
The activity of human erythrocyte phosphofructokinase is influenced by several ligands. The influence of ADP, cyclic AMP, 5'-AMP and Pi is pH dependent. At acid pH they activate the enzyme, but at alkaline pH this activation is much less. Citrate and 2,3-DPG do not inhibit the enzyme. The inhibition by ATP is pH dependent. Cyclic AMP is able to reverse the inhibition by ATP to some extent. With GTP, ITP and UTP no inhibition is observed. At saturating concentrations of GTP, ATP still inhibits phosphofructokinase. It is proposed that the activity in vivo is mainly dependent on the substrate concentrations. — K.P.

A severe deficiency in red cell 3-phosphoglycerate kinase was observed in a 62-yr-old woman with hemolytic anemia. With respect to a red cell population with the same degree of reticulocytosis, the 3-phosphoglycerate kinase activity was reduced to 27%. Pyruvate kinase and hexokinase were both reduced by about 30%. The activities of other glycolytic enzymes were slightly increased. The total glycolytic output of the deficient cells was decreased. The steady state levels of the intermediates preceding the 3-phosphoglycerate kinase step were increased 2.3 fold. ATP, ADP, NADH, and NADPH were not changed. The metabolic significance of the enzyme defect was further investigated by the in vitro creation of cell stressing conditions, i.e., low pH and high pyruvate levels. From the results it is concluded that the increased hemolysis is due to impairment of the ionic pump. --- K. P.


Red blood cells from a splenectomized patient were examined by scanning electron microscopy and transmission electron microscopy to determine whether Howell-Jolly bodies were intra- or extracellular. Results of the examinations indicated that Howell-Jolly bodies were intracellular. --- P. F.


The functional capacity of erythroid cells was studied in 22 children (age 10 mo to 4 yr) with iron deficiency anemia by means of in vitro bone marrow culture with Fe59Cl3. A rapid differentiation of normoblasts was observed. The average increase of eosinophilic forms was from 24.2% to 70.5%, and in individual cases it reached 91.5%, whereas the number of sideroblasts decreased. In six children of the control group whose bone marrow was cultured without Fe59Cl3, the average increase of eosinophilic normoblasts was only 31.5% to 42.0%, but the sideroblasts completely disappeared. The author concludes that by the rate of normoblast differentiation in vitro it is possible to recognize the iron deficiency anemia from the anemias of other origin. --- G. A.

The Effect of Lyophilized Pancreatic Juice on Iron Absorption by Rat Small Intestine. J. Prokopczuk, J. Stasiewicz, A. Gabrylewicz, and J. Dlugosz. Department of Gastrology, School of Medicine, Bialystok, Poland. Pol Arch Med Wewn 49:571-575, 1972

Absorption of radioactive iron in the small intestine of the rat was investigated using the in vitro method of the “reversed intestinal loop.” Lyophilized pancreatic juice was found to significantly reduce iron absorption, the degree of this reduction being dependent on the concentration of pancreatic juice. Dialysis of the juice diminished its inhibitory effect of 59Fe absorption to about 50% of the whole juice activity. --- M. K.


During recurrent severe agranulocytosis probably due to drugs, a woman aged 44 yr developed hemolytic anemia due to penicillin. Owing to the occurrence of septicemia with marked moniliasis of the mouth and pharynx and complete agranulocytosis and a history of rheumatic disease, she received broad spectrum antibiotics in high dosage. During the first 13 days after admission to the hospital, she received 100 million U of penicillin per day intravenously, a total dose of 1,175 million. On the 15th day, the signs of hemolytic anemia appeared with fall in the number of circulating red cells, hemoglobin and hematocrit. Reticulocytes and number of marrow erythroblasts were increased. The half-life of Cr51 marked red cells was 21 days. The hemolysis was immunological. A direct anti-IgG Coombs' test was positive and serum hemagglutinating antibodies to penicillin were found at the titer of 1/256. The Shelley test was positive in the presence of penicillin. On stopping treatment, the Coombs' test became negative and she recov-

Clinical and hematological data in 90 Jamaican cases of Hemoglobin SC disease are reviewed. Clinical features of SC disease were generally less severe than those of homozygous sickle cell disease except that retinitis proliferans was more frequent (approximately 33\%) in SC patients. The authors comment that the relatively high hemoglobin levels in this group (12.4 and 11.0 g/100 ml for males and females, respectively) and relatively high M.C.H.C. (34.8\%) may contribute to retinal hyperviscosity.--- J.A.W.


