HEMATOPOIESIS

THE PROBLEM OF NUCLEUS EXPULSION IN CULTURES OF GUINEA PIG BONE MARROW.


The author regularly observed in tissue culture of guinea pig bone marrow an expulsion of the nucleus of mature erythroblasts by active contractive movements. He supposes the mechanism to be a physiologic process.—C.M.

RESPIRATION AND CELL DIVISION IN THE RED BLOOD CELLS OF THE CHICKEN EMBRYO.


In the developing chicken embryo, it has been established that there is a linear relationship between the number of dividing cells in the midbrain and the rate of aerobic glycolysis. Similar experiments have been conducted on the circulating blood cells removed from chicken embryos on the third to ninth day of incubation. The rate of respiration and number of dividing cells decrease during normal development. Aerobic glycolysis could not be demonstrated. In some tissues, there is an inverse relationship between cell division and cell differentiation, but in other cells division may be linked to different anabolic processes, which manifests itself by differences in the relationships to the catabolism of carbohydrate.—O.P.J.


In vivo experiments have shown that intraperitoneal injections of thiourea increase the number of mitoses in the liver. In order to determine whether it is a direct or indirect effect, 48 hour cultures of chick fibroblasts were treated with 0.1 per cent and 1.0 per cent concentrations of thiourea, and incubated from 5 minutes to 24 hours. In cultures treated with 1 per cent thiourea there was an accumulation of mitoses at metaphase and some were pathologically altered. These changes were shown to be reversible by washing cultures in Ringer’s solution after they had been immersed in a 1 per cent thiourea solution for 15, 20 or 30 minutes. After 3 to 6 hours of recovery most mitoses were of normal configuration. Although there was a metaphase arrest after treatment with thiourea, the total number of mitoses per culture did not exceed the normal and the prophase values were low which suggests that thiourea does not stimulate mitoses in fibroblasts in vitro. The results of these experiments support the view of the indirect and peculiar action of this drug in the liver.—O.P.J.

Previous investigations have been fairly successful in growing new blood vessels in cultures of embryonic tissue. But the results of culturing bone marrow from 1 to 2 year old chickens show an even higher percentage of capillary growth. The new blood vessels extending from the explant appear first as solid, sharp tips of cytoplasm that hollow to form endothelial tubes. Blood cells move into the new sprouts immediately and as the vessels widen and extend, the cells stream slowly toward the growing tips. The new vessels may extend 2 mm. and vary from 7 to 100 μ in width. An initial culture media of pH 7.8 favors the early formation of new capillaries. When 2 pieces of bone marrow are planted approximately 1 mm. apart, new outgrown capillaries from the two explants meet and join. The formation of new capillary tubes is a property of adult blood vessel endothelium.—O.P.J.

**IRON and PIGMENT METABOLISM**


The plasma iron-binding protein of 4 anemic and 3 normal dogs was artificially saturated by means of frequent intravenous administrations of iron before and during the absorption of a known amount of radioactive iron. With the exception of 2 anemic dogs the amount of radioactive iron absorbed was found to be essentially the same as that noted in these animals during the control feeding period prior to the institution of the saturation procedure. These 2 anemic dogs for some unexplained reason showed a decrease in absorption although the amount absorbed still far exceeded that observed in normal dogs. The results, therefore, fail to support the theory held by a few investigators that the plasma iron-binding protein and its relative saturation is the important factor regulating iron absorption from the gastrointestinal tract.—H.W.B.


Recent investigations have indicated that iron absorption is controlled largely by the body's need for iron and that this control is most probably effected through some mechanism in the gastro-intestinal mucosa.

In the experiments described here, a reduction in the usual high absorption of a standard dose of radioiron in chronically anemic-iron deficient dogs was produced by giving the animals a prefeeding of 100 mg. of ordinary iron. This "mucosal block" was, however, not as effective as that observed in normal dogs and was of relatively short duration (35 per cent reduction in absorption 5 hours after prefeeding; no reduction detected at about 22 hours). It is suggested that the short duration of this block may be due to the rapid movement of iron through the mucosa.

