ABSTRACTS

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ERYTHROCYTES


Comparisons of general characteristics were made using six genetically different types of acid phosphatase (EC 3.1.3.2, orthophosphoric monoester phosphohydrolase) from normal human red cells. Heterogeneity was observed on chromatography as well as on electrophoresis done with CM-cellulose and NaCl gradient. Acid phosphatases of phenotypes A, AB and B were found to be less stable toward heat treatment and oxidizing agents than those of AC and BC, and the difference was statistically significant. A change in electrophoretic pattern could be observed either by heat treatment or by incubation of the sample with CSSG. A new zone with slow mobility and reduced activity was formed by these treatments. The effect of guanidine on these types of acid phosphatase was tested as a function of its concentration, but no significant difference could be observed in the different phenotypes of enzyme. Partial purification of the enzymes of phenotypes AB and B was also achieved.—K. F.


The changes of glycolytic intermediates and adenine nucleotides in blood were followed during storage in acid-citrate-dextrose (ACD) medium. Until the end of a 48 hr. storage, hexose 6-phosphates increased gradually, while fructose 1, 6-diphosphate decreased gradually.
CHEMISTRY OF LIPIDS OF THE POSTHEMOLYTIC RESIDUE OR STROMA OF ERYTHROCYTES. XVI. OCCURRENCE OF CERAMIDE PENTASACCHARIDE IN THE MEMBRANE OF ERYTHROCYTES AND RETICULOCYTES OF RABBIT. T. Eto, Y. Ichikawa, K. Nishimura, S. Ando and T. Yamakawa. From Faculty of Medicine, University of Tokyo, Bunkyo-ku, Tokyo, Japan. J. Biochem. (Tokyo), 64:205, 1968.

Glycolipids were obtained from rabbit erythrocytes and reticulocytes. A new glycolipid, galactosyl-(1→3)-galactosyl-(1→3)-N-acetylglucosaminyl-(1→3)-galactosyl-(1→4)-glucosyl ceramide, was found as the main component of erythrocyte glycolipids. Galactosyl-(1→4)-galactosyl-(1→4)-glucosyl ceramide and a small amount of dihexosyl ceramide were also found. Unlike mature erythrocyte glycolipids, those of reticulocytes contained much mono- and di-hexosyl ceramide and an unknown glycolipid in addition to trihexosyl ceramide and ceramide pentasaccharide, suggesting that these glycolipids are metabolized actively in immature cells. The structure of the carbohydrate moiety in the ceramide pentasaccharide was very similar to that of the blood group B active mucoid from body fluids and the glycolipid inhibited hemagglutination of human B-erythrocytes by the corresponding iso-antibody.—K. F.


Changes in the lipid composition of erythrocytes were studied 1) during ontogenesis; 2) under the effect of a fat-free diet; and 3) in some metabolic diseases. Cholesterol, TEFA, lipid P, phospholipid classes and total phospholipid fatty acid pattern of erythrocytes were studied. The constancy of red cell lipids in essential hyperlipidemia and the limits in type and extent of the changes that could be induced in the red cells by dietary means were suggestive of regulatory factors other than the relative change of any component in diet, plasma or adipose tissue. Attention was drawn to the striking similarities in the phospholipid fatty acid pattern of fetal cells, red cells in essential fatty acid deficiency, in anemochytosis, and in some hemolytic diseases. It was suggested that the resemblance in lipid structure, non-electrolyte permeability and viability of these erythrocytes may originate from the essential fatty acid deficiency as an effect of the fat-free diet, of the malabsorption in anemochytosis, and as a secondary local fatty acid deficiency in conditions with highly increased demands for red cells. In these conditions there is a "fetal type" erythropoiesis with accelerated maturation possibly skipping some cell divisions.—S. R. H.

REVERSIBILITY OF THE ERYTHROCYTE LIPID ABNORMALITIES IN HEPATIC DISEASE. R. C. Neerhout. From the Department of Pediatrics, UCLA School of Medicine, Los Angeles, California. J. Pediat. 73: 364–373, 1968.

