
Neonatally thymectomized hamsters implanted with diffusion envelopes containing thymus showed partial prevention of the effects of thymectomy. A normal humoral antibody response was maintained in these animals, although a significant lymphocytopenia remained. This suggests that the thymus participates in immunogenesis by a humoral mechanism and possibly by a cellular mechanism as well, which was blocked by the diffusion envelope. Thymectomized hamsters implanted with diffusion envelopes containing adult spleen, bone marrow or kidney were still impaired in their ability to produce humoral antibody although these tissues appeared to enhance antibody production. The thymus humoral factor appeared to be specific to the thymus. Reimplanted diffusion envelopes, containing large thymic cells resembling epithelial-reticular cells, were used to show that these cells produced the thymus humoral factor.


The metabolism of intact, normal, human lymphocytes in vitro was studied from a total of 80 subjects. Corrected for the metabolism of contaminating red blood cells, the glucose uptake, lactic acid production and oxygen consumption were 62, 95, and 117 μM/10⁶ lymphocytes per hour, respectively, provided the cells were incubated at concentrations greater than 40 × 10⁶ lymphocytes/ml. At lower lymphocyte concentrations the oxygen consumption per lymphocyte rose steeply with decreasing cell concentration (crowding effect). A similar but weaker crowding effect was noted for the lactic acid production, but not for the utilization of glucose.

The oxygen uptake was lower with 20 per cent than with 100 per cent oxygen as gas phase. Small Pasteur and Crabtree effects were demonstrated. The oxygen consumption and lactic acid production proceeded linearly with time, while the glucose utilization was higher during the first 30 minutes of incubation than later on.

It is concluded that lymphocytes have a low aerobic glycolysis accounting for 75 per cent of the glucose utilization. The respiration is severely inhibited at high cell concentrations and it is suggested that this is caused by an insufficient availability of oxygen to the cells.


1. Spleen explants of transfusion-induced polycythemic mice were incubated in vitro with and without erythropoietin.
2. After 24-hour incubation with the erythropoietin, immature large erythroblasts appeared, whereas the mature small erythroblasts were first observed after 48-hour incubation.

3. Marked radioiron incorporation into the heme was observed after 48-hour incubation with erythropoietin.

4. The control incubations without erythropoietin did not show these findings.

5. These data strongly suggest that erythropoietin induced the differentiation of erythroblasts from stem cells in vitro.


Pregnancy of a patient with multiple myeloma and the subsequent uncomplicated delivery of a viable normal infant apparently is the first such case reported. The child is developing normally. The mother died almost 9 months after delivery. Serum electrophoretic and immunoelectrophoretic data are documented. The primary protein abnormality in the mother was the excessive production of a γA globulin.


(δβ) thalassemia or F-thalassemia is characterized by a thalassemic blood picture, elevated hemoglobin F and normal hemoglobin A2.

A family with (δβ) thalassemia is reported in which the propositus was a mixed heterozygote for (δβ) thalassemia and hemoglobin B2. There was complete absence of hemoglobin A2, indicating that this (δβ) thalassemia mutation completely suppressed the cis delta gene. The remaining normal delta gene was capable of increasing delta chain synthesis sufficiently to bring the hemoglobin A2 to within normal range. These findings account for the absence of elevated hemoglobin A2 in this form of thalassemia and demonstrate that (δβ) thalassemia is an entity genetically distinct from A2 thalassemia. The possible genetic mechanisms of (δβ) thalassemia are discussed.


1. Two of three female patients with the autoerythrocyte syndrome were tested for sensitivity to various components of the erythrocyte membrane. One was consistently sensitive to purified phosphatidyl serine.

2. It is suggested that in at least one patient with autoerythrocyte purpura the phosphatidyl serine of the red cell membrane may play a role in the pathogenesis of the purpuric lesions.

3. It is likely that a broad spectrum of autosensitivity-type purpuric disorders exists in women with complex emotional problems. The threshold of reactivity may be modified by the psyche.

