ABSTRACTS

THEODORE H. SPAET, M.D., Editor

ABSTRACT OF SPECIAL INTEREST


The origin of the multinucleated giant cells, or osteoclasts, of bone has remained in doubt since 1873 when Kulliker proposed that they were responsible for bone resorption. In the past, it was impossible to provide definitive evidence for their origin because of the limitation of the methods used to study the problem. It is now possible to trace cells labeled with tritiated thymidine by preparing autoradiographs of tissues fixed at appropriate intervals after incorporation of the isotope into the cells. When animals were given the isotope before amputation of the limb, the only cells labeled were blood and epithelial cells in their sites of origin. The results indicate that osteoclasts arise by the fusion of mononuclear leukocytes, probably monocytes.—O. P. J.

LEUKOCYTES


Experimental studies on human leukocyte chromosomes require information concerning the timing of DNA synthesis, time of the onset of mitosis, duration of the mitotic cycle, and the number of mitoses undergone by individual leukocytes. This information has a direct bearing on the problem of the mitotic potential of circulating leukocytes which is undoubtedly responsible for the capacity of transplants of peripheral leukocytes to induce recovery in lethally irradiated mammals and necessary for the immunologic competence of such cells. The separation of leukocytes from whole blood was done by the use of a buffy coat technic with sterile heparinized venous blood. In fresh blood, only a very small fraction of the leukocytes engaged in DNA synthesis. All labeled cells were either of a large or a smaller mononuclear type. In cultures of blood drawn from a single donor, no mitoses were seen in material fixed at 12, 24, and 36 hours, but numerous mitoses accumulated between 42 and 48 hours. By 17 days, the cultures appeared moribund. Although individual cells underwent at least four mitoses, the cultures had a life span limited to about 2 weeks.—O. P. J.
One aspect of the inflammatory reaction about which little is known is the way in which the initial accumulation in the injured tissues of neutrophils becomes replaced by a collection of mononuclear cells. In order to investigate this, intradermal injections of macromolecular substances were used to provide the stimulus. There are three broad possibilities for the transformation of inflammatory cellular exudates from neutrophil to mononuclear cell preponderance. Migration of hematogeneous mononuclears subsequent to that of the neutrophils, delayed proliferation of tissue R.E. cells, and simultaneous migration of neutrophils and mononuclear cells with differences in the rate of migration and the subsequent fate of the two cell types. Results of the present investigation support the third hypothesis.—O. P. J.


Two cases of tonsillar reactive reticulosis were successfully treated with antibiotics and tonsillectomy. The bone marrow in 60 cases of chronic tonsillitis revealed a reticular reaction in 19 which was accompanied by an enlargement of the regional lymph nodes. Marked hypertrophy of lymph nodes in chronic decompensated tonsillitis is considered to be an indication for tonsillectomy. —J. K.


This investigation describes the white pulp, with particular analysis of the stroma, the reticulum and the relationship of fixed reticular cells. Two types of fixed reticular cells were distinguished. The network of extracellular reticulum is surrounded almost entirely by the cytoplasm of both types of fixed reticular cells. Free cells of the white pulp, namely the lymphoblasts, lymphocytes and plasma cells, were compactly enmeshed in the stroma. Occasional unmyelinated nerve fibers were present.—O. P. J.


The authors developed a method for collecting lymph from the thoracic duct of unanaesthetized mice over several days. During the first 24 hours after cannulation, about 95 per cent of all the cells in the lymph were typical small lymphocytes. The mean lymphocyte output in 10 mice was 7 x 10^9 cells per hour. During four successive 24-hour periods there was a progressive fall in the output of cells independent of the rate of lymph flow. When expressed in terms of body weight, the mean figure of 2.8 x 10^8 cells per Kg. per hour is higher than that recorded for any species. The progressive fall in the output may be due to the loss of the large pool of small lymphocytes, which normally recirculate.—O. P. J.
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In the present paper, the results of all experiments were obtained from merino liver (4 years) and lambs (2–4 weeks). The thoracic, intestinal, hepatic and mammary lymph ducts were cannulated. It appears that in sheep, red cells are continually recirculating from the blood stream to the thoracic duct lymph. In the sheep the medium lymphocyte was the most common cell. Many eosinophil myelocytes and metamyelocytes were present in the lymph as well as varying numbers of neutrophils. Perhaps these came from hemolymph nodes of the thorax. Of particular interest was the high incidence of cells undergoing mitosis.—O. P. J.