In five children and adolescents with reversible liver disorders, significant abnormalities of erythrocyte stromal lipids noted during the acute phase of the illness, reverted to normal as liver function improved. The abnormalities included an increased...
percentage of phosphatidyl choline in the phospholipid fraction in all patients, accompanied by an increase in total membrane lipid in three patients. Morphologic changes in the red cells disappeared as the lipid abnormalities subsided.—J. B. S.

ERYTHROCYTE GALACTOSE-1-PHOSPHATE URIDYL TRANSFERASE ACTIVITY IN INFANTS OF LOW BIRTH WEIGHT. R. Beitner, S. H. Reimer, A. Pinsky, and I. Levi, Department of Biochemistry, Bar-Ilan University, Ramat Gan, Department of Pediatrics, Rothschild Hospital, Haifa and Wizo Premature Center, Tel Aviv, Israel. Israel J. Med. Sci. 5:27, 1969.

Activities of galactose-1-phosphate uridyl transferase were determined in the erythrocytes of 27 infants of low birth weight, weighing between 850 and 2,400 Gm. Mean activity in infants under 72 hr. of age was significantly lower than that found in a control group of older children and adults. Markedly low enzyme activity was found particularly in infants weighing below 1,500 Gm. A gradual increase in enzyme activity was noted up to the age of seven days. The erythrocyte UDPG-pyrophosphorylase activity was also determined and found normal in all groups, at all ages tested.—B. R.


For many years uterine blood, obtained from the retroplacental space immediately after delivery, has been used as a source of gamma-globulin and to make hormone-rich creams and ointments. This material also possesses erythropoietic activity and the authors have prepared a non-toxic, non-pyrogenic extract which exhibits good erythropoietic potency in mice. It is felt that from this readily available material may be developed a therapeutically useful, homologous erythropoietin preparation.—J. V.


MetHb Makita was separated from metHb A (methemoglobin of normal adult hemoglobin) by starch block electrophoresis (pH 7.0) of the metHb hemolysate of the patient, and heme was removed from it to obtain Makita globin (αβ²). A mixture of β polypeptide chains (βM + βA) free from α chains was also obtained by chromatography of the globins (Hb Makita + Hb A) prepared directly from the patient’s hemolysate on a column of carboxymethyl cellulose with buffers containing 8M urea. The fingerprint thus made revealed abnormal spots related to peptides βTP-10 and βTP-10, 11. These were eluted and hydrolyzed with hydrochloric acid. The amino acid analysis of the acid hydrolysate demonstrated that, in Hb Makita, tyrosine substitutes for histidine (β 92) at the ninety-second residue of the β chain. This hemoglobin is therefore expressed by the formula α2β2(92 Tyr). By perusal of literatures it has become apparent that Hb Makita is identical with Hb MHyde Park.—K. F.


A procedure for the isolation and crystallization of ferritin from tuna fish spleen is described and some of the physicochemical properties of this ferritin are reported. The methods used for this purification were the combination of trypsin (EC. 3.4.4.4.) digestion, acetone treatment and DEAE-cellulose column-chromatography. This ferritin contained less iron and phosphorus than horse ferritin. Isoelectric point was pH 4.3. The contents of proline, methionine and isoleucine were different from those of horse ferritin.—K. F.


Five women were given 10 cc. of 59Fe in-
travenously at least 12 hours before therapeutic abortions. Gestational age varied from 11–22 weeks. Uptake of isotope was determined for different fetal organs. The accumulation of $^{59}$Fe was 200 times larger for the liver and 50 times larger for the spleen than for other fetal organs.—R. W.


Eleven iron deficient patients, seven with iron overload and 12 controls received 5 mg. radioiron, and stools were collected to estimate absorption. Intestinal biopsies showed more iron proximal to the stomach, and “mean deviation” of 25 per cent in double biopsies. No significant differences were found between groups. No significant correlation between iron in intestinal biopsies and iron absorption.—P. G. R.


