ABSTRACTS
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ERYTHROCYTES


An atypical erythrocyte pyruvate kinase (PK) was found in a 9-mo-old girl with hereditary nonspherocytic hemolytic anemia. The PK activity was increased more than ten times the upper limit of normal. By contrast, PK activity in the parents was very low. Further investigations of the patient's enzyme showed an abnormal pH-optimum and a great thermolability. After 60 min of incubation at 37°C, the enzyme activity fell to 0. The Km value for the substrate PEP was decreased. The patient's enzyme was not affected by urea up to a concentration of 2.5 M, while normally the enzyme activity falls to 50% in 0.4 M urea. The electrophoretic pattern showed two bands (normally one). The genetics of this atypical pyruvate kinase are discussed.—M.C.V.


The "early hemolysis" syndrome, a condition in which part of the erythrocyte population is destroyed immediately upon leaving the marrow compartment, shows a distinctive erythrokinetic pattern by 59Fe and 51Cr studies, indicating the existence of a double erythrocyte population. The syndrome is observed in hereditary diseases such as erythropoietic porphyria and pyruvate kinase deficiency, as well as in acquired diseases such as PNH, aplastic anemia, and leukemia. The findings in this syndrome indicate that besides a normal erythrocyte population, an abnormal clone of erythrocytes is present in the circulation; this second clone of erythrocytes is destroyed prematurely. The described syndrome of "early hemolysis" has to be discerned from that of ineffective erythropoiesis with intramedullary destruction of red cells.—M.C.V.

A study was done of iron metabolism in a homogeneous population of young blood donors (20–30 yr of age), who had given blood once or several times. In the Netherlands, the Central Blood Transfusion Committee of the Red Cross does not allow more than two donations of 400 ml of blood/yr. It was found that the repeated withdrawal of blood imposed a stress on iron metabolism, especially in women. In the subjects examined, however, this had not led to demonstrable iron on hemoglobin deficiency. Administration of iron to these blood donors had a distinct hemopoietic effect, which was stronger when the hemoglobin concentration was lower. The treatment did not lead, however, to an increase in serum iron level. The same effect could be obtained by a diet sufficiently rich in iron. It may therefore be important to inform blood donors of the value of an adequate diet.—M.C.V.


Iron content of saliva of patients suffering from chronic bronchitis and emphysema was estimated. The average iron loss in saliva was 51 μg, which would mean a loss of 18 mg/yr. Not even in patients who coughed for a number of years could these small losses alone account for the sideropenia that was found in some of these patients. There was no relationship between the iron content of saliva and iron reserves of the organism. Saliva specimens with lower and higher iron content did not differ in their microbiological composition. —L.D.


Clinical and hematologic data, special red cell characteristics, and studies of the hemoglobin structure of an unstable hemoglobin hemolytic anemia (UHHA) are reported. The instability of the patient's hemoglobin originated from a β88 (F4) Leu → Pro mutation and is, together with one observed in France, a further example of the unstable Hb Santa Ana. Special red cell studies revealed deranged nonelectrolyte permeability, slightly lower GSH, and relatively low ATP content of the patient's red cells. Characteristics of fetal-type erythropoiesis were seen, i.e., increased red cell electrophoretic mobility, increased G-6-PD activity, and changes in the lipid composition of the red cell membrane resembling those found in cord blood cells.—S.R.H.


Incorporation of glycine-2-14C (1 μCi/kg administered i.v.) into plasma bilirubin, hemin, and globin of the red cells was studied in five normal subjects and three patients with stimulated erythropoiesis. In two of the normal subjects and in two of the three patients, a parallel study was also made of the incorporation of δ-aminolevulinic acid (ALA)-3,5-3H (administered intravenously at the same time as the glycine, in doses of 0.3–0.4 μCi/kg). In the normal subjects the existence was confirmed of two peaks of early labeled 14C-bilirubin (14C-ELB) and of a single peak of 3H-early labeled bilirubin (3H-ELB). Variability range was calculated for the specific radioactivity values of the 14C-ELB, the 14C-hemin, and the 14C-globin, as well as of the daily increment in the labeled hemin and globin and of their ratio (H/G) at various times. In conditions of stimulated erythropoiesis, the 3H-ELB curve did not undergo significant modifications. The radioactivity values of the 14C-ELB showed a greater and more rapid increase than normal. This alteration was constant and more evident for the second peak but it could
also affect the first peak to a smaller degree. The values and kinetics of the $^{14}$C-hemin and $^{14}$C-globin showed variations that were in agreement with the condition of stimulated erythropoiesis. Discussion of the results lead the authors to conclude that: the first $^{14}$C-ELB peak derives for the most part from nonhemoglobin heme, but also to a slight degree from the intramedullary catabolism of the newly formed Hb; the second $^{14}$C-ELB peak derives from hemoglobin (ELB of erythropoietic origin); and that this method of investigation constitutes a new and interesting means of studying bone marrow kinetics of the erythron.—G.L.


