
Dogs given 1200 r of total body irradiation were cross-circulated with dogs having normal marrow function. Irradiated controls died in from 4 to 11 days with marrow aplasia. Dogs cross-circulated daily for 6 to 9 days showed histologic evidence of bone marrow repopulation after 1 week. Male dogs cross-circulated with female partners showed typical female drumsticks on mature granulocytes after repopulation had occurred. Cytogenetic studies of an irradiated male dog cross-circulated with a female partner showed all mitotable cells from the bone marrow and peripheral blood to be of female donor type. Allogeneic bone marrow engraftment was associated with an early and severe secondary syndrome which resulted in the death of the animals in the second week. When methotrexate was given, survival was increased to 3 weeks.

It was concluded that (a) cross circulation provided leukocytes and platelets adequate for support during the period of radiation-induced marrow aplasia, (b) allogeneic marrow engraftment was produced consistently by cells transferred in the peripheral blood of the normal cross circulation partner, (c) the grafts were associated with an early and severe form of secondary disease, and (d) methotrexate given during the early period of engraftment reduced the severity of the secondary disease.


Immunologic studies were performed in 49 patients with the Di Guglielmo syndrome. Although altered immune reactivity has not been previously thought to be a feature of myeloproliferative disorders, more than one-third of the cases showed immunologic aberrations. The abnormalities encountered included overproduction of antibody protein (hypergammaglobulinemia) with an increased tendency to form rheumatoid factor, LE factor (including one case with overt systemic lupus), positive serologic tests for syphilis, and erythrocyte auto- and isoantibodies.

Possible pathogenetic mechanisms are considered. The underlying neoplastic process might directly involve the immunocytes, resulting in exaggerated and nonspecific responses, or in defective self-recognition and thus in the production of autoantibodies. Alternatively, preexisting but “hidden” antigens might be exposed by the proliferative disorder, thus stimulating an antibody response. Finally, and perhaps most likely, antigenic alteration of bone marrow tissue might accompany its neoplastic transformation. Such tissue could be recognized as “not-self” or “foreign” by a qualitatively normal immune system. This would result in the production of abnormal proteins, some of which would be immunologically effective.
1. Patients with polycythemia vera may be classified according to their erythropoietic pattern. Erythropoiesis is abnormally increased in all classes. Class I is characterized by normal red cell lifespan. Class II is characterized by shortened red cell lifespan; in Class IIa the shortened red cell survival is related to splenic sequestration of RBC; in Class IIb the markedly shortened red cell survival is predominantly related to intramedullary hemolysis. Class I is characterized by extramedullary erythropoiesis. Patients in Classes I and IIa are in relatively earlier phases of their disease and frequently are found to develop red cell kinetics of Class III as their disease progresses. Conversely, patients in Classes IIb and III are generally late in the course of their disease and have previous hematologic findings that suggest that they originally had the red cell kinetic patterns of Classes I and IIa.

2. As the duration of their disease increases, patients with polycythemia vera generally have a progressive shortening of red cell lifespan which is incompletely compensated by a progressive decrease in circulating red cell volume. However, total blood volume remains elevated since the plasma volume increases. These changes occur whether or not the patient receives radiation therapy. Similar changes may occur in white cell and platelet production and functional survival. It is suggested that the natural history of the disease may be characterized by progressive emergence of hematopoietic cell clones which have a selective advantage for reproduction associated with altered functional survival.

3. The results suggest the potential usefulness of iron, and occasionally of splenectomy, in selected polycythemic patients with myeloid metaplasia (Class III) and anemia dependent upon the presence of the frequent finding of iron deficiency or the occasional finding of splenic sequestration of red cells in excess of splenic erythropoiesis.


In order to define the functional defect in marrow cells in B12 and folate deficiency, ten patients were investigated. Chromosome studies showed alterations similar to those produced experimentally by agents interfering with DNA metabolism. Measurements of the DNA content of individual cells in the resting and synthetic stages of the mitotic cycle suggested arrest of DNA synthesis in a proportion of cells, or alternatively prolongation of the S and G2 phases. It was concluded that in these deficiency states changes in the cellular DNA metabolism may cause disturbances during both the mitotic and intermitotic stages of the cell cycle, and that these may account for the deficient production of the various classes of blood cells.

A Nigerian patient is described with megaloblastic anemia due to vitamin B₁₂ deficiency. The deficiency resulted from malabsorption of the vitamin, but no other abnormal functioning of the gastrointestinal tract could be demonstrated. The patient did not have Addisonian pernicious anemia. He had remarkable hyperpigmentation of the skin, especially of the palms of the hands. What is known of possible connections between megaloblastic anemias and melanin metabolism cannot explain this hyperpigmentation.


Ribonucleic acid (RNA) was isolated from a variety of human leukocyte populations exposed to tritiated uridine in vitro. Several species of RNA were extractable from leukocytes in a phenol-water system. With mild conditions of extraction a pH 7.6 fraction was obtained, which contained 60 to 75 per cent of total cellular RNA. After removal of this RNA component reextraction at elevated temperature and pH yielded a pH 9 fraction, which contained 25 to 40 per cent of total cellular RNA. The pH fraction contained 28 and 18 S ribosomal RNA and 4 S RNA. The pH 9 RNA fraction was heterogeneously distributed in a sucrose density gradient. The 28 and 18 S components were slowly labeled by H⁴-uridine and were relatively stable. The 4 S component was rapidly labeled and was unstable. The pH 9 RNA fraction contained most of the rapidly labeled RNA, which was either of high molecular weight or heterogeneous as to molecular size.

The pattern of incorporation of H⁴-uridine into the various components of RNA was similar in normal and neoplastic granulocytes and lymphocytes.

Rapidly labeled leukocyte RNA had the following characteristics: (1) its synthesis was actinomycin sensitive; (2) it was unstable, having a half-life in the range of 16 to 225 minutes; and (3) it was in part a precursor of ribosomal RNA.

The sensitivity of granulocyte protein synthesis to inhibition of RNA synthesis suggests that granulocytes have both stable and unstable templates.


An infant with hemangioma-thrombocytopenia syndrome who was successfully treated with x-irradiation over the hemangioma is described. Studies showed suggestive platelet sequestration in the tumor (as well as spleen), decreased platelet survival, and red cell changes compatible with cell trauma. Speculations concerning the mechanism of the thrombocytopenia are discussed. It is suggested that careful attention should be given to red cell morphology in cases of giant hemangioma in children, particularly those associated with thrombocytopenia.
Stoward conjugated acidified solutions of salicyloyl hydrazide with the dialdehydes formed from the periodic acid oxidation of vicinal glycols in guinea pig tissue sections. The method has now been utilized, with minor modification, to demonstrate glycogen in blood and marrow cells, and it has been compared with the periodic acid-Schiff reaction and with a fluorescent acriflavine Schiff-type method. It is felt that the PA-SH method will replace the existing Schiff-type fluorescent methods and that it will prove to be a useful technic to aid in the diagnosis of blood conditions, such as acute leukaemia, where PAS positivity is known to occur.


1. Iron absorption in rats is increased by dietary iron deprivation.
2. Erythropoiesis in the rat is unaffected by dietary iron deprivation that increases iron absorption by more than a factor of four.
3. Iron absorption is not increased in rats bled of an amount of iron equivalent to that lost in 5 days of iron deprivation.
4. These findings are compatible with the concept that iron absorption is controlled by depletion of iron from a specific pool, separate from the hepatic and erythrocytic iron pools.
5. Iron absorption in human subjects was unaffected by dietary iron deprivation for 13 days. Reasons for differences between human and rat results are discussed.