Observations were made also on the absorption of radioactive iron introduced into the jejunum and colon. The low percentage of absorption here compared to that in the stomach and duodenum adds further evidence to the existence of a gradient in the capacity of the gastro-intestinal tract to absorb iron.—H.W.B.


The authors investigated the fate of orally administrated hemoglobin. At intact stomach function they found a splitting into globin and heme. After enzymatic hydrolysis the globin is absorbed by the mucosa up to 97 to 99 per cent and is utilized by the body for the re-synthesis of hemoglobin. The heme is destroyed and excreted with the stool mainly as pro-
toheme, deuteroheme and hematin (97 to 98 per cent). Only 2 to 3 per cent is transformed to protoporphyrine, deuteroporphyrine and mesoporphyrine. In cases of gastric hypoaicidity and of intestinal mass bleeding unaltered hemoglobin may appear in the feces. The amount of iron split from heme is low (only 2 per cent) and cannot be considered seriously as an iron source for the body. But if hemoglobin, prior to ingestion is treated with H2O2, there was observed full absorption of the globin and of the iron by the mucosa. The reason is that the hemoglobin is split to propentdyopent with liberation of the iron.—C.M.


In 5 cases of chronic phenacetine intoxication with cyanosis the authors found a distinct O2 unsaturation of the arterial blood at a normal pH and pCO2. This denotes a diminished O2 affinity of the resting active hemoglobin and a shift to the right of the dissociation curve. In 2 cases of experimental acute nitrite intoxication similar alterations could not be found, the dissociation curve being normal. The different results parallel the different clinical picture of the intoxications. Progressive hemolysis renders the determination of the O2 dissociation curve with the tonometer difficult to such a degree that the results obtained cannot be compared with the conditions in vivo.—C.M.

THE VITAMIN THERAPY OF PORPHYRINURIA. W. Stich. First Medical Clinic of Munich, Germany. Deutsche med. Wchnschr. 967-970, 1951.

Experiments on the biology of yeast cells have shown that lack of riboflavin leads to an increased production of coproporphyrin I instead of C III and heme compounds. In analogy, in human hyporiboflavinosis (cases of gastro-enteritis, sprue, achylia, Plummer-Winson syndrome) the author observed an increased coproporphyrin I production with anemia.

The same results were obtained in 10 cases of epidemic hepatitis and in 3 cases of liver cirrhosis. Daily injections of 20 mg. riboflavin led to a striking decrease of the coproporphyrinuria I. Similar observations were made treating patients with lead poisoning.

Two cases of congenital porphyrinuria have been followed during a longer period of riboflavin therapy. There was a marked clinical improvement combined with drop in uroporphyrin I and coproporphyrin I in urine after riboflavin injections.—C.M.

LEUKOCYTES

AUREOMYCIN IN THE TREATMENT OF INFECTIOUS MONONUCLEOSIS. C. H. Carter and V. P. Sydenstricker. From the Medical Service, University Hospital, Augusta, Ga. and the Medical Department, University of Georgia School of Medicine, Augusta, Ga. Am. J. Med. 10: 309-315, 1951.

Nine cases of infectious mononucleosis treated with aureomycin are reported. The authors were enthusiastic about the beneficial clinical effects attributed to the drug. In view of the conflicting reports in the literature on the effectiveness of aureomycin, the variability of the course of this disease, and the lack of laboratory evidence that the disease is modified by aureomycin, one must accept such a report with reservation and await the results of more controlled studies.—H.W.B.


The clinical and laboratory manifestations in 210 cases of infectious mononucleosis seen during a ten year period are analyzed. Although nothing new is added to our present knowledge, the data is clearly presented and the diversity of presenting symptoms and clinical findings in this disease well illustrated.—H.W.B.
ABSTRACTS


In a series of 100 human pituitaries, varying from the newborn to 86 years of age, lymphocytes and lymphoid tissue were not found in the youngest group, whereas about 60 per cent of the oldest group had them. Most of these cells were located in the pars intermedia and arranged in a diffuse manner among collagenous fibers. In comparable groups the incidence was almost twice as great in male pituitaries. It is believed that the presence of lymphoid tissue in the pituitary is a normal process and is explained embryologically by the derivation of the pars intermedia from the buccal cavity.—O.P.J.