If environmental conditions are standardized, patients with hemolytic anemia have higher levels of carboxyhemoglobin than do normal controls. When environmental conditions are not standardized, there is complete overlapping of the observed values in hemolyzers and nonhemolyzers.—J.B.S.


The authors studied the production of erythropoietin (ESF) in binephrectomized rats subjected to hypobaric hypoxia at different intervals after removal of the kidneys. The plasmatic level of ESF was evaluated in mice made polycythemic by intermittent hypobaric hypoxia, using the method of $^{59}$Fe in the circulating hemo- globin. The erythropoietic response was significant in rats subjected to hypoxia immediately after nephrectomy, although it was far lower than in normal hypoxic animals. The hormonal response diminished or disappeared completely in the groups in which the time interval between nephrec- tomy and the beginning of the hypoxia was 12 or 24 hr, respectively. On the basis of these results, it is considered that the modest but significant level of erythropoietin in hypoxic, binephrectomized animals is due to residual ESF in the circulating plasma or in extrarenal tissue stores after removal of the kidneys.—F.A.K.


Uptake of vitamin $\text{B}_12$ by microorganisms found within the gastrointestinal tract was found to be a two-stage process. The primary uptake was rapid (1 min), insensitive to metabolic inhibition, and did not require viable organisms. This phase is thought to represent absorption to binding sites on the cell wall. The second stage of uptake was slower, required living bacteria, and was dependent on active metabolic processes. This phase may represent incorporation of the $\text{B}_12$ into the bacterial cell. —F.A.K.

In vitro serum vitamin B₁₂ abnormalities characteristic of chronic myelogenous leukemia were found present in five subjects without leukemia. These included: marked elevation of alpha-globulin B₁₂-binding capacity in all five and high serum B₁₂ levels in three. All five subjects had leukocytosis, and three transiently had immature myeloid cells in the peripheral blood. The B₁₂ abnormalities paralleled recovery in these subjects. — F.A.K.


The effect of cobamamide (a coenzymatic form of vitamin B₁₂) on in vivo and in vitro proliferation and maturation of pernicious anemia megaloblasts was studied. Similar to cyanocobalamine and possibly with a higher degree of effectiveness, cobamamide normalized the increased proliferation rate of megaloblasts and enhanced the evolution of differentiation in pernicious anemia cells. The mechanisms of this action at the biological level are discussed. — S.R.H.


Jejunal uptake of ³H-PGA in chronic alcoholic patients without definite liver disease was measured by perfusion through a triple-lumen tube. Uptake was low on hospital admission in eight poorly nourished, actively imbibing alcoholics, most of whom were folate deficient. Uptake rose following a 2-wk period of abstinence and intake of a hospital diet. The subsequent administration of ethanol did not reduce uptake. The authors conclude that the functional defect is caused by poor nutrition rather than a toxic effect of ethanol on the jejunum. — F.A.K.


In a 40-yr-old jaundiced anemic woman, ill with fever, polyneuropathy, and loss of hair, fulminating hemolysis was identified as the cause of the anemia. The possible causes of this hemolysis have been discussed. The jaundice could not be explained solely on the basis of the hemolysis. Hepatitis was possible; later E. coli sepsis was found, caused probably by cholangitis. Adequate control of the sepsis with antibiotics was followed by improvement of liver function and of the hemolysis. At a subsequent operation, the bile ducts were drained, and a liver biopsy was performed. The biopsy specimen showed signs of cholangitis and extrahepatic cholestasis. The patient made a complete recovery after the operation. — S.R.H.