Yoffey (1960) suggested that a migration of lymphocytes from the blood to form "stem" cells in the bone marrow accounts for the disappearance of lymphocytes from the blood of a large part of the normal daily output of lymphocytes from the main lymph ducts. Results reported in the present article provide no support for even a small-scale process of this kind in the mouse. The intravenous injection of 1 x 10^8 isologous thoracic duct cells did not prolong the life of lethally x-irradiated mice, nor did it lead to any hematopoiesis in their tissues. Under the same conditions 17 out of 20 x-irradiated mice survived after treatment with 1 x 10^8 isologous bone marrow cells, and the remainder showed histologic evidence of extensive hematopoiesis. Whether or not lymphocytes play any part in hematopoiesis, there is no doubt that they possess immunologic activity.—O. P. J.


The bursa of Fabricius (1537–1619) was an enigma to students of avian anatomy, until it was demonstrated that bursectomized chicks had a greatly reduced titer of specific antibody. In order to show whether the bursa of Fabricius is a center of antibody production, a modification of the fluorescent antibody technic was used. The antigen was bovine γ-globulin. The pheasants were provided by the Department of Game from a genetically similar stock. Observations indicate that the fluorescent cells were a direct result of the inoculation with the bovine γ-globulin antigen, and they lead to the conclusion that the bursa of Fabricius in the pheasant is directly involved in antibody production.—O. P. J.


The formation of anticomplementary aggregates which occur when 7-S γ-globulin is heated is suppressed by the presence of albumin or of α- or β-globulins. However, these non-γ-globulin serum protein fractions will not prevent the further aggregation of 9.5-S to 1000-S γ-globulin materials to precipitated components devoid of anticomplementary activity. Hence anticomplementary activity cannot be induced in whole serum by heating, and if present in normal "convalescent" whole serum, can be abolished by heating the serum at 60 to 65 C. Experiments utilizing heated and nonheated preparations of purified macro-γ-globulin (19-S) and purified nonaggregated 9.5-S γ_IAG_globulin indicated that molecular size per se is not responsible for the anticomplementary activity of aggregates and further suggested that such activity is restricted to the 7-S component of the three immunoglobulins. —H. H. F.


The peptides resulting from the enzymatic hydrolysis of Bence Jones proteins have been chromatographed and their chromatograms compared. Extensive differences seen in these chromatograms present further proof of the nonidentity of individual specimens of this class of proteins. Chromatographic fractions of some individual Bence Jones proteins were also analyzed and their peptide patterns found to be different, indicating some degree of nonhomogeneity.—H. H. F.

PURINE RIBONUCLEOTIDE PYROPHOSPHORYLASE ACTIVITY AND RESISTANCE TO PURINE ANALOGS IN P388 MURINE LYMPHOCYTOIC LEUKEMIA. R. W. Brockman, R. A. Roosa, L. W. Law and P.
ERYSHTOCYTES


The use of tannic acid-phosphomolybdic acid-amidoblock (TPA method) was originally developed as a selective stain for terminal bars in Carnoy-fixed rat intestine. When this technic was applied to tissues fixed in Zenker-formol solution, only erythrocytes were stained by amidoblock. Though the TPA method cannot be considered a histochemical test for hemoglobin in the strict sense of the term, it is practical for routine use in histopathology.—O. P. J.


The neutral solutes which can protect living cells such as spermatozoa and red blood cells against freezing damage belong to various chemical species. According to one theory, neutral solutes such as glycerol protect against freezing damage by penetrating into the cell and lowering the concentration of salt in equilibrium with ice at any temperature below freezing. The permissible molecular weight is about 150, and the main requirements are penetrative ability, resistance to salting out at low temperatures, and lack of toxicity. Among the 15 simple neutral water-miscible compounds tested, there was good correlation between the protective ability and the hydrophilic strength and the temperature change on mixing.—O. P. J.