On the basis of radio-isotope studies (using $^{51}$Cr, $^{59}$Fe and $^{55}$Co) in 71 patients with renal diseases the authors conclude that the major factor in the anemia of nephritis is the reduction of red cell survival; depression of erythropoiesis is seen in only a minority of patients and actual blood loss is not significant. Reduced absorption of both iron and Vitamin B$_{12}$ also plays a part in the pathogenesis.—J. V.


Assuming equal rates of bilirubin elimination from the plasma and of bilirubin formation, authors attempt to measure red cell life span by studying bilirubin elimination. Unconjugated bilirubin (ACO or Homburg) was given intravenously, 50 mg., to 5 controls, 14 hemolytic, and 2 pernicious anemia patients. Blood samples were taken 9 times during the first hour and a single exponential $T_1/2$ calculated. $^{51}$Cr or $^{32}$P life spans had a correlation with the bilirubin-based calculations of +0.86, which authors find better than the previously found correlation between $^{51}$Cr and carbon monoxide life spans. **Abstractor’s comment:** Theoretic objections to methods measuring hemolysis by estimating production of heme catabolism end products such as CO or bilirubin include multi-compartment kinetics of bilirubin, differences between conjugated and unconjugated bilirubin and possible alternate routes of producing bilirubin and breaking down hemozoin. In addition, iron-marrow hemin catabolism is naturally included in the catabolic, but not in the red-cell-tagging methods. Nevertheless, the end-products-methods are rapid and clinically useful.—P. G. R.


MMA excretion in 18 controls was up to 3.5 mg./24 hours, raised in 27/41 with B$_{12}$ deficiency (always if serum was under 100 pg./ml., but not if folate was also low). SA excretion was 2 to 12.5 mg./24 hours in controls, and low in 9/41 patients with B$_{12}$ deficiency.—P. G. R.


Author feels it is, because $^{57}$Co-B$_{12}$ is rapidly converted. "Xobaline"—a coenzyme-B$_{12}$ seems to be commercially available in Germany. **Abstractor’s comment:** Possible effect of coenzyme-B$_{12}$ was recently reported in methyl-malonic aciduria. See also abstract above.—P. G. R.
ABSTRACTS

HYPERPROLINEMIA AND HYPERPROLINURIA IN THALASSEMAIA. D. Liakakos, I. Karatzou, and A. Agathopoulos. From the Pediatric Clinic of Athens University, Athens, Greece. J. Pediat. 73:419–421, 1968.

Mean plasma proline levels were 50 per cent higher and mean urinary proline levels were 100 per cent higher in thalassemic children than in normal controls. There is no clear explanation for this finding.—J. B. S.

SELECTIVE VITAMIN B12 MALABSORPTION WITH PROTEINURIA IN ISRAEL. CLINICAL AND GENETIC ASPECTS. I. Ben-Bassat, A. Feinstein and B. Ramot. Department of Hematology, Government Hospital, Tel Hashomer and Tel Aviv University Medical School, Israel. Israel J. Med. Sci. 5:62, 1969.

Selective malabsorption of vitamin B12 with persistent proteinuria is a rare genetic disorder. Eighteen cases in 14 families were found in Israel. Thirteen of the 14 families are of North African origin, mostly from Tunisia and Libya. The minimal prevalence of selective vitamin B12 malabsorption among Israel Jews of Tunisian origin is estimated at 1:1,200 and the approximate gene frequency is 0.025. Thus, this genetic syndrome should be added to the growing list of diseases with a predilection for certain ethnic groups among the Israel population.—B. R.


With sephadex, TC I bound 72–1057 μg/ml or up to 47 per cent of added cyanocobalamin, TC II bound 650–1891 μg/ml or up to 90 per cent. A peak with a larger protein than TC 1 was called TCO, which bound 0 to 76 μg/ml or up to 5.2 per cent.—P. G. R.