MULTIPLE MYELOMA


The authors' experience with urethane and ACTH in the treatment of multiple myeloma is reported. In brief it would appear that urethane is still the drug of choice in treatment of this disease. The 2 patients who received urethane alone experienced relief of bone pain and one showed evidence of healing of his fractured cervical vertebra. Although the one patient who received both urethane and ACTH exhibited a striking clinical response associated with a change in blood chemical findings toward normal and a reduction and cytologic change in marrow myeloma cells, her improvement was attributed primarily to urethane which was given for one year prior to and continued during ACTH therapy.

Three patients, one with solitary myeloma, received ACTH alone. Only one of these patients, whose disease was generalized, showed a favorable response with relief of bone pain, signs of bone healing, diminution in marrow myeloma cells and a return to normal of blood counts and blood calcium. Obviously the therapeutic effectiveness of ACTH in this disease cannot be determined from this small group of cases and at present reports of its clinical trial by others are few.—H.W.B.


Three patients with a variety of clinical symptoms and signs, bone marrow aspirations characteristic of multiple myeloma and negative skeletal x-ray surveys are presented. One of these patients had far advanced myeloma with severe bone pain of one year's duration.

This report stresses the fact that multiple myeloma without demonstrable bone lesions does occur and that little reliance should be placed on negative roentgen findings in patients with obscure anemia, bone pain, etc. unless the disease has first been ruled out by bone marrow examination.—H.W.B.


This is the case of a white, 55 year old male with arrested pulmonary tuberculosis, who had noticed ecchymoses over the thighs, epistaxis and bloody sputum prior to his last admission to the hospital. Two days after admission he had a leukocyte count of 2,700 with a 200 cell differential count as follows: lymphocytes 15, promyelocytes 6, myelocytes 10, band cells 23, segmented neutrophils 120, eosinophils 5, basophils 1, monocytes 9, plasma cells 7, blast cells 2, and stem cells 2. On the fourth day he died in coma. Postmortem x-ray films of the skull, the long bones and the pelvis showed no areas of rarefaction. Marrow from the sternum, ribs and vertebrae showed a diffuse plasma cell infiltration. Other organs, including the pons, contained accumulations of plasma cells.—O.P.J.

The unusual occurrence of leukemia in 5 of 8 siblings is reported. The disease became manifest in these children between the ages of 5 and 8 years. Three of them had lymphatic leukemia and the diagnosis in the other 2 was leukemic reticuloendotheliosis. Also of interest was one other sibling, age 4, who two months prior to death of pneumonia exhibited a leukemoid reaction. Blood studies made on the unaffected siblings and the parents were within normal limits. No other blood disorder and only one case of cancer could be elicited in the family history which included 135 relatives.

Hereditary factors in leukemia are discussed. That a genetic factor was involved in this instance appears highly probable. It is suggested, however, that instead of the more popular concept of a dominant gene with low penetrance, one might postulate, in this particular family, a rare recessive gene with high penetrance. A search for possible causal or modifying environmental factors revealed only the frequency of carious teeth, respiratory infections and sulfonamide medication in all these children, normal as well as leukemic.—H.W.B.


Four adult patients with acute or subacute leukemia (lymphocytic and myelogenous) and one with lymphosarcoma were treated with aminopterin without clinical or hematologic improvement. Toxic manifestations were a prominent feature in all cases and included 2 instances each of marrow hypoplasia, severe stomatitis and hemorrhagic skin lesions; 1 case of severe leukopenia; and ulcerative and hemorrhagic gastro-intestinal lesions in 3 patients.

This report re-emphasizes the frequency and severity of toxic reactions which occur with this drug and the general clinical impression that fewer favorable responses to it are to be anticipated in the adult age group.—H.W.B.