LEUKOCYTES


ABSTRACTS

The above papers, all from the Department of Histology of the Karolinska Institute, present part of the studies by the group of Gyllensten (also a well-known fiction writer and member of the Swedish Academy) and Ernström on growth and differentiation of thymus and lymph nodes. Initially, stimulating (X-ray, infection) and inhibiting (steroid) effects on germinal centers, cytopoiesis, and release of cells from the thymus were studied. In guinea pigs, about 28% of lymphocytes in the thymic vein became labeled with 3H-thymidine, corresponding to an export of 500 lymphocytes/cu mm, mostly small lymphocytes. Since thymocytes are the primary antigen-reactive cells, the total venous output from the thymus was calculated. It was estimated to be 0.7 X 10⁹ cells in 24 hr (circulation is 400 cells/cu mm per hr). Since all cells are labeled after 72 hr when thymidine is given continuously and since counts of homogenates showed a total of almost 10⁹ lymphocytes in the thymus, the total production was calculated to be about 3 X 10⁹ cells/24 hr. In the spleen, the export was about 200 lymphocytes/cu mm, it increased temporarily after sham operation, was not decreased by steroids, but it was perhaps by thymectomy. The lymphocyte export was measured by the a.-v. difference. Lymphocytes were also classified by counting of mitochondria after supravital staining, but all categories behaved similarly. The splenic output was low (especially for small lymphocytes with few mitochondria) in newborn guinea pigs and increased to a maximum at 4-8 wk of age.—P.G.R.


Esterase activity on alpha-naphtyl and naphtol-AS acetates was normal in the polymorphs of a patient with the Chediak-Higashi syndrome. On the contrary, acetylcholoronaphtol esterase activity was very low or absent in the granulocytic series of this patient.—J.C.


Two patients with the syndrome of the so-called blue pigmentophages are presented. The first patient developed severe disturbances of the central nervous system in early childhood. In the second case, marked portal hypertension with esophageal varices and splenic thrombocytopenia and leukopenia were established. From cytochemical analysis of the blue pigment and examination of the macrophages by electron microscopy, it appears that phospholipids play an important role in the composition of the stored pigment. It is suggested that in this syndrome a specific congenital enzymatic disturbance of the reticulum cell exists, whereby these cells have lost their ability to degrade in the usual manner the lipids of the phagocyted blood elements.—L.D.


Phase-contrast cinemicrographic recordings yielded visual evidence of mitoses occurring in well-differentiated newt and mice macrophages performing marked phagocytosis. This is in good agreement with the concept that peritoneal and tissue culture

Non-Specific Esterase Activity of Polymorphs in Chediak-Higashi Syndrome.
macrophages are not end cells and may resume their mitotic activity under certain experimental conditions.—S.R.H.


Peripheral blood lymphocytes of patients with Hodgkin's disease, reticulum cell sarcoma, and chronic lymphocytic leukemia, when compared to those of normal subjects, showed an increase in nuclear diameter (except in stage 1 of Hodgkin's disease) and enhanced PAS reactions; also noted was an increase in sinus-type lymphocytes in Hodgkin's disease, reticulum cell sarcoma, and lymphosarcoma, while in chronic lymphocytic leukemia an increase in follicle-type lymphocytes occurred.—J.V.


The simultaneous occurrence in one patient of diabetes insipidus and acute myeloid leukemia is reported. Scar tissue was found in the neurohypophysis as a morphologic basis for diabetes insipidus. In the adrenal cortex leukemic infiltration and hemorrhage were observed, but the clinical picture and the Metopirone test did not indicate a decreased adrenal cortex function. In the course of the Metopirone test, a transitory increase in the specific weight of the urine was observed.—S.R.H.


Cytogenetic studies are reported in two patients with chronic myeloid leukemia in whom reticulum cell sarcoma developed. In the first case, sarcoma cells in a lymph node possessed the Philadelphia chromosome and a hyperdiploid set of chromosomes (48 with extra chromosomes in groups C and F); bone marrow cells had 46 chromosomes and were Ph' positive. Later, in a blastic crisis, there appeared in the blood sarcoma cells similar to those seen in the node and also progeny of these containing 49 chromosomes (two extra in group C, one in group F and Ph' positive). The marrow of the second case contained clones of hypodiploid cells with 51 and 52 chromosomes, including two Ph' chromosomes. Reticulum cell sarcoma was diagnosed 5 mo later in a lymph node that contained cells with 52 chromosomes (extra chromosomes in groups C and D, and two Ph' chromosomes).—J.V.

The Nature of Leukaemia: Neoplasm or Disorder of Haemopoietic Regulation.