The author has studied the distribution of radio-CN-B12 in mice 15 min. to 60 days after injection. Microsections and whole body sections were applied on film and exposed for 60–300 days. The blackening of the plates was standardized. Furthermore, the radioactivity in the different organs was measured in a crystal. In male mice the most was found in kidneys, testicles, endocrine organs including the pituitary and in the mucous membranes of the stomach. Brown fat had a low concentration at first, but high after approximately 2 weeks. The same was for the epididymis. The brain had little B12 as did the nervous part of the pituitary gland. The high concentration in the testicles is considered to support the hypothesis about the need for B12 for spermatogenesis and the one in the follicles of the ovary about the need for B12 in the production of steroids. The distribution is also considered to support the hypothesis that B12 plays a part in the production of thyroxin. Pregnant rats were also studied between 15 min. and 20 days, and the retention of intravenous 60Co-B12 was measured in the whole animal between 2 crystals. Different animals received different amounts of B12. The more was given, the smaller was the percentage retention, and the less was carried over to the mother. The highest B12 concentration was found in the placenta 15 min. after administration, which is in contrast to several other nutrients. Even the embryo developed a high concentration after a while in, for example, the intestines. The possible connection between the high fetal concentration and the embryological changes in animals with a deficiency of B12 was discussed. The course of the high and long uptake by the placenta was discussed with regard to a similar course of absorption in the intestines. To examine the effect on absorption of competition of B12 analogs, different analogs were given. Co-enzyme B12 and CN-B12 inhibited the absorption in the intestines and the placenta. Furthermore, methyl-B12 which is postulated to be the form of transfer to the embryo, inhibited the placental absorption. If one propionamide-OH had been replaced by NH2, the uptake by the placenta was inhibited more than if 2 sidechains had been substituted.
The B₁₂ uptake in experimental osteosarcoma, mammary carcinoma, and Moloney-virus tumors was studied. All accumulated B₁₂ the first 4 days after administration. Rapid cellular growth was regarded to be the explanation. — P. G. R.

SERUM VITAMIN B₁₂ BINDING CAPACITY IN PATIENTS WITH ANEMIA. H. Olesen, M. P. Andersen, and A. Amris. Dept. of Clinical Chemistry, Bispebjerg Hospital, Copenhagen, Denmark. Scand. J. Haemat. 5, 235-240, 1968.

Results of charcoal assays of cyanocobalamin binding were significantly correlated to erythrocyte sedimentation rates, and increased binding was found in hemorrhage, cirrhosis, cancer, infection, etc. Abstractor’s comment: Tissue damage leads, e.g., to increased concentrations of acid alpha-2-proteins, of which transcobalamin is one. Is the cyanocobalamin binding of such proteins more than coincidental, since physiologically cyanoforms of B₁₂ are not found. — P. G. R.


Malabsorption of vitamin B₁₂, administered with and without intrinsic factor was found present in a subject with pancreatic insufficiency who had steatorrhea. The administration of pancreatic enzymes alone or in combination with sodium bicarbonate resulted in increased absorption of vitamin B₁₂ to normal. The authors suggest that pancreatic enzymes may function to (1) facilitate the formation of the IF-B₁₂ complex; (2) affect the binding of the IF-B₁₂ complex to the intestinal receptor site; or (3) separate or partially digest the IF-B₁₂ complex to permit absorption of vitamin B₁₂. Abstractor’s comment: Previous studies [Gastroenterology 55:705, 1968] which indicate that malabsorption of vitamin B₁₂ is correctable by neutralization of acidity in the proximal intestine in the Zollinger-Ellison syndrome. — F. A. K.


Low serum folate concentrations were found in six of nine subjects with chronic exfoliative dermatitis. The author attributed the subnormal values to folate loss in the exfoliated skin, which was found to range from 5 to 20 μg. per day. The absorption of a pharmacologic dose of crystalline folic acid was normal in three subjects tested. Abstractor’s comment: Folate loss in dermatitis does not appear to approach the order of magnitude of increased utilization that occurs in severe hemolytic anemia and to date no instance of megaloablastic anemia has been described in this condition. Determination of red blood cell folate values in subjects with dermatitis would be of interest. — F. A. K.