Blood Coagulation

A New Antithrombic Acting Anticoagulant in Liver Diseases. E. Schwarz and Wanner J. Koller. From the Medical Clinic of the University of Zurich, Switzerland. Acta haemat. 6: 70-77, 1951.

In a case of severe diffuse liver damage, the authors observed a new antithrombotic acting anticoagulant. It is quite different from heparin-antithrombin since it cannot be neutralized by protamin sulfate nor by toluidine blue. Heating the plasma to 50 C. for 10 minutes does not inactivate the factor. It seems to be concerned in the coagulation process. The bleeding tendency in patients with liver diseases therefore may not only be explained by a diminution of coagulation activators (prothrombin, factor V, thrombocytes, fibrinogen) but also by an increase of this new anticoagulant.—C.M.


A number of fibrinogen B tests and clotting times were carried out on 26 normal persons, 172 postoperative patients, 35 patients with miscellaneous conditions and 78 obstetrical patients. The results showed that fibrinogen B was absent from the blood of normal persons but present in the great majority of postoperative patients (or all those having major surgery) for two or three weeks following operation. Fifty per cent of the normal women in labor and 100 per cent of the pre-eclamptic patients near term also showed fibrinogen B in their blood. In general it was concluded that tissue necrosis of any great extent predisposes to fibrinogen B formation and that while its presence is quite probably a necessary
prerequisite for intravascular clotting, the mere demonstration of its presence is of no practical advantage in the prediction of those patients in whom thromboembolic phenomena will develop.

A clotting time of 3 minutes or less was found in association with fibrinogen B in 8 of the postoperative cases. Two of these patients later exhibited mild signs of phlebitis. It is possible that, had the clotting times in these patients been followed for a period of several hours, a prognostic prethrombotic state might have been demonstrated.

It would appear, however, that no test has yet been devised which can reliably predict the occurrence of thromboembolism in any particular patient.—H.W.B.


The authors have extended the characterization of fibrinogen polymerization in vitro by means of light scattering measurements employing a Brice-Speiser light scattering photometer. By this method the molecular weight of fibrinogen was found to be 840,000 and the length 840 Å. Fibrin dissolved in urea and guanidine gave the same molecular weight as fibrinogen under similar conditions.

During the clotting of fibrinogen larger and larger particles were built up through side-by-side and end-to-end associations of the apparently original fibrinogen particles. The relative importance of the two kinds of association depends on pH and ionic strength. End-to-end associations were found to be weaker than side-by-side associations.

The clotting of fibrinogen by papain was found to be similar to the clotting brought about by thrombin, however, the situation is complicated by the proteolytic activity of papain.—C.E.R.

SKELETAL CHANGES IN DISEASES OF THE BLOOD


The author in discussing the roentgen appearance of skeletal changes in leukemia, myelosclerosis and the chronic familial and racial anemias, attempts to correlate these changes with what is known concerning metabolic dysfunction in the respective blood dyscrasias. Interesting questions are raised regarding the pathogenesis of some of the bone lesions. It is suggested that in many instances the skeletal changes are not just a local response to the adjacent disease process but rather occur because there is in these disorders a physico-chemical change in the protein substrate of bone with altered conditions for the precipitation of calcium.—H.W.B.

ANEMIA


This paper describes in more complete detail previously reported data on a megaloblastic anemia produced in monkeys fed milk diets deficient in ascorbic acid. Considerable attention is given here to the clinical symptoms and hematologic manifestations.

This anemia, believed clinically similar to the megaloblastic anemia of infants, can be prevented or cured by ascorbic acid and by either pteroylglutamic acid or folic acid without ascorbic acid. Vitamin $B_12$ alone, however, is ineffective both in its cure and prevention.

It is believed that the megaloblastic anemia is due to a deficiency of ascorbic acid which in some way interferes with the metabolism of pteroylglutamic acid. Other investigators
have suggested that ascorbic acid plays a role in the effective conversion of pteroylglutamic acid to folinic acid. Of interest in this respect will be further investigation of the possibility that folinic acid is a more potent therapeutic agent than pteroylglutamic acid in this anemia, as well as the prospective study by these authors of the production of folinic acid from pteroylglutamic acid in scorbutic monkeys.—H.W.B.