Six patients in whom polycythemia vera had been diagnosed were treated with melphalan (Alkeran). Treatment with doses varying between 80 and 135 mg, divided over 28-44 days, was followed by a good remission. A decrease of the thrombocyte and leucocyte count to subnormal values, and a protracted decrease of the erythrocyte count and the hemoglobin level constitute the dangers of this method of treatment that should not be underestimated. One patient developed melena. Unless regular control examinations are possible, treatment with melphalan is not to be recommended. The results so far obtained have not been better or more rapid than those of blood letting, and for this reason the author is of the opinion that the latter method is still to be preferred.--- K.P.
without preincubation in 3-amino-1,2,4 triazole solution. Catalase activity was demonstrated in mature granulocytes as fine, numerous granules dispersed in the whole cytoplasm. No activity was detected in lymphocytes. The localization of catalase activity has been found to differ from that of peroxidase.


A report is presented of the results of hematological control tests (leukocyte count and differential) during use of pyrazolone derivatives. The frequency of the control tests was adjusted to the dosage, the duration of the treatment and the reactions of the white blood cells. The investigation was a follow-up study concerning the period from 1958 to 1971. In 32 patients the hematological reaction to the use of pyrazolone consisted in granulocytopenia (number of granulocytes less than 1500/cu mm) exclusively. Very rapid development of granulocytopenia was observed in two patients, both of whom had already exhibited such granulocytopenia before. Agranulocytosis was seen in 11 cases. In all these cases, the agranulocytosis was diagnosed before the classical symptoms, sore throat and angina had developed. In nine of the 11 patients a granulocytopenic prophase was demonstrated. On the first day of the agranulocytosis the patient might remain afebrile. None of the patients became severely ill, and any illness that occurred was of short duration. There was no mortality. It is concluded that meticulous hematological control in patients treated with pyrazolone derivatives will reveal a threatening agranulocytosis before other hematological symptoms develop.


Horse and human blood neutrophils and rabbit peritoneal exudate cells were studied. Direct morphological evaluation of cell locomotion was carried out on cover slip preparations prepared over dry streaks of aggregated γ globulin or other proteins. Chemotaxis was evaluated by determining directed locomotion of individual cells toward the test lines. Locomotion and chemotaxis were also evaluated by a modified Millipore chamber system. Evidence is provided for presence of a factor in leukocytes which stimulates locomotion and exerts a chemotactic effect on nearby polymorphonuclear cells. The release and action of the factor does not depend upon presence of serum factors.


The effects of a variety of cell types in feeder layers upon the development of colonies from bone marrow were studied. Feeder layers comprised of fibroblasts and lymphocytes had no stimulation for colony growth. Granulocytes showed only slight stimulation and monocytes showed the most marked ability to stimulate colony formation. The criteria for purity of the various cell types tested depended upon morphology, histochemistry, and function tests.


By measuring the contact angle which a drop of saline makes with bacteria or phagocytic cells, it was determined that noncapsulated bacteria have higher interfacial tension than phagocytes. In vitro phagocytosis tests using human neutrophils showed that such bacteria could be spontaneously phagocytized without requiring opsonization. More hydrophilic encapsulated bacteria resisted phagocytosis (having a lower interfacial tension). The interfacial tension of encapsulated bacteria could be increased by specific anticapsular antibody. Complement produced further increases in interfacial tension and phagocytosis of sensitized and capsulated bacteria.-P.F.

Three classes of membrane bound particles were isolated from the polymorphonuclear cells of chicken peritoneal exudates. The first group were rod-shaped and electron dense and measured 1 to 3 μm in diameter. These were associated with three cationic proteins and lysozyme. The second group which measured 0.3-0.8 μm was composed of two granule types, one of which contained peroxidase and the other of which did not. The peroxidase containing granules were only occasionally found and were believed to originate from eosinophils. The third group of small granules (0.1-0.2 μm) contained acid hydrolases and were heterogeneous. Extracts of the large granule group were inhibitory to Escherichia coli, Serratia marcescens, and Staphylococcus albus. — P.F.