LEUKOCYTES


The fact that two of 70 patients in the Rheumatology Institute developed leukemia leads the authors to discuss the relationship between leukemia and hypersensitive states, particularly long-standing polyarthritis; there are three illustrative case reports. It is speculated that following sensitization by an antigen there is intense proliferation of immune-competent cells with a rise in the frequency of mutations, some of which may initiate clones with auto-immune potential; collagenosis supervenes. As auto-immune clones continue to proliferate more mutations occur and from these a neoplastic clone could possibly emerge. — J. V.
STUDIES ON LEUCOCYTE METABOLISM. I. GYCOLYTIC INTERMEDIATES AND NUCLEOTIDES IN GUINEA PIG EXUDATE GRANULOCYTES. S. Minakami. From Faculty of Medicine, University of Tokyo, Tokyo, Japan. J. Biochem. (Tokyo), 63:83, 1968.

Glycolytic intermediates and adenine nucleotides in polymorphonuclear granulocytes from guinea pig peritoneal exudate were analyzed. Glucose 6-phosphate, fructose 6-phosphate, fructose 1,6-diphosphate, dihydroyacetone phosphate, glyceraldehyde 3-phosphate, 3-phosphoglycerate, 2-phosphoglycerate, phosphoenolpyruvate, pyruvate, ATP, ADP and NAD+ were measured enzymatically using a fluorometer. Nucleotides were also analyzed by column chromatography on Dowex 1-formate. Peritoneal exudate was deproteinized either immediately after removal from the body to obtain an aerobic steady state pattern or after incubating with cyanide to obtain an anaerobic steady state pattern. Mass action ratios of glycolytic reactions in leucocytes were calculated from the above data and rate-limiting steps in the cellular glycolysis were discussed. Hexokinase [EC 2.7.1.1], phosphofructokinase [EC 2.7.1.11] and pyruvate kinase [EC 2.7.1.40] were found to be major rate-limiting steps in leucocytes as in the case of erythrocytes. The following changes were observed when leucocytes were incubated in the presence of cyanide: 1) decrease in hexose monophosphates, 2) increase in fructose diphosphate and triose phosphates, 3) decrease in monophosphoglycerates and phosphoenolpyruvate and 4) slight decrease in ATP and increase of ADP.

—K. F.

STUDIES ON LEUCOCYTE β-GLUCURONIDASE. II. OBSERVATIONS IN LEUKEMIAS, RELATED DISORDERS AND SEVERAL NONHEMATOLOGICAL DISEASES AND CULTURED LYMPHOCYTES. H. Danno. From Nagasaki University, School of Medicine, Nagasaki, Japan. J. Kyu. Hemat. Soc. 18:219, 1968.

Histochecmical studies of leucocyte β-glucuronidase (GL) by Tomonaga’s method using naphthol AS-BI β-D-glucuronide and fast red violet LB were performed in 68 cases of acute leukemia, 54 cases of other blood diseases, 27 cases of non-hematological disorders and in cultured lymphocytes. GL-reaction of acute leukemic cells was divided into two main types referred to as D and S, each of which was classified further into three and two subtypes respectively referred to as DD, DL, DF and SS, SB. Acute leukemias were classified into four groups referred to as D, DS, S and DF, according to the frequencies of leukemic cells with each GL-reaction type. Considering the results of histochemical-stainings and phagocytic function of the leukemic cells, it was concluded that groups D, DS and SD represent acute granulocytic leukemia, group S either acute lymphatic leukemia or the most immature or dedifferentiated form of acute granulocytic leukemia and group DF myelomonocytic leukemia. GL-reaction of acute leukemic cells seems to be determined and/or modified not only by their stem cell lines, but by the stage of differentiation or de-differentiation. Type D expresses the proper characteristics affording evidence for the myeloid origin and type S lymphatic origin; however, the transition from type D to S occurs when the myeloid cells are extremely primitive or dedifferentiated. The occurrence of complete remission is higher and the mean survival time is longer in groups DS and SD of acute granulocytic leukemia than in group D. No difference was noticed between GL-reaction of immature myeloid cells of chronic granulocytic leukemia and normal bone marrow. GL-reaction of the lymphocyte of chronic lymphatic leukemia was definitely weaker than that of normal lymphocytes. The lymphocytes of aplastic anemia, multiple myeloma and aleukemic malignant lymphoma revealed stronger reaction. Pathologic cells of leukemic reticulosarcoma and lymphosarcoma equally revealed type SB reaction, showing their lymphatic origin. However, the frequency of type SB in the former was peculiarly characteristic and distinctly different from the type SB of the latter and of normal lymphocytes. Therefore, the GL-staining is useful in differentiating reticulosarcoma and the so-called Schilling and Naegeli types of monocytic leukemia. A great increase of GL-reaction was noticed in lymphocytes transforming to blast cells under the short-term culture with phytohemagglutinin.—K. F.