ABSTRACTS


Studies were made of the metabolism of purines and analogs in sensitive and azaguanine-resistant cells growing in culture and in vivo in the mouse, and an analysis was also made of the purine ribonucleotide pyrophosphorylase activities of these cell lines. The resistance to azaguanine in P388 leukemia cells in culture was also found to be accompanied by decreased GMP pyrophosphorylase activity.—O. P. J.

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The electrolyte, biochemical and physical changes which occur in refrigerated cells have been collectively called a cold storage lesion. By butanol treatment, mammalian red cells can be made to exchange their Na and K rapidly over a period of minutes and a controlled degree of cation reversal can be obtained by removing the butanol quickly. The object of the present study was to compare red cell recovery from these two lesions when similar Na and K reversals were produced by the two methods. It is suggested that conditions which permit the alcohol to remove membrane lipid components lead to uncompensated cation exchanges and hemolysis.—O. P. J.


Heterogeneity of lactic dehydrogenase (LDH) activity in human erythrocytes was first demonstrated by electrophoretic separation. The approach of comparing LDH from various species by electrophoretic separation of tissue extracts on starch gels, and by direct histochemical visualization of enzyme activity, was used in the present article. Erythrocytes from representatives of the five classes of vertebrates revealed a marked species variation in the number of LDH isozymes, in the distribution of the total LDH activity among these isozymes, and in their electrophoretic mobilities.—O. P. J.


The effects of mercury on red blood cells have been studied chiefly for the physiologic responses in terms of the concentrations of added metal. The present article describes some of the characteristics of the binding of mercury itself to the red cell and relates the amount of metal bound to some of the alterations in physiologic responses.—O. P. J.

HISTOCHEMICAL STUDY OF GLYCOGEN SYNTHESIS FROM GLUCOSE-1-PHOSPHATE IN BLOOD CELLS
ABSTRACTS

UNDER NORMAL AND PATHOLOGICAL CONDITIONS. T. Takeuchi, N. Tadokoro and H. Ide. From Kumamoto University School of Medicine, Kumamoto, Japan. J. Histochem. 10:572–579, 1962.

There appears to be conclusive evidence for the existence in many tissues of a synthetic pathway for glycogen wherein the α 1,4-glucosidic links are generated, not from glucose-1-phosphate by phosphorylase, but from uridine diphosphoglucose by a transferase. It has been difficult to get always a surely positive reaction for phosphorylase in blood and bone marrow cells. In the present study it was found better to use an improved substrate mixture containing 10–25 per cent alcohol. The synthetic reactions appeared in the neutrophilic, pseudoeosinophilic or amphophilic series of leukocytes, and weakly in lymphoeytic and thrombocytic series. The reaction of blood neutrophils was enhanced by the acute inflammatory lesion in human appendicitis, by experimental staphylococcic infection in rabbits, and by the skin lesion produced by croton oil. The factor which activated the phosphorylase and branching enzyme activities seemed to be the injury and necrosis of tissues.—O. P. J.


Initial studies have shown an inhibition of rabbit stromal adenosinetriphosphatase activity by phloretin, phlorizin and glucose. These suggested a possible relationship to sugar permeability. A comparison of the action of these inhibitors was made using stromata of erythrocytes obtained from three different mammals. The three sources of enzymes studied were human, a very permeable cell; rabbit, a slowly but measurably permeable cell; and beef, an apparently impermeable cell in which only glucose metabolism is measurable. It was suggested that although ATP-ase activity is not essential for sugar permeability, the ATP-ase and the mechanism of sugar entrance have structural features in common.—O. P. J.


Examination of a number of photochemically active dyes, such as euisin, erythrosin and rose bengal, indicated that rose bengal was the most effective of the dyes studied in producing phlebolytic exchange of Na and K in rabbit cells. Critical concentration of rose bengal in the presence or absence of light reduced the amount of glucose taken up by rabbit red cells. Apparently the fluorescein dye competes with glucose by blocking uptake sites at the surface of the cell, but the accelerated cation exchange observed with photosensitization is a photochemical alteration of the cell surface.—O. P. J.