Three cases of genetically determined benign neutropenia associated with an enzymatic defect, i.e., absence of alkaline phosphatase in granulocytes are reported. Detailed investigations were repeatedly performed during the 6 yr of observation of the mother and her two daughters. They all showed persistent neutropenia, relative block of maturation of granulocyte precursors in the bone marrow, diminished activity of serum muramidase. Absence of alkaline phosphatase but normal activities of acid phosphatase and peroxidase were demonstrated by cytochemical tests. Two grandfathers suffered from rather frequent infectious episodes. This syndrome seems to represent a new variant of familial benign neutropenia, absence of alkaline phosphatase in granulocytes being its distinctive characteristic. — M.K.


Peripheral blood leukocytes in 38 patients with infectious mononucleosis were tested for succinic dehydrogenase, acid phosphatase and alkaline phosphatase. Compared to control subjects, neutrophil alkaline phosphatase was reduced and lymphocyte acid phosphatase increased in most patients; lymphocyte succinic dehydrogenase was greatest at the height of the disease and in early convalescence. — J.V.


The authors report a case of gamma globulin myeloma together with type III hyperlipemia and a xanthomatos rash. The authors discuss the association of myeloma and lipid metabolic disorders. In the light of various cases published in the literature, they recall the theories which suggest the sudden rise in serum lipids to be due to the plasma cell disease. — J.C.


About 20% of patients with chronic granulomatous disease have unexplained diarrhea and perianal abscesses. In four out of nine patients studied there were gastrointestinal symptoms. Manifestations included perianal fistulas, friable rectal mucosa, malabsorption of vitamin B12 and steatorrhea. In eight out of nine histiocytes were observed in biopsies of rectal mucosa and similar histiocytes were found in small bowel biopsy specimens in seven patients. The authors conclude that pigmented lipid-laden histiocytes in small bowel biopsies were highly suggestive of chronic granulomatous disease. — P.F.

Alkaline Phosphatase Activity of Neutrophil Granulocytes in Polycythemia Vera and in Secondary Erythrocytomas. W. Szczepkowski and I. Urasinski. Department of Hematology, School of Medicine, Kraków, Poland. Pol Arch Med Wewn 50:269-277, 1973

Cytocchemical examinations of alkaline phosphatase (AP) in granulocytes were performed in 51 patients with polycythemia vera, 15 cases of secondary erythrocytoma and in 20 healthy subjects. The mean AP scores were shown to be four times greater in polycythemia vera than in the secondary erythrocytomas and in the controls. The increase of granulocyte PA was found to be a more constant symptom of poly-

Total and differential leukocyte counts were compared in splenic artery and vein of 15 adult rabbits. Granulocytes were classified depending on the number of segments in nuclei and mononuclear cells depending on their size. A markedly higher mononuclear count has been found in the blood of splenic veins rather than in the blood of splenic arteries. No differences could be detected in granulocyte counts and in various morphological groups of granulocytes and mononuclears. The authors conclude that the role of spleen in elimination of aged forms of granulocytes from the peripheral blood is probably insignificant. M.K.


A retrospective study of leukemia incidence in Chicago among infants of 0 6 yr of age was carried out for the years 1964 1969. The incidence of leukemia was compared in a population receiving BCG vaccine at the age of 2 3 days at the Cook County Hospital, and a population not receiving such vaccination. A statistically significant difference in leukemia incidence in the two groups was demonstrated; leukemia incidence was higher in the unvaccinated group. P.F.


A 3-yr-old child with Wilms' tumor received VCR in a 10 times recommended dose. Five days later, she developed anorexia, abdominal pain, vomiting, diarrhea, lethargy, alopecia, oral cavity ulcerations, weakness, and hyporeflexia. After parenteral therapy with hyponatremia she developed hyponatremia with serum sodium 120 mEq/L, despite which urine specific gravity remained around 1.014. The serum ADH level was 4 µU/ml (normal adult values 1.0). The rise cause of the elevated ADH is unclear but may be related to the effects of VCR on the CNS. Serum sodium levels rose to normal by the sixteenth hospital day. -- J.B.S.


Plasma copper concentrations were higher and plasma zinc concentrations lower in children with untreated acute lymphoblastic leukemia than in treated children and normal controls. The plasma copper/zinc ratio was higher in untreated children than in the other two groups. -- J.A.W.

