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SHORT COMMUNICATION

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Ring-Shaped Nuclei of Granulocytes in a Patient with Acute Erythroleukaemia

PER STAVEM, M.D., PETER F. HJORT, M.D., ERIK VOGT, M.D.
& CARL B. VAN DER HAGEN, M.D.

Section of Haematology (Chief, P. F. Hjort), Rikshospitalet, Oslo,
Department of Medicine (Chief, E. Vogt), Sarpsborg Hospital
and
Department of Medical Genetics (Chief, K. Berg), University of Oslo, Norway

A patient with acute erythroleukaemia had a large number of ring-shaped granulocyte nuclei. Cytogenetic studies showed normal chromosomes. A hereditary anomaly was unlikely, since his 2 children were normal. Therefore, the anomaly was probably acquired and a result of the acute erythroleukaemia.

Stained blood and bone marrow smears show that the normal segmented human granulocyte nucleus has developed from the round myelocyte nucleus via the indented and the band formed stages. Ring-shaped nuclei are so uncommon in human granulocytes that classification systems used for differential counts do not even mention such forms (Bessis 1956, Wintrobe 1967).

In rats and mice, the normal development is different. A large number of round myelocyte nuclei gradually develop into ring-shaped granulocyte nuclei (Figure 1).

We have recently studied a patient with acute erythroleukaemia. Many of his myelocyte nuclei had a central 'hole' and apparently developed into ring-shaped granulocyte nuclei, resembling those in rats and mice. We have not found reference to similar observations in the literature.

CASE REPORT

K.A.K., a man born in 1903, was treated medically for duodenal ulcer in 1931 and 1952, but had since been well.

In March 1968, he started to feel weak, and his family doctor referred him to hospital for a moderate anaemia. A subacute myelogenous leukaemia was diagnosed, and the patient was treated with transfusions and discharged after 2 weeks. In May, he was readmitted for more transfusions. When the patient was admitted to hospital for the third time, in June 1968, his haemoglobin was 8.4 g./100 ml., R.B.C. 3.3 mill., W.B.C. 9,200 and platelets 5,000 per μl. blood.

The patient was treated with fresh blood transfusions and prednisone 20 mg. daily, but he gradually deteriorated and died July 14.

Peripheral blood smear showed a marked erythroblastosis with 11 erythroblasts per 100 leukocytes. 85 % of the leukocytes were neutrophils, shifted to the left with some myelocytes and metamyelocytes. A striking feature was a large number of ring-

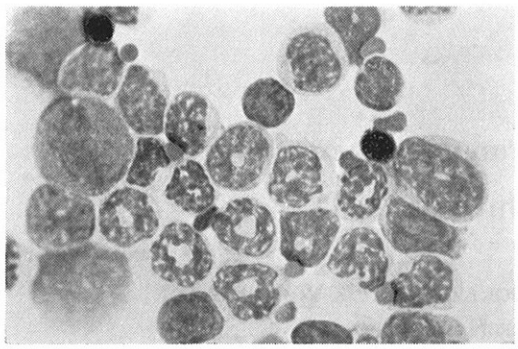

Figure 1. Bone marrow smear of albino mouse.

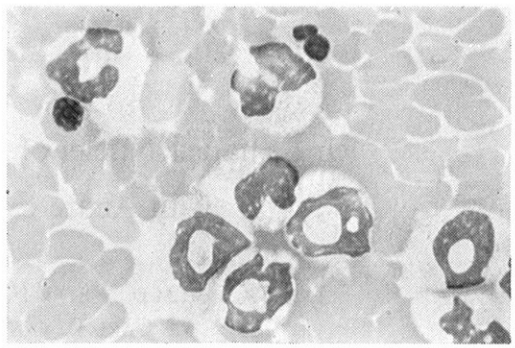

Figure 2. Buffy coat smear of patient K.A.K.

shaped granulocytes (Figure 2) resembling those seen in rats and mice (Figure 1).

Bone marrow smear showed a cellular marrow. A mixed megaloblastic and normoblastic erythropoiesis constituted 40 % of the nucleated cells. There were many mitoses and nuclear fragments in the erythroblasts, indicating a marked dys-erythropoiesis. The myelopoiesis was shifted to the left with an increased number of promyelocytes and myelocytes. The nucleus of some myelocytes had a small central 'hole'; many of the mature granulocytes had a ring-shaped nucleus.

Cytogenetic investigation. Chromosome preparations were made from peripheral blood, cultured for 44 hours (van der Hagen 1968). 30 suitable metaphases were counted. Chromosome number was 46 in 29 cells and 45 in 1 cell. Chromosome analyses were conducted on photographs of 5 cells and by microscopy of another 10 cells, according to the recommendations of the Chicago Conference (1966). Chromosome constitution 46, XY was found in 14 cells and 45, Y, C− in 1 cell. In conclusion, the chromosome constitution of the leukocytes was normal.

Family studies. None of his two children showed any abnormality in the blood smear.

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Correspondence should be addressed to

Per Stavem, M.D.
Section of Haematology
Rikshospitalet, Oslo, Norway