All varieties of circulating white blood cells in patients with Chediak-Higashi syndrome characteristically contain giant granules in their cytoplasm. The similarity of the massive particles to normal-sized leukocyte lysosomes has been previously recognized. In the present study the technics of ultrastructural histochemistry were used to demonstrate acid phosphatase activity in giant C.H. particles and their degenerating remnants in the leukocytes of two patients with the C.H. syndrome. The presence of an acid hydrolase in massive granules indicates that they are lysosomes. The selective localization of enzyme reaction product in large particles by this method, when small normal-appearing lysosomes in the same cells remained unstained, has suggested that the unit membranes surrounding C.H. granules are abnormally permeable. The increased permeability of the large particles may be related to the pathogenesis of morbid clinical features of C.H. syndrome.


A simple technic is described by which the cells exuded from a skin abrasion can be collected as a cell suspension suitable for quantitation and for further study of the living cells. The technic is identical in principle to the quantitative modification of Rebuck’s “skin window” technic which was devised by Perillie and Finch, but the smaller, flatter chamber is more easily affixed to the arm and rarely leaks and can be left in place overnight without interfering with sleep. Hence, it is more acceptable to the subjects under study and technically more satisfactory. It provides a method of obtaining normal cells, and of studying the cellular reaction to various antigenic or nonantigenic stimuli.


The observations of many individuals are correlated to indicate that the myeloid and lymphoid derivatives of mesenchyme carry on important complementary roles in tissue nutrition. Whereas the myeloid tissues specialize to the internal transport of oxygen by producing erythrocyte hemoglobin, it is suggested that the lymphoid tissues and, to some extent, the reticulum become specialized to the transport of water and food by producing plasma containing a variety of low and high molecular weight proteins, and by producing lymphocytes which may carry nucleoproteins to the tissues. Fundamentally, the lymphoid tissues (and the reticulum elsewhere) appear to subserve this nutritive function by utilizing molecular substrate from multiple sources—including the arteries, the branchial pouch entoderm (in the embryo), the gastrointestinal mucosa (in the adult), and the peripheral lymphatics—to produce a variety of mononuclear cells which “give of themselves” by undergoing dissolution, by shedding soluble cytoplasmic droplets, or by migrating to other tissues and dissolving there. It is stressed that dissolution of the reticulum, the mono-
nuclear cells, and the cytoplasmic droplets (essentially gels) will yield sols (plasmas) whose water makes possible the intravascular migration and flow of proteins and other nutritive elements, and whose proteins (colloids) osmotically enable the intravascular retention of water. While it is assumed that the parenchymal cells of the liver are the source of most of the plasma proteins, circumstantial evidence is presented to suggest that this assumption is incorrect and that derivatives of mesenchyme are the direct source of the blood, its cells, its plasma, its water, and its diverse extracellular as well as intracellular proteins.


Some enzyme activities of normal human red cells treated with AET and cysteine have been investigated. Treated red cells showed low acetylcholinesterase activity and low O₂ uptake in the presence of methylene blue; on the contrary, glucose-6-phosphate-dehydrogenase activity and lactic acid production in the presence of glucose were found to be normal. Results are briefly discussed.


Simultaneous microwave and x-irradiation at a sublethal x-ray dose level modify the hematologic response to x-irradiation. Earlier neutrophil recovery and delayed lymphocyte and hematocrit recovery resulted following simultaneous microwave and x-ray exposure.


This report presents the first case of factor 13 deficiency in an adult female. Her hemorrhagic manifestations were repeated and severe: umbilical vein bleeding at birth, hematomas on various sites, late bleeding after cuts, and, most important, severe uterine bleeding during 12 pregnancies, which were all interrupted by spontaneous abortions.

Plasma infusions assuring F.13 concentration of less than 10 per cent of its normal level normalized the hemostatic functions of the patient’s plasma clots and rendered them insoluble in concentrated urea solutions.

By regular transfusions of plasma the patient’s last pregnancy had a normal course; a cesarian section was performed without any incident and she gave birth to a normal child.

Lisker, R., Zarate, G., and Loria, A.: Studies on several genetic hematological traits of Mexicans. IX. Abnormal hemoglobins and erythrocyte glucose-6-phosphate dehydrogenase deficiency in several Indian tribes. First submitted Aug. 4, 1965; accepted for publication Nov. 13, 1965.

The distribution of abnormal hemoglobins and erythrocytic glucose-6-phosphate dehydrogenase deficiency in 2000 Mexican Indians is described. It is
pointed out that the frequency of hemoglobin S and G-6-PD deficiency is low and directly related to Negro admixture. On the other hand, two rare mutants were encountered: hemoglobins Mexico and Chiapas, the former in 2 unrelated subjects. The clinical, hematologic, genetic and biochemical characteristics of Hb Chiapas are described.


