

blood

1991 78: 1630-1631

Human granulocyte colony-stimulating factor receptor expressed on T-cell malignant lymphoma cells [letter; comment]

S Kondo, S Okamura, Y Niho, H Gondo and S Hayashi

Information about reproducing this article in parts or in its entirety may be found online at:
http://bloodjournal.hematologylibrary.org/misc/rights.dtl#repub_requests

Information about ordering reprints may be found online at:
<http://bloodjournal.hematologylibrary.org/misc/rights.dtl#reprints>

Information about subscriptions and ASH membership may be found online at:
<http://bloodjournal.hematologylibrary.org/subscriptions/index.dtl>



HUMAN GRANULOCYTE COLONY-STIMULATING FACTOR RECEPTOR EXPRESSED ON T-CELL MALIGNANT LYMPHOMA CELLS

To the Editor:

Tsuchiya et al¹ recently reported that Ph¹-positive acute lymphoblastic leukemia cells with myeloid surface markers responded to granulocyte colony-stimulating factor (G-CSF) and granulocyte-macrophage CSF. We also experienced a case of leukemic malignant lymphomatosis, in which the tumor cells in the peripheral blood possessed human G-CSF receptor. A 38-year-old man entered a hospital suffering from cervical and mediastinal lymphadenopathy with some bone marrow invasion. Histologic examinations showed malignant lymphoma of the diffuse T-lymphoblastic cell type. Despite combination chemotherapy, marked leukocytosis of 90,600/ μ L appeared thereafter. The characteristics of tumor cells that occupied 98% of the peripheral blood leukocytes were peroxidase-negative and the surface marker profile of the tumor cells was CD2, CD5, and CD7 positive and CD3, CD4, CD8, CD10, CD13, CD19, CD20, CD25, CD33, T-cell receptor (TCR) α/β , HLA-DR, and surface Ig negative, indicating immature T lymphoblasts. Unexpectedly, G-CSF receptor was detected on the surface of the tumor cells, which were more than 98% purified (Fig 1). The dissociation constant was 83 pmol/L and the number of G-CSF receptors per cell was 71. The affinity was as high as that of granulocytes and leukemic myeloblasts, but the number of G-CSF receptors was smaller than that of such cells.^{2,3} Human G-CSF receptors have previously only been shown on the surface of cells in the granulocyte lineage among haematologic malignancies.^{2,3} However, it has been reported that human G-CSF receptor transcripts were detected not only on myeloid cell lines but also on B-lymphoblastoid cell lines.³ Because we have detected G-CSF receptors on lymphoma cells, attention must now be paid when using G-CSF in the course of treatment for malignant lymphoma.

SEIJI KONDO
SEIICHI OKAMURA
YOSHIYUKI NIHO

*Cancer Center and the First Department of Internal Medicine
Kyushu University
Fukuoka, Japan*
HISASHI GONDO
SHIN HAYASHI
*Sanshinkai-Hara Hospital
Fukuoka, Japan*

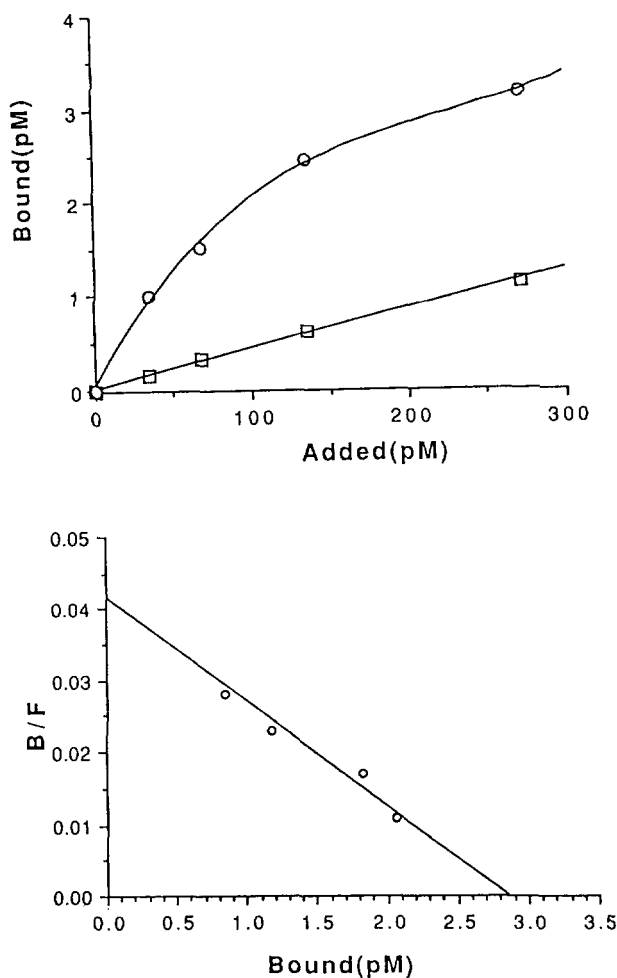


Fig 1. Binding of radiolabeled G-CSF to T-cell malignant lymphoma cells in the upper figure. Lymphoma cells (3×10^6) were incubated with ¹²⁵I-labeled G-CSF for 2 hours at 24°C.² Nonspecific binding was determined in the presence of excess unlabeled G-CSF. Total (○) and nonspecific (□) binding. Scatchard analysis of specific binding appears in the lower figure.

