Glycosylation orchestrates megakaryocytic fate of hematopoietic stem cells

Description

Hematopoietic stem and progenitor cells (HSPCs) sustain blood production through tightly regulated fate decisions. Disruption of this control underlies disorders such as myelodysplastic syndromes (MDS), myeloproliferative neoplasms (MPN), and inherited thrombocytopenias. While transcriptional and epigenetic regulation of HSPCs is well established, the contribution of glycosylation has remained largely unexplored.

The results of the work establishes **B4GALT1 as a master glycosyltransferase regulator** of hematopoiesis that maintains **hematopoietic stem and progenitor cell (HSPC)** quiescence and prevents malignant transformation. When **B4GALT1** is deficient, the resulting altered glycosylation landscape disrupts bone marrow microenvironment niches and aberrantly activates the **Wntâ??MUC13/Î²-catenin signaling pathway**, leading to hematopoietic disorders like myelodysplastic syndromes (MDS) and myeloproliferative neoplasms (MPN). These findings define a previously unrecognized glycan-dependent regulatory axis that directs HSPC fate through coordinated transcriptional reprogramming, signaling modulation, and niche remodeling.

Category

1. News