Binding to cellular constituents is generally believed to be a prime requisite for active ion accumulation by living cells. In a previous study, the hydrogen ion binding properties of human erythrocyte ghosts were investigated. The present paper describes results of Na and K binding experiments by an equilibration and ultracentrifugal washing method.—O. P. J.


Parallel studies by electron microscopy and x-ray diffraction of partially isolated nuclei were preceded by those with light microscopy. It was noted that the volume of frog erythrocyte nuclei after partial isolation by hemolysis was determined by the concentrations of divalent cations in the medium. The results on erythrocyte nuclei show that discrete filaments or possibly tubules varying in diameter from about 200 A downwards can be produced in the chromatin of higher organisms by what appears to be an improper fixation accompanied by volume changes. In the absence of calcium ions, there was inadequate penetration of the embedding medium which was attributed to the materials becoming too densely packed during fixation and dehydration to permit infiltration of the embedding medium. This effect was avoided when the fixative contained 0.01 M calcium chloride.—O. P. J.

OBSERVATIONS ON THE DEVELOPMENT OF ERYTHROCYTES IN MAMMALIAN FETAL LIVER. J. A.

This article further emphasizes the statement that, "The fetal liver is a superlative tissue for a number of cytological problems." The livers used for these electron microscope studies were obtained from one human fetus (3 months) and from 13-, 14-, and 15-, and 23-day rabbit fetuses. The classical features of erythropoiesis were readily observed, but of particular interest in human proerythroblasts was the occurrence of dense bodies approximately 0.1 to 0.2 µ in length in the Golgi region, the nature of which is unknown. In basophilic erythroblasts, nucleoli revealed a tendency to be fragmented or inconspicuous, as Akasaka (1961) described them in erythremic myelosis. The cytoplasmic matrix appeared lightly stippled as a probable result of hemoglobin synthesis. In human material, hemoglobin deposition appeared to be more concentrated just beneath the cell membrane than in the remainder of the cell. Ferritin was localized within vesicles and could not be seen free within the cytoplasmic matrix. The occurrence of finely stippled material (hemoglobin) within the interchromatin regions of the nucleus has been interpreted to indicate that after hemoglobin was synthesized in the cytoplasm, it diffused part way back into the annular tubes of the nucleus. The "release" process whereby extravascular blood cells are released into the circulation appears to occur in several ways: First, it was observed that the sinusoidal lining was discontinuous; second, the release of blood cells through diapedesis. A modification of the latter mechanism can be found in the rupture of the reticuloendothelial lining as a result of pressure exerted by the underlying erythroid cells.—O. P. J.


The use of electron microscopic methods for the study of the erythrocyte membranes (ghosts) prepared by gradual hemolysis has recently revealed a difference in the ultrastructure of the membranes of young human erythrocytes as compared with old erythrocytes. The young human erythrocyte membrane presented a granular structure with large concentric foldings. The old cell membrane was found to be a "thinner and smoother" structure, larger in diameter and containing only a few narrow, radial and sometimes also concentric foldings. A study of the age population distribution of ghosts in domestic animals, viz., cattle, sheep, goats, horses and rabbits, by electron microscopic morphology was undertaken. Without taking into consideration the differences in diameter of the ghosts of the various animals, which are related to the initial differences in the size of the erythrocytes, the basic surface structure of young erythrocyte membrane for the animals studied was found to be similar but not identical. The same was true for the old cell membrane. About one-third of the cells were morphologically old cells.—O. P. J.


In the studies reported here, the rate at which distinctly labeled cells appeared in the peripheral blood after administering Fe59 of high specific activity was determined radioautographically. For the first 7 days after iron administration there was a linear increase in the percentage of labeled cells and this rate was used to calculate the life span. The possible complication of Fe59 reutilization was surmounted by limiting the time course of the studies to the first few days after radioiron injection, before there was any significant release of the label through cell destruction. The rate at which newly-formed labeled cells appeared in the blood was approximately 3 per cent per day of the total circulating erythrocyte population for both control and experimental animals. The circulating life span of the rat erythrocyte is estimated to be approximately 33 days.—O. P. J.