The fluorescent antibody technic was applied to the study of thrombocytopenic purpuras with a presumable immunologic pathogenesis.

The results of the investigation suggest the hypothesis that some plasma protein material is strongly adherent to the surface of megakaryocytes in more than 50 per cent of chronic ITP.


The presence of iron in plasma cells was demonstrated by light and electron microscopy. The iron compound was identifiable as ferritin in at least one patient. Possible modes of origin, function and fate of iron in these cells was discussed.


1. Ultrastructural studies were made of 400 agranulocytes each from the thoracic duct effluent of 12 normal Holstein calves of both sexes.

2. Tabular electron microscopic evaluation of the agranulocytes present demonstrated that 89 per cent were lymphocytes, 4.8 per cent plasmacytes, 1.3 per cent reticular lymphocytes, 4 per cent proplasmacytes, and 0.7 per cent mitotic forms of the various cell types enumerated.

3. Mitochondrial tabular studies demonstrated that profile numbers (6.2–8.2) and profile sizes (0.15–0.25 μ²) were similar among cell sections of the 5 designated cell groups in the calf and the lymphocyte of the human. Monocyte mitochondrial profiles of the human were highly significantly smaller (0.05 μ²) than those of other cells studied. These studies provided added proof that monocytes probably are not present in the thoracic effluent of the calf.

4. Nuclear bodies were found to be present only in lymphocytes. They were present on the average in 12 per cent of thin sections of cells in this class. In contrast to nuclear bodies of other nonblood cells, in lymphocytes they were not associated with the nucleolus, were smaller in overall diameter, and often contained practically no electron opaque central portion.


Daily injections of 60 μg actinomycin D per Kg mouse caused cessation of erythropoiesis due to complete disappearance of erythroid marrow elements,
and the mice were absolutely refractory to erythropoietin. No decrease in myelo-, lympho-, or megakaryocytopoiesis was found during more than 3 weeks of daily administration of the drug. Observations on the effect of the drug on a cohort of erythroid cells, induced by erythropoietin in polycythemic mice, gave no evidence of its destructive or inhibitory action on early or late normoblasts. A critical reduction in the number of integer stem cells was likewise ruled out as the cause of eradication of erythropoiesis. The latter is attributed to a specific interference of actinomycin D in the effector pathway of erythropoietin controlled transformation (differentiation) of stem cells into early pronormoblasts. Factors possibly responsible for the resistance of myelo- and megakaryocytopoiesis are discussed.


Autologous erythrocytes were irradiated at doses of 35,000 to 200,000 rads, were chromated, and red cell survival was studied. The 24-hour loss of labeled cells and subsequent apparent erythrocyte survival times were found to be functions of the radiation dose. EC1B-produced red cell hemolysis of a mild degree is to be expected during courses of therapy, as demonstrated by clinical findings. However, there is no doubt that acute, severe hemolysis could be produced by administering large doses to patients over a short period of time.

Gamble, C. N.: The effects of phytohemagglutinin on mouse spleen cells in vivo. First submitted Sept. 27, 1965; accepted for publication Nov. 28, 1965.

The intravenous injection of absorbed (erythroagglutinin free) PHA in mice resulted in a marked increase in spleen weights, numbers of nucleated spleen cells, and spleen cells in mitosis. The morphologic changes induced in the splenic lymphocytes were striking and closely paralleled the changes observed following the addition of PHA to cultures of human and animal leukocytes. Observations on the absolute numbers of mature lymphocytes and immature lymphoid and blast cells suggest that the proliferative effect of PHA on spleen lymphocytes is due in part to mitosis following blast cell transformation of mature small lymphocytes. PHA also stimulated the normoblasts and granulocytes present in the mouse spleen to proliferate. The normoblasts showed a single early peak of proliferative activity. The granulocytes showed a similar early increase in numbers, but remained elevated for the duration of the experiment. The lymphoid cells showed an early, primary peak of proliferation as well as a later, secondary, smaller peak which preceded the appearance of serum antibody directed against PHA. The findings suggest that PHA acts as both a nonspecific or nonantigenic stimulus and as an antigenic stimulus to the proliferation of spleen lymphoid cells in vivo.