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ABSTRACTS


This detailed review article discusses the nature of the leukemic cell with emphasis on new findings arising from the technique of in vitro marrow culture. The principal conclusions are that leukemic cells are not autonomous tumor cells but are partly responsive to physiologic regulators of differentiation and that disturbances of regulator levels are common in established leukemia and may be present in preleukemic states. This article by a leading worker in the field should be read in the original by all those interested in leukemia. —A.A.M.

Long-Term Culture of Human Leukemic Leukocytes. V. Půssnerová, K. Smetana, M. Krecek, F. Hermansky, and J. Fortynová. Department of Medicine, Charles University, Prague, Czechoslovakia. Neoplasm (Bratisl.) 17:513-523, 1970.

The leukocytes of a patient with chronic myeloid leukemia in blastic crisis were cultured in Eagle’s medium (USOL, Praha). Proliferation in the culture occurred for 268 days in the form of immature blasts. The blasts were studied by radioautography, cytochemistry, and electronmicroscopy, and the karyotype was also determined.—L.D.

HEMOSTASIS

Immunologic Differentiation of Classic Hemophilia (Factor VIII Deficiency) and von Willebrand’s Disease. T. S. Zimmerman, O. D. Ratnoff, and A. E. Powell. Department of Medicine and Surgery, Case Western Reserve University School of Medicine, Cleveland, Ohio. J. Clin. Invest. 50:244, 1971.

Factor VIII activity was detected by an immunoprecipitation method using heterologous antiserum prepared in rabbits against highly purified factor VIII. Material, antigenically similar to normal factor VIII, was detected in each of 22 patients with classical hemophilia, but decreased amounts were found in the plasma of 11 patients with von Willebrand’s disease. These findings, as well as those in the paper by Stites et al. (Science 171:196, 1971), suggest that the deficiency in factor VIII in von Willebrand’s disease is due to decreased synthesis of the protein, while the latter may be present but nonfunctional in hemophilia. —H.J.W.


In 11 patients with hemophilia it was possible to prove the presence of an abnormal protein, using plasma from a patient with a circulating inhibitor against factor VIII. The neutralization test showed that in three patients with hemophilia A from different families the abnormal factor VIII lacked physiologic activity.—L.D.


In ten patients with severe hemophilia, the inhibitor of fibrinolysis, tranexan acid (AMCA) (Cyclocapron), was administered for 6-105 wk in the daily dose of 3 g orally. In six patients there was a decrease in the number of hemorrhagic manifestations, the number of hospitalizations, and of plasma or antihemophilic globulin infusions. The abnormal blood clotting was not changed by the treatment, and also unchanged were the prothrombin consumption, the thrombelastogram, and the plasma level of antihemophilic globulin. With the exception of diarrhea and abdominal pain in one case, no side effects were observed. —L.D.


Repeated administrations of cryoprecipitate to four female patients during various
bleeding episodes showed good clinical results. The peak level of AHG in the plasma did not occur immediately after transfusion of the cryoprecipitate but 2-4 hr thereafter. This finding demonstrates again that the defect of AHG in Von Willebrand's disease is different from that in hemophilia A.—L.D.

Influence of Hydrocortisone and Anallergin on Aggregation of Thrombocytes With bleeding episodes showed good clinical results. The peak level of AHG in the plasma did not occur immediately after transfusion of the cryoprecipitate but 2-4 hr thereafter. This finding demonstrates again that the defect of AHG in Von Willebrand's disease is different from that in hemophilia A.—L.D.


Intravenously administered solutions of trisodium citrate or acidified citrate of various concentrations (0.38%, 0.76%, 1.14%, 1.50%, 1.90%) produced a pronounced fall of the platelet count in rats. The decrease was noticed with concentrations up to 1.9%. Higher concentrations of citrate had lethal effect in some animals. Oxalate or EDTA solutions had no significant influence on the platelet count. Solutions of citrate caused a decrease in platelet count, probably by causing adhesion of platelets on the altered vessel walls. Histologic examination showed accumulation of basophilic masses in the lung capillaries, and a study with 51Cr-tagged platelets confirmed the trapping of platelets in the lungs of the animals.—L.D.


The coumarin derivatives, warfarin, ethylbiscoumacetate (Tromexan), and biscoumacetic acid, inhibit aggregation of blood platelets induced by adenosine diphosphate, thrombin, collagen, or epinephrine. The highest inhibition was shown by biscoumacetic acid, and the lowest by warfarin. Inhibition took place after addition of coumarin derivates to the platelet-rich plasma in vitro and was not mediated by interference with the physiologic synthesis of prothrombin.—L.D.