The results of liver extract therapy in 63 patients with pernicious anemia treated for periods of one to twenty years are evaluated. Since the introduction of concentrated liver extracts, the maintenance dose in most of these patients was 30 units weekly.

Data are presented on the symptoms and physical signs at the onset and at the conclusion of study. With the exception of 3 patients who had complicating diseases, all maintained a satisfactory hematologic remission. Seven of the 50 patients with objective neurologic disease at the onset of observation underwent complete remission, none of the 13 without initial neurologic complaints developed any such manifestations, and there was no progression but rather improvement in the great majority of those with neurologic involvement.

This report is presented for the purpose of comparison with a study now in progress evaluating the effectiveness of vitamin B12 therapy on a long term basis.—H.W.B.


Cobalt containing red pigments with high microbiologic activity for L. leichmannii 313 were prepared from fish solubles and were tested clinically in 4 cases of pernicious anemia in relapse. In doses equivalent to 100 and 120 μg. of vitamin B12 activity they had no hemopoietic effect. In contrast, a B12 equivalent of 50 or 60 μg. of a similar extract treated with potassium cyanide gave a good hemopoietic response. On such treatment the red pigments became completely soluble in butanol and gave the absorption spectrum of vitamin B12.

The significance of these findings is discussed and the suggestion made that the hemopoietically inactive red pigments are peptide conjugates of B12, from which free B12 can be released by the KCN.—S.T.C.


The well known clinical association of megaloblastic anemia with intestinal strictures and anastomoses led these workers to investigate the possibility of producing an intestinal macrocytic anemia in an experimental animal.

This paper reviews briefly the work of others on these lines and more fully the results of the authors' experiments with rats. It was found that a macrocytic anemia did develop in a proportion of rats in whom a small intestinal cul de sac had been produced, provided that the cul de sac was in the upper part of the small intestine and the contents were stagnant.

The anemia differs from the macrocytic intestinal anemia of man in that the marrow is not megaloblastic and there is evidence of a considerable hemolytic element. Bartonella infection as a cause of the anemia has been excluded. There is frequently an associated steatorrhea. The anemia responds to folic acid and aureomycin treatment but poorly or not at all to B12.—S.T.C.


Two patients are described, in whom many of the findings suggested a diagnosis of myelogenous leukemia. The bone marrow was predominately granuloeytic. The response to
vitamin B₁₂ was dramatic, with return to normal of the marrow and all other abnormalities. The authors conservatively discuss the possibility that leukemia may be the result of a deficiency of some as yet undefined substance.—T. R. T., Jr.

ACUTE ERYTHROBLASTOPENIA IN SICKLE-CELL ANEMIA AND INFECTIOUS MONONUCLEOSIS.

Studies made during an acute transitory cessation of erythrocyte production, so-called “acute erythroblastopenia,” occurring in 4 cases of sickle cell anemia and 1 case of infectious mononucleosis are reported. As would be expected, a striking drop in hemoglobin and red cell levels was observed during this period in the patients with sickle cell anemia whereas the decrease was relatively mild in the child with infectious mononucleosis who was previously hematologically normal.

Diagnosis of this condition depends on bone marrow examination although it may be suspected or anticipated in any patient with a known hemolytic anemia who fails to show polychromatophilia on the blood smear. The common and most striking marrow finding is the disappearance of most of the red cell precursors except for a few pronormoblasts. Other changes depend largely on the type of disease with which the erythroblastopenia is associated.

No specific etiologic agent has been found to date although the frequency with which erythroblastopenia has been associated with infectious and allergic processes is probably not coincidental. The phenomenon is believed to represent a marrow reaction to a variety of noxious agents and quite possibly virus infections are among the prime offenders. In the present series, 3 of the children had associated upper respiratory infections, one a Salmonella choleraesuis bacteremia and the fifth was, as stated, a case of infectious mononucleosis. It is suggested that marrow studies during virus infections may disclose a higher incidence of erythroblastopenia.—H. W. B.


