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Thrombopoietin: a potential T-helper lymphocyte
stimulator. Change in T-lymphocyte composition
and blood cytokine levels in thrombopoietin
cDNA transferred mice
JIAN ZENG ZHAO, YING JIE MEI, ZI KUAN GUO, HUI REN CHEN
Laboratory of Gene Therapy, Center for Clinical Molecular
Biology, General Hospital of Air Force, PLA, China

The aim of this study was to evaluate the effect of
thrombopoietin (TPO) on T lymphocyte in Balb/c mice
delivered hTPO cDNA with plasmid vector. Both
mature and immature T lymphocytes in central organs
increased, but only the CD4\(^+\) subset was preferably
proliferated in circulation. High serum IFN-\(\gamma\) was coin-
ciding with the declination of platelet counts, but TNF-
\(\alpha\) was positively associated with the platelet count,
while high IL-2 level was similar to the course of TPO
expression. Our data suggested that TPO is a stimu-
lator for T lymphocytes, especially the CD4\(^+\) subset.

Accumulating materials have enlightened the par-
ticipation of thrombopoietin (TPO) in immunologi-
cal processes. TPO stimulates the proliferation of
endothelial cells and enhanced their expression of cell
adhesion molecules.\(^1\) It also indirectly induces the
production of interferon-\(\alpha\) in \textit{vivo}.\(^2\) We previously
observed macrophage proliferation and endothelial
cell activation in the spleens of TPO gene therapy

Figure 1. T-lymphocyte frequency alterations.
IFN-γ is inhibitory to CFU-Mk.\textsuperscript{3} Although a contrary conclusion was recently gained,\textsuperscript{4} its striking increases that coincide with the declination in platelet count and accompanying the fluctuation of platelet counts\textsuperscript{5} inferred its down-regulatory role in thrombopoiesis. TNF-α can stimulate the proliferation of a human megakaryocytic cell line.\textsuperscript{6} However, it showed little correspondence with platelet count in the later stages. The change of IL-2 was associated to TPO expression\textsuperscript{7} that might support a direct stimulatory role of TPO on T lymphocytes. Although TPO indirectly induced IFN production in vitro\textsuperscript{2} here, the proliferation of T lymphocytes might give a better explanation for the cytokine overproduction.

Several groups effectively promoted mice platelet production by TPO over-expression.\textsuperscript{5,8,9} Recently, it was noticed that following platelet peak, the adenovector-mediated hTPO delivery had induced autoantibodies against TPO in Balb/c mice and resulted in pathological changes.\textsuperscript{10} Was the activation of T lymphocyte part of such reactions? With the plasmid vector, first, we kept TPO expression for much longer than the platelet peak\textsuperscript{7} without its being neutralized by the possible autoantibodies; second, our primary analysis of marrow megakaryocyte did not observe its reduction during this process. Furthermore, we recently observed that hTPO cDNA delivery thoroughly induced the turnover of tumor infiltration T lymphocyte phenotypes from CD8\textsuperscript{+} to CD4\textsuperscript{+} that accompanied significant retardation of the implanted tumor (unpublished data). The immunological responses did not seem auto-reactive.

**Key words**

Thrombopoietin, T lymphocyte, IFN-α, TNF-γ, IL-2

**Correspondence**

Jian Zeng Zhao Ph.D., Laboratory of Gene Therapy, Center for Clinical Molecular Biology, General Hospital of Air Force, 30th Fucheng Road, Beijing 100036, China.
Phone: international +86-10-68410099-8758 (local)  
Fax: international +86-10-68413108.

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**References**


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**Phenotypic changes in neutrophil granulocytes after G-CSF administration in patients with acute lymphoblastic leukemia under chemotherapy**

**Maria-Andreles Zarco,*, Josep-Maria Riera,***

**Neus Villamor,*, Avelina Balmes,*, Alvaro Urbano Ispizua,*, Evarist Feliu***

Departments of Hematology, *Hospital Universitari Germans Trias i Pujol, Badalona, Universitat Autònoma de Barcelona and *Hospital Clinic, Barcelona, Spain

Phenotypic changes in neutrophil granulocytes (NG) after G-CSF have been scarcely studied. Using flow cytometry, we analyzed the changes of CD11b, CD14, CD33, CD71, HLA-DR, CD10, CD16 and CD15 on NG after G-CSF treatment in 6 patients with ALL receiving