REDUCED LEVELS OF INTERFERON PRODUCTION BY HUMAN LEUKOCYTES IN LYMPHATIC LEUKEMIA

K. R. CULMER[1]

Nassau, Bahamas

Project Supervisors: SPENCER, H. S. LEE, PHD.,[2] R. L. OZERE, B. SC., M.D.,[3] C. E. VAN ROOYEN, M.D., CH.B., D.SC. (Edin.), M.R.C.P. (Lond.), F.R.C.P. (C).[4]

It has been observed in certain specific examples that humans with lymphatic leukemia have reduced resistance to fungal and bacterial infections, and also develop serious infections when attacked by viruses such as those of measles, chicken pox and vaccinia. Previous studies, and also this project were designed to try to explain the latter phenomenon on the basis of differences in their leukocyte interferon content - interferon being a by-product of cell-virus interaction.

METHOD.

Leukocyte suspensions from normal donors and a total of fourteen patients with leukemia, both acute and chronic, and one with myelogenous leukemia were prepared by adding dextran to sediment erythrocytes in the heparinized blood samples, and by removing the leukocyte-rich plasma. In a portion of the experiments mononuclear cells were separated from polymorphonuclear cells by a technique using the phagocytic capacity of the latter to ingest fine iron particles.

Each cell suspension was divided into 2 aliquots. To one of these, stock Sendai virus was added, and the other served as a control. The assay was done by preparing three-fold serial dilutions and testing in tube cultures of HA-FL cells for inhibiting activity against Sindbis virus. The interferon titre was expressed as 50% protection titre. (IND_{50})

A cytogenetic study was done on peripheral blood leukocytes of one patient with acute leukemia, while simultaneous control studies were carried out on two healthy subjects. All leukemia patients except this one were treated with anti-leukemic drugs.

RESULTS.

1. **Interferon Yields.**
   Control subjects - Range 132-219, Mean 152.6 IND_{50}
   Acute leukemic patients - Range 13-81 - Mean 37 IND_{50}
   Chronic leukemic patients - Range 3-65 - Mean 24.7 IND_{50}
2. Suspensions containing both polymorph and mononuclear cells showed no significant increase in interferon yield over those containing mononuclear cells alone.
3. Inteferon was found to be sensitive to trypsin, not sedimentible by ultra centrifugation, stable at 56°C for one hour, and completely destroyed by boiling for ten minutes.
4. In one untreated case of acute leukemia, eight mitoses were found to have 47 instead of the normal 46 chromosomes in which 5 members of the 21-22 group showed abnormalities.

CONCLUSION

The lowered capacity for the formation of viral interferon may be explained by the following: -

1. A relatively smaller proportion of leukemic leukocytes in leukemia may participate in the production of interferon in contrast to a larger number of leukocytes in the normal individual.

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[1]4th Year Medicine.
[2]Dept. of Bacteriology.
[3]Associate Professor, Department of Paediatrics.
[4]Professor and Head of Dept. of Bacteriology, Dalhousie University.

2. Leukocytes themselves in leukemic blood displayed a lowered capacity for the production of interferon.
3. Anti-leukemic medications may be a determining factor in this reduced capacity to produce interferon.
4. The possibility of interfering material in the genetic chromosomes.