This is an excellent presentation and discussion of studies which demonstrate that hemosiderinuria is an invariable finding when hemoglobinemia was present. The results also indicated that “low-grade” hemolysis was often present when other signs failed to reveal it, or at least failed to reveal its degree. Methods are described for the determination of plasma hemoglobin and hemosiderin in urine.—T.R.T., Jr.

LES ANEMIES HYPOPLASTIQUES DU PETIT ENFANT (Hypoplastic Anemias of Childhood).

Three cases of this very rare disease are reported. From the study of these cases and of the literature, the authors point out that there is erythroblastic arrest of the bone marrow at the polychromatophilic or acidophilic stage, the constant lack of reticulocytes in the peripheral blood, and an arrest in growth and development. The authors give a tentative classification of the hypoplastic anemias in the young child.—J.P.S.


Systematic radiologic studies were made in 10 cases of myeloid metaplasia of the spleen and liver. The osseous alterations are absolutely latent. The only sign, which is characteristic is the great difficulty, or even the impossibility, of successful bone marrow st-
ABSTRACTS

Pulmonary. Only 3 patients had osseous pains. The radiologic opacity of the skeleton is subject to great variations. Sometimes the opacity is localized to the pelvis, the rachis, the skull or the long bones. The architecture of the bone is disorganized. The cortex of the long bones is thickened. There is no periostic modification, no deformations of the form of the bones, no calcifications of the joints and no visceral calcifications. Only 2 of the 10 patients had no radiologic lesions, but the possibility exists that there may be histologic changes without radiologic modifications. Autopsy has been performed in 3 cases and histologic sections were studied: bone marrow is invaded by osseous arches and fibrosis.—J.P.S.


The case history of a 13 month old infant with an acute hemolytic anemia of unknown etiology is presented. A positive Coombs test was obtained on several occasions. ACTH therapy, instituted after numerous blood transfusions had failed to improve the patient's condition, proved a life saving measure. Doses from 40 to 80 mg. daily were administered for 22 days. A complete clinical and hematologic remission, including reversal of the Coombs reaction, occurred and at the time of this report had been maintained for 7 months.—H.W.B.


Two cases of acquired hemolytic anemia treated with ACTH are described. The first, a woman of 72, received 100 mg. a day (25 mg., 6 hourly) for eleven days with little if any benefit. The second, a woman of 55, with acquired hemolytic anemia associated with positive Kahn and Wasserman reactions showed a striking remission on such treatment, improvement being maintained after stopping the ACTH, although the Coombs test remained strongly positive.

ACTH did not suppress antibody formation in rabbits to guinea pig cells nor did it prevent the antigen antibody reaction between the rabbit antisera and guinea pig cells in vitro or in vivo.—S.T.C.

BLOOD VOLUME, BLOOD TRANSFUSION and BLOOD GROUPS

Fatal Transfusion Reactions from Massive Bacterial Contamination of Blood. C. W. Borden and W. H. Hall. From the Veterans Administration and the Department of Medicine, University of Minnesota Medical School, Minneapolis, Minn. New England J. Med. 245: 760–765, 1951.

The clinical features and bacteriologic findings in 2 deaths from the transfusion of grossly contaminated blood with gram-negative bacilli are reported. The cardinal feature of such a reaction is peripheral vascular collapse. The contaminating organisms were capable of growing rapidly at low temperatures in preserved blood and did not produce macroscopic hemolysis.—P.F.W.


Three out of 4 recipients of Rh blood type rr receiving a series of injections twice weekly of blood from a donor thought to be r r, developed anti-C plus a blocking type of anti-D. The donor cells were shown in fact to have a weak D* antigen.—S.T.C.

The Blood Volume in Pre-Eclampsia as Determined with 131I Labeled Red Blood Cells. N. I. Berlin, G. M. Hyde, J. H. Lawrence, R. J. Parsons and S. Port. From the
ABSTRACTS

Donner Laboratory of Medical Physics, University of California, Berkeley, and The Pathology Laboratory, Highland-Alameda County Hospital, Oakland, Calif. Surg., Gynne. & Obst. 84: 21-22, 1952.