Repeated biweekly intraperitoneal injections of methylcellulose produced in the rat a hemolytic anemia characterized by splenomegaly, decreased erythrocyte survival, and bone marrow hyperplasia. Splenectomized rats receiving equivalent doses of methylcellulose had less severe anemia and normal erythrocyte survival. Renal injury may play a role in the pathogenesis of the ane-
mia as evidenced by proteinuria, hypercholesterolemia and hypoalbuminemia.—O. P. J.


The paper presents observations, made primarily by electron microscopy, of the fine arterial vessels which arise from the central artery of mammalian spleens. The material included normal spleens and spleens after the injection of Thorotrast. Splenic arterial vessels are distinguished by distribution, high endothelium, abundant endothelial projections, and slitted openings into the cords. It appears that in life, depending on the degree of constriction or upon the height of the endothelium in these arterial vessels, four possibilities are present in regard to the flow of blood through them: 1) blood flow is impeded; 2) erythrocytes are rubbed through narrow, nodose, irregular channels; 3) plasma is passed and erythrocytes retained and thereby concentrated; 4) blood flow is stopped. A review of the spleen’s role in normal red cell destruction is presented as an appendix to this article.—O. P. J.


Cr51-labeled erythrocytes from two G-6-PD defective donors have been transfused into each of 11 patients recovering from a hemolytic crisis induced by fava beans, and into six normal subjects. Two days after transfusion, fava juice was administered to nine of the “after crisis” recipients and to all “normal” subjects. A definitely higher rate of hemolysis of the transfused erythrocytes was observed in the former group. These data seem to demonstrate that in favism the erythrocytic defect is not the only factor in the pathogenesis of the hemolytic crisis.—H. H. F.


A case is presented in which a severe hemolytic reaction was detected 9 hours after an intravenous injection of 25 mg. of chlorpromazine. By the technic of passive cutaneous anaphylaxis and by the drug-dependent Coombs test technic, suggestive evidence of the presence of antibodies against chlorpromazine in the patient’s serum was found. When human erythrocytes were coated with chlorpromazine and exposed to the patient’s serum in the presence of guinea pig complement, a hemolytic effect was clearly demonstrable.—H. H. F.


Although studies of experimentally induced hemolytic anemia have contributed substantially to the understanding of iron metabolism, no results have been available on the relative parts played by ferritin and the other iron storage compound, hemosiderin, during deposition and release of iron from the stores, and little is known of the changes in plasma-iron concentration and especially in plasma iron-binding capacity in experimental hemolytic anemia. Some of these aspects were studied during acute and chronic anemia produced in rats by the administration of phenylhydrazine hydrochloride or methyl cellulose. Iron in both storage forms appeared to be readily available when required by the bone marrow for hemoglobin synthesis. The plasma iron concentration was elevated only during the early stages of acute hemolytic anemia, whereas the plasma total iron-binding capacity was increased in both acute and chronic hemolytic anemia.—O. P. J.


Determinations of hemoglobin, iron, vitamin B12 and folic acid concentrations were performed in 367 parturient women and their newborn infants. The results are analyzed with respect to previous maternal disease, the course of pregnancy and delivery, the infantile birth weight and neonatal condition and the season of the year at birth. The paper contains a tremendous amount of data which resist compression into an
abstract. Of particular interest are the data on blood concentration of folic acid (Lactobacillus casei assay, method of Hoff-Jørgensen). In 31 per cent of the mothers the folic acid concentration was lower than the lowest value found in a series of healthy female blood donors. The folic acid concentration in the cord blood was, on an average, 3.5 times that in the maternal blood. Definitely reduced values were found in nine epileptic mothers treated with phenytoin and/or phenobarbitone. The blood folic acid concentration in the mothers showed seasonal variations with a minimum in February–April. Reduced serum B_{12} concentrations (< 150 μg/ml) were found in 17 per cent of the mothers. The serum B_{12} in cord blood was higher than in maternal blood. Infants with severe jaundice without demonstrable red cell sensitization had lower average serum B_{12} in the cord blood than non-icteric infants or slightly icteric infants.—S. A. K.