Influence of Hydrocortisone and Anallergin on Aggregation of Thrombocytes With bleeding episodes showed good clinical results. The peak level of AHG in the plasma did not occur immediately after transfusion of the cryoprecipitate but 2-4 hr thereafter. This finding demonstrates again that the defect of AHG in Von Willebrand's disease is different from that in hemophilia A.—L.D.

The effect of hydrocortisone, anallergin (antazolinium chlorate), ketazone, and sodium salicylate on human platelet aggregation induced by streptokinase was investigated. Platelet aggregation was significantly inhibited by hydrocortisone in concentrations of 4 x 10^{-3} M and by anallergin in concentrations of 4 x 10^{-4} M. Ketazone (ketophenylbutazone pyrazolidine) and sodium salicylate in a concentration of 5 x 10^{-3} M did not inhibit platelet aggregation induced by streptokinase.—L.D.


Homologous platelet concentrates were labeled in vitro with 51Cr and administered to patients of identical blood groups with different hematologic diseases in order to study the survival time and localization of platelet destruction. In normal control subjects the survival time was not less than 7 days (7-11 days). The spleen/liver ratio varied from 0.9 to 3, suggesting a uniform destruction in the reticuloendothelium of both spleen and liver. In 39 cases with idiopathic thrombocytopenia, the survival time was reduced in almost all cases. In 50% of the patients platelet destruction in the spleen and liver varied within the range of normal; in others there was increased activity over the spleen or over the liver. However, the cases did not show substantial clinical differences in their subsequent course. In secondary hypersplenism and in myelofibrosis there was always increased activity over the spleen.—L.D.

Scattered petechiae were present at birth in an infant, the fetal surface of whose placenta contained a moderately large capillary hemangioma (chorangioma). By the fifth day the platelet count had risen from 35,000 to 180,000/cu mm, and the purpura disappeared.—J.B.S.

Donor blood was drawn into various solutions, some of which contained the antiproteolytic, antifibrinolytic substances tsalol and epsilon-aminocaproic acid (EACA). After 2-wk storage the bloods containing tsalol and EACA had a higher concentration of proaccelemin and AHC than did the controls. They also contained higher antiplasmin and lower plasminogen levels than controls, suggesting that the better preservation of coagulation elements was due to inhibition of proteolysis and fibrinolysis—J.V.


Coagulation studies revealed similar findings in patients undergoing hyperacute renal allograft rejection and in a group of infants with hemolytic-uremic syndrome (HUS). Elevated levels of fibrin degradation products without significant abnormalities in fibrinogen levels, prothrombin times, or partial thromboplastin times, along with mild to moderate thrombopenia were present in both groups. Occasional elevations of factors V and VIII and fibrinogen were seen. From these findings the authors suggest that the HUS is an immunologic disorder centered in the kidney.—J.B.S.


A girl who evidenced onset of an altered immune responsiveness at the age of 6 yr was studied extensively between the ages of nine and 11. Although there was ample evidence of normal humoral and cellular immunity through early childhood, at age ten she had lymphopenia, marked deficiency of all immunoglobulins, and absence of any skin or lymphocyte responses to antigenic stimulation. Despite recurrent illnesses she remained relatively healthy and at age 11 had an increase in total lymphocyte count and a return of normal response to PHA stimulation.—J.B.S.

Immunoochemical Studies on Group-Specific Agglutinins of Diverse Origin. A. S. Wie-
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ner. Department of Forensic Medicine, New York University, School of Medicine, N.Y. Haematologia 4:157-166, 1970.

The agglutinin anti-A111 from the snail Helix pomatia, which gives reactions similar to those of other anti-A reagents in tests on human blood, was inhibited by N-acetyl-D-galactosamine and to a lesser extent by N-acetyl-D-glucosamine. The agglutinin anti-Ag from the snail Achatina granulata was inhibited by all three amino sugars, N-acetyl-D-galactosamine, N-acetyl-D-glucosamine, and N-acetyl-D-mannosamine. Neither anti-A111 nor anti-Ag was inhibited by any of the many other simple sugars tested. Comparative quantitative inhibition tests were carried out with a number of different agglutinating reagents having A specificity in tests on human blood and saliva. The reagents included anti-A111 snail agglutinin, anti-A lectin (Dolichos biflorus), anti-A lectin (lima bean), anti-A isoagglutinin of human and rhesus monkey serum, and human anti-A serum absorbed with A0 cells. The results, while supporting the predominant role of N-acetyl-D-galactosamine for A specificity, also demonstrated qualitative differences among the reagents. The probable basis for these qualitative differences is discussed.—S.R.H.


