, catalog # 17856). Equal numbers of $CD34^+$ and $CD34^-$ cells ($5\times10^5$ each) were then pooled at a 1:1 ratio. Nuclei were extracted following the 10x Genomics Single Cell Multiome nuclei isolation protocol (see links below), generating high-quality nuclei suitable for downstream ATAC + gene expression multimodal profiling.

## Steps

1 Nuclei isolation from fresh $CD34^{+}$ and $CD34^{-}$ cells: **link**

2 Chromium Next GEM Single Cell Multiome ATAC + Gene Expression library preparation: **link**

## Acknowledgements

This work was supported by HuBMAP NIH grant U54HL165445.