The Effects of Long-term Administration of Azathioprine to Healthy Dogs. Z. Filipowicz. School of Medicine, Warsaw, Poland. Pol Arch Med Wewn 49:239 248, 1972

Azathioprine was administered in a daily dose of 3 mg/kg to four healthy dogs during 17 22 mo. A decrease of lymphocyte, leukocyte, and thymus atrophy occurred in all four dogs. Platelet counts dropped to low values but were not associated with signs of hemorrhagic diathesis. Anemia was not observed. The diminished leukocyte reserve was found to be earliest and most sensitive index of the damage to the hematopoietic system. Transient rise in activity of serum transaminases and alkaline phosphatase, persistent increase in bromsulphophthalein retention, hypoalbuminemia, and hypergamma globulinemia indicated the damage of liver parenchyma. -- M.K.

Results of Cytosine Arabinoside Treatment in Adult Patients with Acute Myeloblastic Leukemia (AML). M. Gepner-Wozniewska, A. Reitmanska, Z. Sboczynska-Czechowska, and S. Pawelski. Department of Internal Medi-
Cytosine arabinoside was administered to 17 unselected adult patients with AML. Complete remission was obtained in 18% of cases and partial in 35%. In 6%, no improvement was observed and 41% of the patients died during the treatment or immediately after it had been completed. The median survival of the whole group was 6 mo. Remissions occurred more frequently in patients of lower age, in good general condition and with platelet counts above $6 \times 10^9/\mu l$. The percentage of blast cells in myelograms and the white cell counts in peripheral blood were found to be without prognostic significance. Neither previous treatment with other cytostatic agents nor concomitant application of 6MP influenced the frequency of the occurrence of the remissions.

M.A.

**TREATMENT OF ACUTE LYMPHOCYTIC LEUKEMIA:**


Seventy-five children with acute lymphoblastic leukemia (ALL) were treated “prophylactically” for CNS leukemia while 80 children with ALL who received no CNS prophylaxis served as controls. Prophylaxis was 2500 rads to the cranium followed by 1000 rads to the spine in addition to intermittent intrathecal methotrexate (11 doses at 10 mg/sq m up to a maximum of 12 mg). Twenty-six of the 80 control patients developed meningeal leukemia while only 1 of 75 in the treatment group relapsed with meningeal leukemia. This trial differs from other major trials of CNS prophylaxis reported to date in that both radiotherapy and methotrexate were used to treat the spine. The significance of four deaths in remission in the treated group is not clear. J.A.W.

**HEMOSTASIS**


A systematic study of NaCl concentrations on fibrinogen solution (ionic strength 0.05–0.5) as measured by viscosimetry and light diffusion. J.C.

**A CASE OF NEPHTOPATHY AND NEUROGENIC DEAFNESS WITH THROMBOCYTOPENIA, AMINOACIDURIA AND IMPAIRMENT OF URINE ACIDIFICATION.** Z. Chodorowski and J. Zukowska. Department of Nephrology, School of Medicine, Gdansk, Poland. Pol Arch Med Wewn 49:489–492, 1972

A case of coexisting congenital nephropathy and neurogenic deafness associated with thrombocytopenia, aminoaciduria and impairment of urine acidification despite normally efficient excretory renal function is reported. Abnormalities in the mother and brother of the propositus were limited to thrombocytopenia (about $6 \times 10^9$ platelets/cu mm). M.A.


Many members of two families described had increased platelet adhesiveness measured by a modification of the Salzman technique. The defect appeared to be inherited as an autosomal dominant characteristic. One member of each family had a low factor VIII level and a moderately severe hemorrhagic disorder while two members of one family had factor VIII levels at the lower limit of normal and several other family members had a mild hemorrhagic disorder. J.A.W.

**IMMUNOHIMATOLOGY**

**The Role of Lysosomes in Lymphocyte Transformation in Vitro.** H. Tchorzewski. Faculty of General and Experimental Pathology, Military School of Medicine, Lodz, Poland. Arch Immunol Ther Exp (Warsz) 20:831–831, 1972

Inhibitor of proteolytic enzymes (lymophren) has been found to strongly inhibit blastic transformation induced by PHA or specific antigen in guinea pig lymphocytes in cultures. A thermolabile factor stimulating blastic transformation of lymphocytes has been isolated.
from the lysosomal fraction of guinea pig granulocytes obtained from peritoneal exudate. The results are interpreted in respect to the role of granulocyte lysosomes and of proteolytic enzymes in elastic transformation of lymphocytes. M.K.