Blood volume determinations in eight women with preeclampsia revealed an average reduction of 26 per cent in blood volume, 16 per cent in total red cell volume and 31 per cent in plasma volume as compared to average determinations made previously in a control series of 47 normal women during the third trimester of pregnancy. The somewhat higher hematocrit in the preeclamptic state was attributed to the greater decrease in plasma volume than in red cell volume.

The relationship of the anemia and low plasma volume to the etiology and other manifestations of preeclampsia is at present unknown.—H.W.B.

ENDOCRINE INFLUENCE on the BLOOD


This work is an attempt to bring light upon the actual mechanism involved in the effects of the adrenal cortex on erythropoiesis. Rats were used. Adrenalectomy induced an anemia in the rat maintained on NaCl which was maximum at 2 to 3 weeks and gradually disappeared so that the erythrocyte count was practically normal by 60 days postoperation. Adrenal cortical extracts, cortisone and epinephrine prevented this anemia. Findings in the bone marrow did not always correlate with changes in the peripheral blood. The authors conclude that the experiments suggest that the adrenal cortex plays a regulative or supportive role in blood forming processes.—R.C.C.

NEURO-ENDOCRINE AND ENDOCRINE INFLUENCES ON THE CIRCULATING BLOOD ELEMENTS. E. Simms, M. Pfeifenberger and P. Heinbecker. From the Department of Surgery, Washington University School of Medicine and Barnes Hospital, St. Louis, Mo. Endocrinology 49: 45-66, 1951.

This work is a study of the effects of alterations in neuro-endocrine and endocrine interrelations on the peripheral blood picture of the dog with main emphasis on the white blood cells.

The hypophyseal-adrenal cortex production of a decrease in circulating eosinophils and lymphocytes was confirmed. It was found that the lymphopenia was maintained for longer periods than the eosinopenia. Underaction of this hypophyseal-adrenal cortex complex permits an increase in these blood elements. Overaction of this endocrine complex was brought about by (1) complete denervation of the neural hypophysis, and (2) a tumor of the adrenal cortex; underaction by (1) removal of anterior lobe of hypophysis, (2) adrenalectomy, (3) overaction of the neural hypophysis and (4) by excess of adrenal cortical hormone.

In normal dogs an eosinopenia was produced by treatment with ACTH, growth hormone (which the authors now think was due to contamination with ACTH), by preloban naphanoid (Winthrop), by cortisone and by epinephrine. In adrenalectomized dogs, cortisone was the only one of the above substances which was effective. Thyroidectomy, gonadectomy, and treatment with thyrotropic hormone, desiccated thyroid extract, and posterior lobe extract were ineffective.

Release of ACTH by epinephrine was abolished by hypophysectomy, denervation of the neural hypophysis, by an excess of circulating thyroxine or epinephrine. The authors conclude that epinephrine stimulates the pituitary by way of the cerebral cortex, which in turn inhibits the paraventricular nuclei of the hypothalamus. This decreases action in the posterior lobe of the pituitary which in turn, according to the authors, causes an overaction of the eosinophils of the anterior lobe of the hypophysis.

A concept of the mechanisms of neuro-endocrine and endocrine interrelations is presented.—R.C.C.
ABSTRACTS


This work was performed to determine whether the increase in eosinophils following a decrease due to adrenal cortical therapy is due to a proliferation and differentiation of new cells in the bone marrow. Mice of the C-57 brown strain were used.

Adrenalectomized male mice were given an injection of Lipo-adrenal Cortex. Myelograms were taken at 2, 4, 6, 8, 12, 24 and 36 hours after the injection. A marked increase in the younger stages of eosinophils occurred, and the authors think the increase was sufficient to account for the increase that occurs following the decrease caused by such injections.—R.C.C.


This work was undertaken to determine the factors involved in the demonstrated increased resistance of the erythrocyte to hypotonic saline following adrenalectomy.

