Review of: "Enhancer-priming in ageing human bone marrow mesenchymal stromal cells contributes to immune traits"

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The age-related lineage switch between osteogenic and adipogenic fates in BMSCs underlies the skeletal aging process, which contributes to bone loss and marrow fat accumulation. However, how aging initial the BMSCs fate shift remained poorly understood. Previous studies on BMSCs aging have focused on changes at RNA and protein level by utilizing proteomics and RNA-seq. In this work, the authors applied multiomics profile to investigate the impact of aging in BMSC at chromatin, RNA and protein level. Of interest, the aging BMSCs represent unparallel changes on different regulatory levels with poor correlation: “most age-sensitive genes are only present on one molecular layer highlights the complexity of biological ageing”. Through data integration analysis, the authors demonstrated enhancers and TFs-mediated BMSCs lineage priming during aging. Given the role of BMSCs in bone marrow niche, the authors also hypothesized that enhancer-mediated cellular changes and function alteration of BMSCs during aging could orchestrate immune disorder. Altogether, this work opens up new avenues in the investigation of the aging-related bone marrow-immune disorders, demonstrating more multiomics technologies should be applied for unrevealing complex information in future studies.