Necropsy findings in four children dying with the hemolytic-uremic syndrome (HUS) are described. Vascular lesions were limited to the kidneys. Small arteries and arterioles were markedly narrowed by swollen endothelial cells and by PAS-positive material deposited between cells and basement membrane. This material was stained for fibrin and contained a lipid. Surrounding the arteries were lipid-containing pericytes. None of these vessels contained thrombi. Glomerular lesions consisted of swollen, vacuolated cells and subendothelial deposits that caused significant capillary narrowing; similar deposits were seen in the mesangial regions. Unlike the arteriolar deposits, this material contained little fibrin. Immunofluorescent studies corroborated the presence of fibrin in arteries and arterioles but not in glomeruli. In a small proportion of blood vessels there was mild fluorescence for B1, and IgG. Fluorescence in the glomeruli was negligible for fibrin, B1, or IgG. On the basis of these findings the authors suggest a toxic or infectious, rather than immunologic, etiology for the HUS.—J.B.S.


In patients with various blood diseases, especially with bone marrow hypoplasia and peripheral cytopenias, the following serum antibodies were found: antibodies toward allogeneic and autologous bone marrow; antibodies toward blood vessels; and cytotoxic antibodies against allogeneic and, in some cases, autologous bone marrow. It is postulated that approximately one-fourth of the so-called idiopathic bone marrow failures are caused by an immune mechanism.—L.D.

MISCELLANEOUS


Over-all mortality in this group of infants was 34%. Among those who were categorized as being severely affected (mortality rate 80%), early peritoneal dialysis appeared significantly to favor survival. Heparin therapy was administered to eight patients; no clear-cut benefit was noted.—J.B.S.

The Problem of a Suitable Concentration of Glycerol as a Protective Substance in Bone Marrow Preservation by Freezing. E. Dobry, J. Fiala, and J. Livora. Institute of Hematology and Blood Transfusion,

The protecting effect of 5, 10, or 15% concentrations of glycerol on the repopulation ability of mouse bone marrow subjected to a slow freezing process was studied. The Till and McCulloch test was used for evaluation. The 5% concentration of glycerol was found to be optimal for the above-mentioned purpose.—L.D.


In 1846, in the Journal of Military Medicine (XVIII, No. 1, pp. 7-23) an article entitled "On Transfusion of Blood" was published by one of the foremost surgeons of the day, I. V. Buyalski. This was of special significance in disseminating the concept of blood transfusion, the author stating that blood transfusion was truly a beneficial procedure and should be classed among those operations to which resort should be made in extreme cases. Transfusion was made directly from donor to recipient using a special syringe with a double glass wall containing water so that the blood could be maintained warm, a matter he considered of great importance. Another of his concerns was to avoid the introduction of air into the veins. In 1832, an obstetrician, Dr. Bolfo, had used a similar technique in performing the first human blood transfusion in Russia. Besides this scientific paper, an account of the technique was also published in the local newspaper, the St. Petersburg Gazette.—J.V.

NATIONAL BLOOD CLUB

The National Blood Club will meet on Saturday, April 29, 9:00 p.m., in Atlantic City, N.J. The topic is: Recent Advances in Basic Cancer Research (1) The Intracellular Regulation of Lymphocyte Growth: Arnold Rubin, M.D., Mt. Sinai School of Medicine, New York, N.Y.; (2) Immunological Induction of Malignant Lymphomas: Robert S. Schwartz, M.D., New England Medical Center Hospitals, Boston, Mass. (3) Structural and Biosynthetic Disorders of Immunoglobulins: Edward C. Franklin, M.D., New York University Medical Center, New York, N.Y.; (4) Human Cancer and the RNA Tumor Viruses: S. Spiegelman, Ph.D., College of Physicians and Surgeons, Columbia University, New York, N.Y.

CONFERENCE ON BLOOD PLATELETS

The Fifth Conference on Blood Platelets, sponsored by the Biology Division of Oak Ridge National Laboratory, will be held Thursday and Friday, June 1–2, 1972, at the Oak Ridge Playhouse. Additional information may be obtained by writing to: T. T. Odell, Jr., Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tenn. 37830.