REFERENCES

1. Tsuchiya H, Adachi N, Asou N, Takatsuki K, Matsuda I, Kawano F, Murakami T, Mizutani S, Watanabe M: Responses to granulocyte colony-stimulating factor (G-CSF) and granulocyte-macrophage CSF in Ph¹-positive acute lymphoblastic leukemia with myeloid surface markers. *Blood* 77:411, 1991

2. Kondo S, Okamura S, Asano Y, Harada M, Niho Y: Human

granulocyte colony-stimulating factor receptors in acute myelogenous leukemia. *Eur J Haematol* 46:223, 1991

3. Larsen A, Davis T, Curtis BM, Gimpel S, Sims JE, Cosman D, Park L, Sorensen E, March CJ, Smith CA: Expression cloning of a human granulocyte colony-stimulating factor receptor: A structural mosaic of hematopoietin receptor, immunoglobulin, and fibronectin domains. *J Exp Med* 172:1559, 1990

RESPONSE

The case report by Kondo et al that T-cell malignant lymphoma cells expressed granulocyte colony-stimulating factor (G-CSF) receptors is another example showing that mixed-lineage leukemia/lymphoma (MLL) may have not only mixed-lineage surface markers but also mixed-lineage functions.¹ Several interesting aspects can be pointed out. First, the original diagnosis of the patient was T-cell malignant lymphoma. Kantarjian et al² described T-cell acute lymphoblastic leukemia (ALL) cases with myeloid characteristics such as CD13, CD33, and/or myeloperoxidase stain with electron microscopy. Thus, it is possible that G-CSF receptors are expressed on the blast cell surface in such patients. Second, similar to our case,¹ the dissociation constant of G-CSF receptors of blast cells of their patient was as high as that of granulocytes and leukemic myeloblasts, but the number of G-CSF receptors was smaller than that of such cells. However, we also found G-CSF receptors with a similar value of dissociation constant as that of granulocytes, leukemic myeloblasts, and MLL blasts in malignant lymphoma (morphologically diagnosed) cells from a newly diagnosed patient and the number of receptors was as high as that of normal granulocytes (manuscript in preparation). Accordingly, it

appears that the dissociation constant of G-CSF receptors of MLL blasts is similar to that of granulocytes and leukemic myeloblasts, and that blast cells from some MLL patients potentially have a smaller number of G-CSF receptors than those of granulocytes and leukemic myeloblasts, but there are exception(s). If we can extrapolate the results of Ohno et al,³ who noted the effect of G-CSF after intensive induction therapy in relapsed or refractory acute leukemia, including both lymphoid and myeloid, administration of G-CSF to patients with MLL having a smaller number of G-CSF receptors may carry little risk because, according to their report, the rate of regrowth of leukemic blasts was somewhat slower in the patients treated with G-CSF, albeit without a statistical significance.

HIROYUKI TSUCHIYA
 ICHIRO MATSUDA
*Department of Pediatrics
 Kumamoto University Medical School
 Kumamoto City, Japan*

REFERENCES

1. Tsuchiya H, Adachi N, Asou N, Takatsuki K, Matsuda I, Kawano F, Murakami T, Mizutani S, Watanabe M: Responses to granulocyte colony-stimulating factor (G-CSF) and granulocyte-macrophage CSF in Ph¹-positive acute lymphoblastic leukemia with myeloid surface markers. *Blood* 77:411, 1991

2. Kantarjian HM, Hirsch-Ginsberg C, Yee G, Huh Y, Freireich EJ, Stass S: Mixed-lineage leukemia revisited: Acute lymphocytic

leukemia with myeloperoxidase-positive blasts by electron microscopy. *Blood* 76:808, 1990

3. Ohno R, Tomonaga M, Kobayashi T, Kanamaru A, Shirakawa S, Masaoka T, Omine M, Oh H, Nomura T, Sakai Y, Hirano M, Yokomaku S, Nakayama S, Yoshida Y, Miura AB, Morishima Y, Dohy H, Niho Y, Hamajima N, Takaku F: Effect of granulocyte colony-stimulating factor after intensive induction therapy in relapsed or refractory acute leukemia. *N Engl J Med* 323:871, 1990