

Editorial

Latent Defect in Haematopoiesis of UBC-GFP Mice Sheds Light on the Lymphoid Developmental Potential of Haematopoietic Stem Cells

(stem cell / haematopoiesis / green fluorescent protein / UBC-GFP mouse / lymphopoiesis, T cell)

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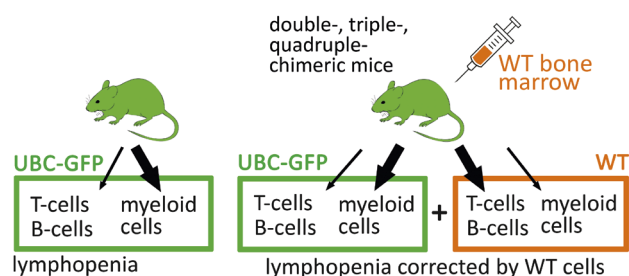
A haematopoietic stem cell (HSC) defect in UBC-GFP mice with the human ubiquitin C promoter (UBC)-driven expression of green fluorescent protein (GFP) (Schaefer et al., 2001) was revealed in competitive transplantation experiments (Faltusová et al., 2018). The stem cell defect negatively affects lymphopoiesis, especially production of T cells (Faltusová et al., 2020). The UBC-GFP transgene has been recently localized on chromosome 17 (Chr17:29,435,589) next to the MHC locus \approx 4.6 million bases from the H-2 K1 gene (Liu et al., 2020).

The defect in HSCs in UBC-GFP mice can be corrected by transplantation of bone marrow cells of wild-type (WT) mice. UBC-GFP mice engraft HSCs of WT mice also without conditioning by haematopoiesis-damaging agents (Faltusová et al., 2018, 2020). The transplantation of bone marrow cells of WT mice corrects lymphopenia in UBC-GFP mice (Faltusová et al., 2020). In mice with established chimaeric WT/UBC-GFP haematopoiesis, the transplanted WT cells mainly produce T cells and B cells, while the host UBC-GFP cells mainly produce myeloid cells (Fig. 1) (Faltusová et al.,

2020). The stroma microenvironmental support of haematopoiesis is normal in UBC-GFP mice (Faltusová et al., 2018). Therefore, the lymphoid-primed HSCs preferentially engraft in UBC-GFP mice and outcompete the host HSCs. Transplanted bone marrow of WT mice to UBC-GFP mice provides robust long-term production of T cells, which can be transplanted to secondary and tertiary recipients (Faltusová et al., 2020). The determination of how the particular insertion site of UBC-GFP transgene next to the MHC locus on chromosome 17 compromises the lymphoid function of HSCs could enlighten the gene control of the myeloid-lymphoid potential of pluripotent HSCs.

References

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Abbreviations: GFP – green fluorescent protein, HSC – haematopoietic stem cell, UBC – ubiquitin C promoter, WT – wild type.