SCREENING TEST FOR THE DIAGNOSIS OF CHRONIC GRANULOMATOUS DISEASE. R. B. Johnston, Jr. From the Children’s Hospital Medical Center, Boston, Massachu-
Lysosomal granules in the leukocytes of patients with CGD apparently are not released normally. As a result, ingested nitroblue tetrazolium (NBT) dye is not reduced, and no blue color develops within the white cell. A simple screening test for CGD is described, using leukocytes suspended in plasma and added to latex particles suspended in a saline solution of NBT.—J. B. S.

**HEMOSTASIS**


The comparative diagnostic value of diverse bleeding time determinations, factor VIII assay, and studies of platelet adhesiveness was evaluated in 28 patients from 8 families with von Willebrand’s disease. The Ivy or modified Ivy bleeding time was more often abnormal than the Duke bleeding time, but the authors recommended that the Duke test and a modified Ivy bleeding time be done routinely, along with a factor VIII assay. Platelet adhesiveness studies were not additionally helpful in establishing a diagnosis, and the authors have noted false positive results in occasional normal subjects. The variability of the bleeding times and Factor VIII levels in some patients is stressed.—J. B. S.


In lieu of repeated transfusions of fresh frozen plasma over a 48-hour period, 51 episodes of acute hemarthrosis occurring in patients with classic hemophilia were treated with one of several Factor VIII concentrates, in a single dose (20 to 30 AHF units/Kg.) designed to achieve a post-infusion Factor VIII level of 40 per cent to 50 per cent. In 47 of the episodes so treated, satisfactory resolution of the hemarthrosis occurred without need for further AHF therapy. Two of the four failures followed severe trauma affecting several joints. —J. B. S.


The development of caseinolytic, fibrinolytic, and esterolytic activities from human plasminogen was examined using various amounts of crude and purified streptokinase. Streptokinase was purified by ethanol precipitation at pH 5.6. High esterase activity (with tosyl-L-arginine methyl ester as substrate) was obtained with a catalytic amount of crude or purified streptokinase. Further addition of streptokinase resulted in only a slight increase in this elevated activity. Fibrinolytic activity was obtained with a catalytic amount of purified streptokinase and the activity was unaffected by further addition of the enzyme. On the other hand, the maximum caseinolytic activity was obtained with a catalytic amount of purified streptokinase and the activity decreased on further addition of streptokinase. However, when purified streptokinase was added, no decrease of caseinolytic activity was observed. Therefore, it seemed that the decrease of caseinolytic activity on addition of a large amount of streptokinase was due to an inhibitor present in the crude streptokinase.—K. F.


Coagulation studies were made on 30 patients with fractures of the pelvis and varying degrees of surgical shock, determinations of prothrombin time, thrombin time,
fibrinogen, fibrinolytic activity, heparin tolerance and free heparin being made on admission, at 10-12 hours and at 2-3 days. Changes were most marked in the more severely shocked patients, deficiencies in prothrombin and fibrinogen, and increased fibrinolytic activity being noted most frequently. The authors maintain that coagulation studies and the prompt correction of any abnormalities revealed, should be an integral part of the treatment of surgical shock.—J. V.