Proteolytic Activity of Lymphocytes During Skin Transplant Rejection in Rabbits. J. Paradowski, B. Halawa, and J. Giedmanowski. Department of Immunopharmacology, Institute of Immunology and Experimental Therapy, Polish Academy of Sciences and Department of Cardiology, School of Medicine, Wroclaw, Poland. Acta Physiol Pol 23:973-985, 1972

Proteolytic activity of lymphocytes isolated from peripheral blood, spleen and lymph nodes has been investigated in rabbits on third, seventh, tenth, and fifteenth day after transplantation of allogenic skin. $^{311}$J labeled casein was used as a substrate for determination of proteolytic activity of lymphocytes disrupted by freezing and thawing. A considerable post-transplantation increase in the activity of proteases in lymphocytes from peripheral blood has been observed. The intensity of the changes recorded were parallel to the biological state of the transplants similarly to the previously described increase in serum proteolytic activity. Spleen and particularly lymph node lymphocytes showed much less regular and characteristic changes. Actinomycin C (50 $\mu$g/kg. every third day) administered to rabbits with allo-transplants induced a significantly greater increase in serum proteolytic activity and showed no effect on transplant survival. On the contrary, Vincristine (100 $\mu$g/kg. every third day) inhibited the posttransplantation increase of proteolytic enzymes in lymphocytes and prolonged the survival of the skin graft. M.K.


Serologic investigations were repeated during a six mo period in a patient with severe gastro-duodenitis. At the beginning of the observation the patient’s erythrocytes behaved like A1B, but the serum contained weak anti-B isoagglutinins. At that time anti-B sera agglutinated the patient’s erythrocytes as strongly as the control A1B red cells but the titers of agglutination with immune anti-B antibodies of human milk were much lower with the patient’s erythrocytes than with the control A1B erythrocytes. During convalescence the patient’s red blood cells were agglutinated by anti A1 sera only and the titer and activity range of titers of anti-B isoagglutinins increased to normal values. On the basis of these results a “B-like” or “pseudo-B” phenomenon was diagnosed. — M.K.

Immunocompetence in Undernutrition. R. K. Chandra. All India Institute of Medical Sciences, New Delhi 16, India. J Pediatr 81:1194, 1972

Ninety malnourished children were studied. Forty-seven showed small amounts of tonsil tissue, and decreased blood lymphocytes were observed in 15 cases. There was decreased serum siderophilin and C3 complement. There was a decrease in immunoglobulin G in the children without infection but high serum immunoglobulin levels were found in the presence of infection. Antibody response to Salmonella typhi vaccine was significantly reduced. There was evidence for impaired cutaneous hypersensitivity, with reduced in vitro lymphocyte response to PHA. There was also reduced skin test conversion following vaccination by the BCG in the malnourished group. P.F.


Decrease pools of antigens prepared by continuous-flow electrophoresis of Mycobacterium tuberculosis culture filtrate were prepared. These were tested for their ability to induce lymphocyte blastogenesis in blood leukocyte cultures from normal subjects who showed a positive intermediate skin test for tuberculin PPD. The great majority of blastogenic activity was found in the pool of protein antigens while only a small per cent could be detected in the polysaccharide pool. The blastogenesis induced in the PPD positive subjects was of the order of ten times greater than that in PPD negative subjects. The authors conclude that tuberculo-
protein antigens determine the blastogenic response of lymphocytes in sensitive subjects.

-P.F.


In Sezary syndrome, cells stimulated by phytohemagglutinin are able to form rosettes spontaneously. This was also found by J. D. Broome et al. (Clin. Immunol. Immunopath.). -J.C.