Sixteen normal subjects and 26 patients with pernicious anemia were given 0.5 μg. cyanocobalamin labeled with 0.5 μl. Co^{57} orally. Plasma samples were drawn at intervals and counted in a well-type scintillation counter. The counts were converted to radioactivity per liter of plasma and expressed in per cent of the dose administered. Maximum activity was reached 8–10 hours after isotope administration. At 10 hours, the value in normal subjects ranged from 0.64–2.42 per cent. The corresponding figure in pernicious anemia patients was 0.00–0.37 per cent. In order to study the urinary excretion of the radiovitamin, 1,000 μg. cyanocobalamin were given parenterally 10 hours after isotope administration. This resulted in a small rise in plasma radioactivity in the control subjects. Correlation was found between the plasma radioactivity at 12 hours and the urinary excretion of Co^{57}. Normal plasma activity was found in pernicious anemia patients when the test was repeated with intrinsic factor added. The test is recommended for cases where quantitative urine collection is difficult or when for investigational purposes the administration of a large flushing dose of vitamin B_{12} as used in the shilling test is undesirable.—S. A. K.


In 20 patients with gastric or duodenal ulcer complicated by stenosis of the pylorus, or perforation, the author studied blood levels of copper, cobalt, and iron before and during operation, and at different postoperative periods. Reduced levels of these trace elements ran parallel to the development of anemia. The content of copper, cobalt and iron was markedly decreased in patients with agastic asthenia.—J. K.


One hundred and seventy patients with total gastrectomy for 1 to 12 years were examined; of these, 33 developed agastic pernicious anemia. Studies of 100 patients after partial and total resection of the stomach showed a moderate tendency to macrocytosis; pernicious anemia developed in eight cases. After total gastrectomy, if patients were not persistently treated with vitamin B_{12}, macrocytic and then megaloblastic anemia occurred. Hematologic investigation of patients with cancer of the gastric cardia excluded an etiologic role of the initial disease in the development of pernicious anemia. The pathogenesis of agastic pernicious anemia is associated with the disturbed intestinal absorption of vitamin B_{12} and the development of endogenous B_{12}-avitaminosis.—J. K.


Two important papers are presented which may form the basis for an accurate immunoassay of erythropoietin. Human urinary erythropoietin was used to immunize rabbits and "anti-erythropoietin-serum" was harvested. The following studies showed that the serum induced, could neutralize, and precipitate erythropoietin. 1) Ouchterlony technic revealed specific precipitation...
bands between serum and erythropoietin. 2) The action of erythropoietin on the Fe^{59} utilization of polycythemic mice was neutralized by serum. 3) Anti-erythropoietin-serum depressed Fe^{59} utilization and bone marrow E/M ratio in normal mice. The effect was similar in timing and magnitude to the effect of transfusion polycythemia. 4) Injection of anti-erythropoietin-serum into polycythemic mice 24 or 48 hours after an injection of erythropoietin had no effect on the erythropoietic response, but injection of the anti-erythropoietin-serum earlier diminished or abolished the response.—A. J. E.


Two papers are presented supporting the concept that the supply of oxygen to the kidneys regulates the production of erythropoietin. In the first paper, unilateral constriction of the renal artery resulted in an immediate increase in erythropoietin titer and reticulocytes, but not in sustained erythropoietic activity. In the second paper, splanchnic ligation prevented the usual erythropoietic response to a hemorrhage, allegedly because compensatory renal vasoconstriction was prevented. Both papers are suggestive but not convincing.—A. J. E.


These two supplementary papers show convincingly that the use of polycythemic mice in the bioassay of erythropoietin results in a more sensitive test than the use of starved rats. A 48-hour Fe^{59} utilization test was found by both groups to be the best erythropoietic measure in these animals. It is hoped that this sensitive technique can be used to establish whether or not erythropoietin participates in the fine adjustment of normal red cell production.—A. J. E.


