THE INFLUENCE OF BATYL ALCOHOL ON THE PERIPHERAL BLOOD AND BONE MARROW OF CATS WITH INFECTIOUS FELINE ENTERITIS

By

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GENERAL INTRODUCTION

The purpose of the present experiment is to investigate and evaluate the action of batyl alcohol as a therapeutic agent in cats infected with infectious feline enteritis virus. The parameters for evaluation are based on comparative quantitative and qualitative data on blood and bone marrow morphology of diseased animals, a portion of which received batyl alcohol injections.

Infectious feline enteritis is a highly contagious and highly fatal disease which affects predominantly young cats. Verge and Cristoforoni (1928) appear to be the first to identify a virus as the cause of the disease. The disease is characterized clinically by fever, nasal and ocular discharge, depression, anorexia, emesis, diarrhea and rapid and severe dehydration (Stansbury, 1966). Hematologic changes characteristic of the disease include severe leukopenia with pronounced neutropenia associated with depression or aplasia of the bone marrow and slight anemia (Lawrence et al., 1940). Hemorrhagic or diphtheretic enteritis affecting mainly the ileum, dehydration, and occasionally pseudomembranous laryngitis are the more prominent postmortem lesions (Jubb and Kennedy, 1963). The incubation period following experimental parenteral exposure ranges from 4 to 8 days (Newberne et al., 1957).

Lawrence and Syverton (1938) described a disease which they designated spontaneous agranulocytosis. It occurred in a group of laboratory cats. Their initial observations included the occurrence of severe

leukopenia and neutropenia in affected animals. Hammon and Enders (1939) independently reported on the same disease but named it malignant panleukopenia. Characteristic changes observed in affected animals included panleukopenia, enteric lesions, and the presence of inclusion bodies in epithelial cells of the intestinal mucosa and in reticulum cells of the spleen, lymph nodes and bone marrow. Hematologic aberrations commenced with a slight lymphopenia followed by severe panleukopenia, most pronounced in the neutrophil series, and associated with aplasia of the bone marrow. They were able to produce the disease by inoculation of susceptible cats with bacteria-free filtrates of spleen emulsions obtained from diseased animals.

Lawrence et al. (1940) made a complete study of the hematologic picture of peripheral blood and bone marrow, plus a brief clinical and pathologic study of feline infectious agranulocytosis. Total leukocyte counts revealed either a gradual decrease in numbers a few days postexposure until the height of the disease, or a precipitous decline in number beginning on the fifth to seventh day postexposure. Slight anemia was apparent during the height of the disease and during the first days of convalescence. The bone marrow macroscopically was described as being fatty, aplastic or normal. Severe depletion of myeloid cells, predominantly the granulocytic series, was noted. Histologic changes which suggested a viral etiology consisted of acidophilic, intranuclear inclusion bodies of variable size, shape, and structure in the epithelial cells of the gastrointestinal mucosa, in widely distributed reticulum cells and in epithelial cells of bronchial mucous glands. They discussed similarities between this disease and agranulocytosis in humans, particularly in reference to peripheral leukocytes and bone marrow.

Riser (1947), in a study of the blood picture of experimentally infected cats, described a slight increase in the leukocyte count the first day but a marked decrease from the third to the tenth days post-inoculation. Erythrocyte counts diminished at a similar rate, leading to a marked anemia. However, the anemic crisis occurred three days after the leukopenic crisis.

Newberne et al. (1957) demonstrated that the incubation period of the experimentally induced disease ranged from 4 to 8 days and usually 6 to 7 days. Histologically they observed aplasia of the bone marrow and damage to the intestinal epithelium which initially was manifested by swelling and loosening of the basement membrane and desquamation with generalized loss of epithelium in most of the intestinal glands. Inclusion bodies were rarely observed in their experimental subjects.

Therapy has been directed toward combating dehydration and electrolyte inbalance and prevention of secondary bacterial infection. Electrolyte solutions, antibacterial agents and blood transfusions are commonly utilized for these purposes. In spite of such measures, the mortality rate remains high (Stansbury, 1966).

Batyl alcohol, 3-Octadecyloxy -1, 2-propanediol, is the monooctadecyl ether of glycerol and has a melting point of 70 to 71°C. The optically active form of batyl alcohol has been synthesized by Baer and Fischer (1941).

Holmes et al. (1941) isolated batyl alcohol from the unsaponified fraction of the yellow bone marrow of cattle. Karrer (1947) reported this compound in the spleen and aorta of mammals and it has also been found in erythrocytes and liver lipids (Brohult and Holmberg, 1954).

