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Abstract

The chemotactic activity of granulocytes obtained by the Terumo Filtration Leucapheresis System (F.L.) was examined by the method of Boyden's chamber. The number of cells migrating through the Millipore filter was expressed as the chemotactic activity. The mean values were 117 for the F.L. and 122 in a control, in which cells were collected from the same donor blood using dextran sedimentation. The results suggested that the in vitro chemotactic function of granulocytes obtained by F.L. was within normal limits.

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— BRIEF NOTE —

NORMAL CHEMOTACTIC ACTIVITY OF GRANULOCYTES OBTAINED BY FILTRATION LEUCAPHERESIS

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Abstract. The chemotactic activity of granulocytes obtained by the Terumo Filtration Leucapheresis System (F. L.) was examined by the method of Boyden's chamber. The number of cells migrating through the Millipore filter was expressed as the chemotactic activity. The mean values were 117 for the F. L. and 122 in a control, in which cells were collected from the same donor blood using dextran sedimentation. The result suggested that the *in vitro* chemotactic function of granulocytes obtained by F. L. was within normal limits.

Filtration Leucapheresis (F. L.) is one of the methods currently available for the collection of a large amount of segmented granulocytes from a normal donor for granulocyte transfusion to neutropenic patients who are on antileukemic chemotherapy. The effectiveness of the granulocyte transfusion against severe infection and septicemia has been reported by us (1) and by other workers (2–4). Using the fact that granulocytes can be harvested after their temporary adhesion to the tetron fiber surface of the Leucolumn Filter, we investigated chemotactic activity (one of the granulocyte functions), by the method of Boyden's chamber (5).

In this study, we compared the chemotactic activity of granulocytes obtained by F. L. with those separated by dextran sedimentation from venous blood of the same donor. Continuous-flow F. L. was performed on each donor for two hr using the Terumo Filtration Leucapheresis System as shown in the Fig. 1. A modified model of Boyden's chamber was kindly provided by Dr. Noriyuki Tatsumi, the Osaka City University Medical School (6). A Millipore filter with a mean pore size of 0.65 μm was set to separate the upper and lower compartments. The chemotactic factor was generated from human AB type serum activated by *E. coli* endotoxin. The viability of granulocytes was more than 99% by the

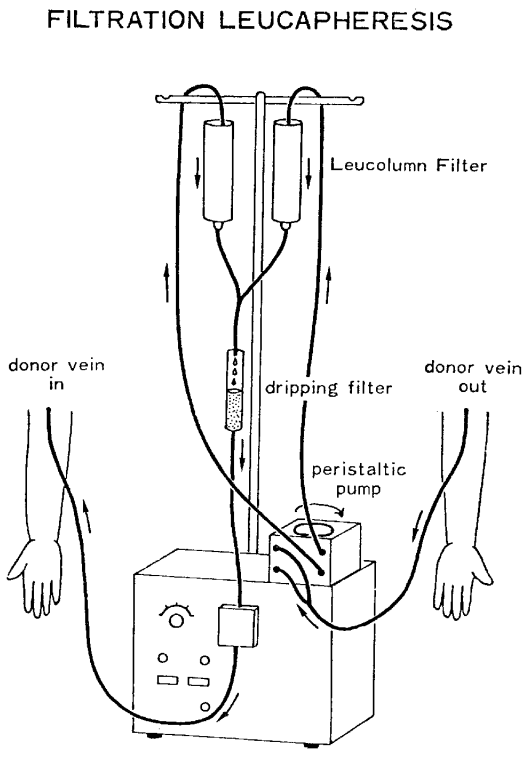

Fig. 1. Schematic representation of the blood flow pathway and the tubing set usd for granulocyte collection.

trypan blue dye exclusion test. The upper compartment was filled with 0.8 ml of the cell suspension (1×10^6 granulocytes per ml) in Hanks' balanced salt solution supplemented with 15% of autologous serum. The chemotactic factor was placed in the lower compartment. After exactly three hr of incubation at 37°C, the filter was removed, fixed in methanol and stained with hematoxylin solution. The number of cells migrating through one half of the thickness of the filter was counted in ten fields of the high power ($400\times$) using a conventional microscope, and the mean value in one field was expressed as the chemotactic activity as in Table 1. The mean values were 117 for the F. L. and 122 in the control. The difference in their mean values was not statistically significant. Our results suggest that the *in vitro* chemotactic function of granulocytes obtained by F. L. was within normal.

Previous results (7, 8) for the chemotactic activity of granulocytes obtained by F. L. of the Fenwall System were also within normal limits, as in our present experiment. Other function tests, including adhesivness and bacteria killing,

TABLE 1. CHEMOTACTIC ACTIVITY OF GRANULOCYTES OBTAINED BY FILTRATION LEUCAPHERESIS (A MEAN VALUE OF TEN HIGH POWER MICROSCOPE FIELDS)

cases	F.L.	control
1	123	115
2	121	128
3	117	120
4	108	117
5	123	121
6	123	124
7	112	117
8	111	122
mean±S.D.	117±6	122±4

are now in progress. Granulocyte transfusion by the Terumo Filtration Leucapheresis System is considered to be a useful, alternative treatment for neutropenic patients who have not been responding to massive antibiotics therapy.

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