Rats were used in this study. Adrenal removal induced an increased resistance to lysis if whole blood was used. If the erythrocytes were washed, no increase in resistance was demonstrable. The authors state that the plasma contains a factor(s) which inhibits lysis, and this factor is present in greater amounts in the adrenalectomized rats. The possible nature and mechanisms involved are discussed.—R.C.C.

INFLUENCE OF STRESS STIMULI ON LYMPHATIC TISSUE OF ADRENALECTOMIZED MICE. T. F. Dougherty and L. F. Kuniagai. From the Department of Anatomy, University of Utah College of Medicine, Salt Lake City, Utah. Endocrinology 48: 691-699, 1951.

This paper is a study of the effects of stress on the blood picture in the adrenalectomized animal. CBA mice were used. Stress stimuli were starvation, histamine and anaphalaxis. Mice stressed 2 hours after adrenalectomy exhibited a significant lymphocytosis 2 hours later. The lymphocytosis was increased further at 8 hours, and disappeared at 24 hours after stress. This lymphocytosis also was elicited in adrenalectomized splenectomized mice.

This result is the reverse of that obtained in normal animals and, according to the authors, indicates the presence of unknown factors which have an influence on lymphatic tissue which are not mediated through the adrenal cortex.—R.C.C.


This paper is a detailed description of a method of assay for adrenal cortical hormones using a decrease in eosinophils as a criterion of activity.

The authors summarize their method as follows: "A method of assaying adrenal cortical hormones has been described. This assay is based on the decrease in the number of circulating eosinophils in adrenalectomized mice during a 3 hour period following a subcutaneous injection of an 11-oxy corticosteroid hormone. In some animals, presumably mice with adrenal cortical rests, a nonspecific response was obtained. This occurred primarily following injections of toxic materials such as benzyl alcohol. The nonspecific response was eliminated by treating the adrenalectomized mice with epinephrine prior to the adrenal cortical hormone injection.

"The assay is performed as follows: (1) Jax C57 Brown mice weighing 20 to 25 grams are adrenalectomized in a one step operation and 15 mg. pellets of 11-desoxy corticosterone acetate are implanted subcutaneously. (2) Three days postoperatively the mice receive a subcutaneous injection of 5 micrograms of epinephrine and the material to be assayed is
injected 4 hours later. (3) Eosinophil counts are taken immediately prior to and 3 hours following the injection of the assay material. The per cent decrease of the number of eosinophils is correlated with the quantity of 11-oxy-corticosteroid hormones injected.

"Using this assay, a straight line log-dose-response was obtained between 0.5 and 6 micrograms of cortisone acetate, cortisone (free alcohol) and compound F. Similar dose responses were obtained with a commercial extract of the adrenal cortex and also with an untreated, pooled pregnancy urine. Androsterone, testosterone, estradiol, progesterone and other non-adrenal steroids in the doses injected had no eosinopenic effect. 11-Desoxy-corticosterone acetate produced a partial eosinopenic response when relatively large doses (over 100 micrograms) were given."—R. C. C.


These authors have shown previously in dogs that many agents would induce a hypoferremia. Such agents included bacterial abscesses, sterile turpentine abscesses, histamine, epinephrine, fracture, anaphylactic shock and occasionally the stress of taking blood samples. Adrenal cortical extract and ACTH were found to cause an equal decrease in iron. The purpose of the present work was to determine whether the rat responded in a similar manner.

Five hundred Sprague-Dawley rats were used in the experiment. Adrenalectomy induced a decrease in plasma iron which could be prevented by adreno-cortical extract and cortisone, but not by desoxycorticosterone acetate. A decrease in food intake was not responsible for this decrease in plasma iron. On the other hand, larger doses of these hormones produced a hypoferremia in rats as was found in dogs. The injection of ACTH, adrenal cortical extracts, cortisone, desoxycorticosterone acetate and turpentine produced an acute hypoferremia in intact rats. Adrenalectomy abolished this effect of ACTH but did not abolish the effect of the other substances. The results in rats confirmed the observations in dogs. The adrenal cortex plays a dual role: (1) in maintaining a normal plasma iron, and (2) producing a marked hypoferremia under conditions of stress.—R. C. C.
ABSTRACTS