Preparations of the above natural products containing batyl alcohol

were used for therapeutic purposes in myelophthisic disorders because workers reasoned that, since the bone marrow produced leukocytes, some component in it might stimulate leukocyte production. In the U. S. the product most frequently used was yellow bone marrow of cattle because this was easily obtained. Watkins and Giffin (1938) treated more than 24 cases of human agranulocytosis with finely strained, yellow bone marrow of cattle with remarkable success, however, little success was achieved in the treatment of semi-aplastic anemia and anemia of pregnancy with the same product (Giffen and Watkins, 1930). Marberg and Wiles (1938) were the first to prepare an extract of the non-saponifiable fraction of the yellow bone marrow of cattle. They established the therapeutic value of the extract in six cases of malignant neutropenia and four cases of leukopenia.

Batyl alcohol extracted from the nonsaponified fraction of yellow bone marrow of cattle was used experimentally for the first time by Sandler (1949). He conducted experiments using normal white rats and normal humans, and white rats subjected to benzene toxicity and observed a significant reticulocytosis in normal human beings and erythrocytosis in normal rats treated with the compound. Rats given batyl alcohol were markedly resistant to benzene toxicity. Edlund (1954) claimed that batyl alcohol exerted a protective effect in white mice subjected to x-irradiation. Eighty-six per cent of the untreated mice died within 30 days after being irradiated while only 56 per cent of those receiving batyl alcohol succumbed. Brohult and Holmberg (1954) observed elevations in leukocyte counts of leukopenic, irradiated humans who were given batyl alcohol. Brohult (1958) also observed an increase of megakaryocytes and nucleated bone marrow cells in irradiated rats receiving

0.15 gm. of an emulsion of purified shark liver oil containing about 50 per cent of alkoxyglycerol esters. Cattle suffering from leukopenia caused by bracken fern poisoning responded favorably to treatment with batyl alcohol and antibiotics (Evans et al., 1958); however, Dalton (1964) reported failure in field cases of bracken poisoning treated with moderate levels of batyl alcohol. Schultze et al. (1958) did not observe a favorable response in experimental aplastic anemia in calves induced by trichloroethylene-extracted soybean oil meal after treatment with batyl alcohol.

The dosage of batyl alcohol seems to be an influencing factor in the results achieved. Evenstein et al. (1958) failed to produce erythrocytic stimulation in rats using a dosage of 1 mg. daily for 20 days and 5 mgs. for 10 additional days or 0.5 mg. during 11 days of batyl alcohol treatment. Linman et al. (1958) reported that a dosage rate of 50 mg. daily produced a more marked erythrocytosis and reticulocytosis in rats than occurred following administration of 12.5 or 25 mg. daily. Leukocytosis also occurred at the higher dosage but was not observed with lower levels. Osmond et al. (1963) observed erythropoietic and lymphopoietic responses in bone marrow and blood determinations with small doses (10 mg./kilo for 5 days) in guinea pigs, however, a granulopoietic response did not occur.

MATERIALS AND METHODS

Fourteen healthy cats approximately three months of age were utilized in the experiments. They were housed in metal kennels and fed a variety of commercial cat foods throughout the course of the studies. The infectious feline enteritis virus used was a strain of challenge virus and consisted of a 10 per cent splenic emulsion harvested from infected cats.[1] The inoculum was administered in 2 ml. doses intraperitoneally. Batyl alcohol of dogfish liver oil origin was prepared in a 5 per cent olive oil suspension by stirring and heating at 250°F for 30 minutes.[2] The heated product was a clear yellow fluid; however, upon cooling it was a turbid whitish fluid. The suspension was administered subcutaneously at a rate of 50 mg. batyl alcohol per kilogram body weight daily. Venous blood for hematologic determinations was obtained by jugular venipuncture. Dipotassium ethylene diamine tetraacetate (EDTA) was the anticoagulant used. Total erythrocyte and leukocyte counts were performed using standard hemocytometer methods. Hemoglobin was determined using the Spencer hemoglobinometer (Model AO 1000 D) and hematocrits were obtained by the microcapillary method. Differential leukocyte counts were performed on Wright's stained smears and reticulocyte counts were determined by supravital staining with brilliant cresyl

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[1]Infectious feline enteritis virus, challenge strain, lot 25. Obtained from Pitman-Moore Company, Indianapolis, Indiana.

[2]Batyl alcohol, from dogfish liver. Obtained from Sigma Chemical Company, St. Louis, Missouri.

blue.