The Production of Antibodies after Influenza Vaccination in a Number of Hematological Diseases. J. Ph. H. B. Sybesma, J. D. Hollow, and B. J. M. Zegers. Department of Hematology and Immunology, State University Hospital, Utrecht, Netherlands. Ned Tijdschr Geneesk 117:21, 1973

A group of 49 patients, of whom 38 suffered from a proliferative lymphocytic disease, seven from paraproteinemia, and four from myelogenous leukemia, were vaccinated with an influenza vaccine which among other components contained influenza A Hong Kong antigen. A control group of 27 volunteers were vaccinated with the same antigen. At least a fourfold increase of the titer of hemagglutination-inhibition antibodies was seen in all the subjects of the control group, but this increase could not be demonstrated in six patients with Hodgkin's disease, in two patients with other lymphomas, in three patients with paraproteinemia, and in one patient with myeloblastic leukemia. The incapacity to produce antibodies after vaccination in the patients with lymphomas may have been associated with radiotherapy during the immunization period, but in these cases no correlation could be demonstrated between the insufficient increase of the titers on the one hand and immunosuppressive pharmacotherapy or the immunoglobulin level on the other. -K.P.


Normal lymphocytes and leukemic paralymphoblasts treated with glicosyl transferases and with UDP galactose can modify ABO groups, O being transformed into B, or A, deficient being also transformed into B. -J.C.

MISCELLANEOUS

Quantity of Diagnostic Blood Sampling and Its Clinical Relevance. P. Helin and A. Videhaek. Medical Department C, Gentofte University Hospital, Copenhagen, Denmark. Scand J Haematol 9:654, 1972

Median blood loss through diagnostic tests in 155 consecutive internal medicine patients was 50-100 ml, and 11% of the patients lost over 200 ml. -P.G.R.

Effect of Cancer on 14C-thymidine per mg DNA in Mice (in German). O. Lockner, U. Ericson, and A. Petersson. Hevesy Laboratory, Department of Alcohol Research, Karolinska Institute, Stockholm, Sweden. Z Krebsforsch 77:1, 1972

Thymidine-14C was studied in different organs of mice inoculated with solid growing ELD tumor. Spleen activity and spleen size increased as did those of the liver. The mesenteric fat decreased. -P.G.R.

Fetal Damage Due to Maternal Aminopterin Ingestion. Follow-up at Age 9 Years. E. B. Shaw. University of California School of Medicine, San Francisco, Calif. Am J Dis Child 124:93 94, 1972

This youngster, first described in 1968, resulted from a pregnancy in which aminopterin was ingested as a possible abortifacient. In early infancy she was not expected to survive. When described at the age of 4 yr. she had physical and mental retardation, along with multiple defects of skull and long bones. At the age of 9 yr. she is well, of normal IQ, and though still below normal height, she shows marked improvement in most of the skeletal abnormalities described earlier. -J.B.S.

The unsaturated vitamin B₁₂-binding capacities (UBBC) of the large molecular size B₁₂-binding protein (TC L) and of the small molecular size B₁₂-binding protein (TC S) were determined by gel filtration. Precautions were taken to avoid in vitro release of TC L into the body fluids. The mean value (ng/ml) of the TC L UBBC was 2.5 in 16 knee joint fluid specimens from 15 patients with seropositive rheumatoid arthritis, but only 0.5 in 37 specimens from 33 patients with seronegative arthritis. These values were 30 and 13 times higher than the plasma values, respectively. TC S had only twice the plasma value. The author suggests release of TC L from granulocyte lysosomes into the synovial fluid during the local inflammatory process. P.G.R.

Transfusion of Blood and Protein Preparations During Treatment of Patients with Acute Renal Insufficiency. A. T. Dolsenko. The Odessa Regional Clinical Hospital, Odessa, USSR. Probl Gematol Pereliv Krovi 18:3 7, 1973

Severe anemia and disturbances of plasma proteins were seen to aggravate further the clinical condition of 143 patients with acute renal insufficiency, seeming to prolong the patients’ recovery. To control this, transfusions of whole blood and serum albumin with and without anabolic hormones were given. These proved most effective when given at the stage of restoration of diuresis; antistaphylococcal plasma was also useful in patients with septic complications.—J.V.

The Use of Anabolic Hormones and Aminokrovin in Children Suffering from Chronic Enterocolitis. I. A. Bodnya. The Institute of Pediatrics, Tashkent, USSR. Probl Gematol Pereliv Krovi 18:8 11, 1973

The deranged protein metabolism of 65 children suffering from chronic enterocolitis was treated by anabolic hormones and aminokrovin. This succeeded not only in restoring plasma proteins and their fractions to normal levels but also led to increased well-being and amelioration of the major clinical signs of the disease. Abstractor’s comment: Aminokrovin is an acid hydrolysate prepared from outdated bank blood after the plasma has been removed. —J.V.