THYMIC ALYMPHOPLASIA ASSOCIATED WITH THE HEMOLYTIC-UREMIC SYNDROME.
L. D. Dubilier, J. A. Chadwick and J. P. Leidly. From the University of Rochester School of Medicine, Rochester, New York. J. Pediat. 73:714-724, 1968.

A 6 month old boy who had previously been healthy became acutely ill with signs and symptoms of the hemolytic uremic syndrome. Although high normal levels of circulating lymphocytes and immunoglobulins were present initially, following (and questionably related to) a blood transfusion, the levels fell progressively as did the level of circulating granulocytes. He died three weeks later at which time there was lymphopenia and neutropenia and the immunoglobulin levels had fallen by 30 per cent to 60 per cent. Post-mortem examination revealed the lymphoid changes seen in thymic alymphoplasia as well as renal lesions consistent with the diagnosis of hemolytic-uremic syndrome.—J. B. S.

MISCELLANEOUS


In 15 of 30 patients undergoing heart surgery with normothermic extra-corporeal circulation, the citrated blood in the oxygenator was diluted with 33-63 ml. Ringer-Locke solution per Kg. body weight; the remaining patients were studied as controls. Determinations of hemoglobin, hematocrit, red cells, prothrombin time, fibrinogen, fibrinolytic activity and total serum protein were made on each patient before, during and after perfusion. The diluted patients showed a decrease in hemolysis, a marked increase in diuresis and a more rapid and stable recovery of the coagulation system,
this last reducing post-perfusion blood losses.—J. V.


During radiological examinations of young children, the whole trunk is irradiated. This means that a large amount of bone marrow is in the beam. Thus it seems of great importance to measure the amount of marrow in each bone in order to estimate the irradiated bone marrow volume. The authors, therefore, tried to estimate both the distribution of marrow and the weighted ratios between bones and marrow by a method derived from the technic used for vascularization studies in cervical bones. The protein contents of the bones were removed by ethylene-diamine following Williams and Irving’s technic as modified by Losee. Then, a plastic material, Stratyl A 116 (Saint-Gobain) chosen for its physical characteristics being near to those of the bone marrow, was injected to take the place of the proteins. After each operation, the bones were weighed so that the difference in their weights gave the ratios between bone and marrow, and the total marrow weight. With this technic, all the bones of the skeleton of a new-born were studied. The results are expressed in weights and percentages referring to the total weight of the marrow. Comparisons were made with other results for children and adults. The results of Toppic expressed in percentage of the whole medullar volume are in good agreement with the authors results, though the technics are very different. In both cases, the percentage of marrow in cranial bones was very important, with values equal to the sum of marrow in ribs, spinal column, pelvis and scapulae. The comparison with adult studies by Mechanik (with corrections of Ellis) showed: a) a large decrease of the marrow in adult skulls; b) an increase (by a factor of 2) of the marrow percentage in the vertebræ, especially in lumbar vertebræ where the factor reached 5; c) an increase of the marrow percentage in the sacrum of adults; d) an inversion of the percentage values between the scapular belt and the pelvis in the adult; e) no change for the ribs. The measurements of the ratios between bones and marrow weights were verified on bone samples (femur and vertebræ) of three more new-born infants; the results were similar. It was not possible from these measurements to infer an accurate evaluation of the marrow distribution in the newborn or in young children. The authors only wanted to show how this method was satisfactory and could be applied for such an evaluation. However, a number of errors are possible both on weight determination and on measurement, and on the complete penetration of plastic in bone marrow spaces, but these errors can be minimized.—G. M.


Mortality among 232 infants who underwent 351 exchange transfusions was 4.7 per cent. Most of the deaths occurred more than six hours after the last transfusion, and only one occurred in an infant originally described as vigorous. Prematurity was not associated with an increased mortality. This mortality rate is as low as in any reported large series, and the authors wish to emphasize the low risk of the procedure even when performed by a large group of house officers.—J. B. S.