Rats rendered polycythemic for various lengths of time were challenged with a single injection of erythropoietin, and the response of reticulocytes and 18-hour Fe^{59} utilization was observed. In animals kept polycythemic for prolonged periods of time, the response was delayed and compatible with an effect of erythropoietin on stem cells. However, the response in animals with polycythemia of brief duration was so immediate that the authors felt that erythropoietin also must have an effect on more mature red cell precursors.—A. J. E.


Erythropoietin and cobalt were shown to increase the growth of a Novikoff hepatoma. Although statistically significant, the results were not impressive and did not compare to the effect of partial hepatectomy. It is, of course, tempting to relate partial hepatectomy to partial “erythrocytectomy” (hemorrhage) but so far the evidence for a hormone transmitting the stimulus of partial hepatectomy is not convincing.—A. J. E.


Administration of thyroid for prolonged periods of time to normal dogs was found to produce an increase in red cell production reflected by increased plasma iron turnover, hematocrit from 46 to 56 per cent, and red cell mass from 40 ml./Kg. to 50 ml./Kg. There was no associated change in red cell life span or in white count or platelet count. It appears now that three hormones, thyroid, testosterone and erythropoietin, are capable of producing polycythemia or, expressed more accurately, erythrocytemia.—A. J. E.

The level of erythropoietin was determined in 45 anemic patients with normal renal function and 39 equally anemic but uremic patients. Erythropoietin titer was elevated in half of the non-uremic patients but in only one of the uremic, emphasizing the important correlation between the kidney and erythropoietin. Erythropoietin was elevated in seven of eight cases with acute leukemia, and in each of four cases of hypoplastic anemia, whereas it was low in all five patients with pernicious anemia. (The bioassay used, starved rats, whole serum, s.c. and Fe59 i.p., is obviously useful and easy, although probably the most inaccurate of the present assay procedures.)


This is the ninth reported case of erythrocytosis (Hct. 80 per cent, RBC, 7.2 mill./cu.mm.; Hb. 19.5 Gm. per cent) "cured" after the removal of a large uterine fibroid. Lack of splenomegaly, and the normal white cell count, platelet count and leukocyte alkaline phosphatase appeared to exclude polycythemia vera. The tumor was huge (6.5 Kg.) but there was no definite evidence for respiratory embarrassment. (Oxygen saturation was reported to be normal, although this does not rule out alveolar hypoventilation.) —A. J. E.


A 52-year-old Negro male with cirrhosis of the liver developed, concomitantly, a hepatic carcinoma and erythrocythemia. Hematocrit was, 66 per cent; RBC, 8.4 mill. cu.mm.; Hb., 19.8 per cent; reticulocyte count, 0.9 per cent; and red cell mass, 69 ml./Kg. WBC and arterial oxygen saturation were normal. Platelet count was slightly increased (400,000). Erythropoietin studies were not done.—A. J. E.


In an extensive review of the Rh blood group system, a neutral terminology and coding system has been introduced to permit a more complete and concise presentation of Rh data. In the new terminology a number denotes each specificity of Rh antigen. No other terms or symbolisms appear. Over 20 kinds of Rh antisera and over 30 complex Rh alleles are tabulated and described. —R. E. R.


A new specificity of Rh antibodies, called Wiel. [anti-Rh(23)], was encountered in the serum of a woman immunized by blood transfusions and pregnancies. Her Rh phenotype was Rh:1, -2, 3, 4, 5, 6, -7, -8, -9, -10, -(20), -(23) and her serum contained, in addition to anti-Rh(23), anti-Rh2, anti-Rh7, anti-Rh8, anti-Rh10 and/or anti-Rh(20). Anti-Rh(23) agglutinated only rare specimens of type Rh:wl (Rh or Dr) erythrocytes; other red cells of similar phenotype were not agglutinated. Studies of one Caucasian and one Negro pedigree showed Wiel. to be associated with a complex allele, R^w1, -2, -3, 4, 5, 6, -7, -8, -9, -10, -(11), w12, -(13), (14), -(15), -(16), -(20), -(21), (23).—R. E. R.


In the serum of most of the animals studied (belonging to 13 animal species), heteroagglutinins specific for horse A, C, D and J erythrocytic factors have been found. These heteroagglutinins may be used as reference sera for the study of horse blood groups. —H. H. F.