Bone marrow aspirates were obtained alternately from the iliac crest, the femur, and the humerus. The subjects were anesthetized with Brevane[1] and the site of puncture prepared for aseptic collection. Collection from the iliac crest was done by the method of Gilmore et al. (1964). Femoral marrow was obtained by a modification of the procedure described by Schryver (1963). Penetration of the bone cortex was achieved through the use of a marrow needle.

Humeral marrow was collected by the following procedure. The anesthetized kitten was placed in lateral recumbency and the skin over the area of the scapulohumeral joint prepared for surgical manipulation by clipping, washing and disinfection. A sterile, 18 gauge, 0.75 inch bone marrow needle and seated stylet were introduced through the skin. The scapulohumeral joint was flexed and the articular surface of the humerus exposed. The needle was then placed near the center of the head and introduced into the marrow cavity by moderate pressure and rotation. After the needle was introduced about 1 cm., the stylet was removed and a 5 ml. syringe containing a few drops of EDTA attached to the needle and marrow aspirated into the syringe. Different sites for removal of marrow specimens were utilized to avoid repeated invasion of the same site at short intervals.

Following a stabilization period of at least two weeks during which one to three blood and marrow specimens were collected and data obtained to serve as normal control data, the experimental animals were divided

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[1]Brevane (Methohexital Sodium), obtained from Corvel Division of Eli Lilly and Company, Indianapolis, Indiana.

into three treatment groups. One group of five cats received batyl alcohol alone, four for a period of 10 to 12 days and one for seven days. Another group, split into two subgroups, were infected with infectious feline enteritis. Two cats were inoculated with virus suspension and three acquired the disease spontaneously. The third group was composed of six cats inoculated with virus suspension. Commencing on the third day postinoculation, batyl alcohol was administered daily for 10 to 12 days. Two of the cats (numbers 1 and 2) had received a series of injections of batyl alcohol six weeks before incorporation into this group.

The animals were examined and rectal temperatures were obtained twice daily throughout the course of the experimental period. All experimental animals were subjected to gross necropsy at termination of the experiment. Pretreatment hematologic and marrow examinations were made on three samples of blood and bone marrow from each of 11 of the cats. Only 1 sample of blood and bone marrow was obtained from each of 3 cats because these became spontaneously infected with panleukopenia before additional samples could be taken.

Experimental treatments commenced eight days following collection of the third normal sample. Five specimens of blood and bone marrow were obtained from each animal receiving panleukopenia virus and batyl alcohol over a 21 day period. An additional specimen was collected from one of these animals on the 25th day. Six samples were obtained from each cat with untreated infectious feline enteritis during the 25 day postinoculation period. Five specimens were obtained over a 20 day period from each healthy cat receiving batyl alcohol only.

Blood and bone marrow specimens following experimental treatments were obtained at intervals as outlined in Table I. Pretreatment specimens were collected 20, 14, and 8 days prior to treatment except as previously noted.

TABLE I

INTERVAL IN DAYS OF COLLECTION OF BLOOD AND BONE MARROW SPECIMENS

Specimen	Batyl Alcohol	Infectious Feline Enteritis		Inf. Fel. Ent. Batyl Alcohol
		Experimental	Spontaneous	
First	3	3	5-6	4
Second	6-7	6	6-8	6-7
Third	9-10	9	10-12	8-9
Fourth	13-15	14	14	10-14
Fifth	16-20	21	21	21
Sixth		25		21

RESULTS

The data concerning the results of examination of blood and bone marrow for each experimental subject are tabulated in Tables II through IX, and curves of the average values of cytomorphologic findings in each treatment group are presented in Figures 1, 2, 3, 4, 5, 8, 9, and 13. Salient variations between findings in specimens before and after experimental treatments as well as comparisons between treatment groups will be summarized subsequently.

Hematologic Findings in Peripheral Blood

The effect of batyl alcohol treatment of the normal cat. Table II and Figure 1 contain detailed results of hematologic determinations on this group of animals. Hemoglobin and hematocrit levels and total erythrocyte counts were slightly increased in treated animals compared with pretreatment values for the same individuals. Elevations were apparent three days after treatment and persisted throughout the twenty-five day experimental period. Average hemoglobin values during the pretreatment period ranged from 10.2 to 10.3 gm.% whereas hemoglobin values after batyl alcohol treatment ranged between 10.9 and 11.5 gm.%. The maximum hematocrit value prior to treatment was 32.5 vol.% and was elevated to 35.6 vol.% on the sixth to seventh days post-treatment. Total erythrocyte counts were also elevated, the principal increase occurring between the third and seventh days after treatment commenced.

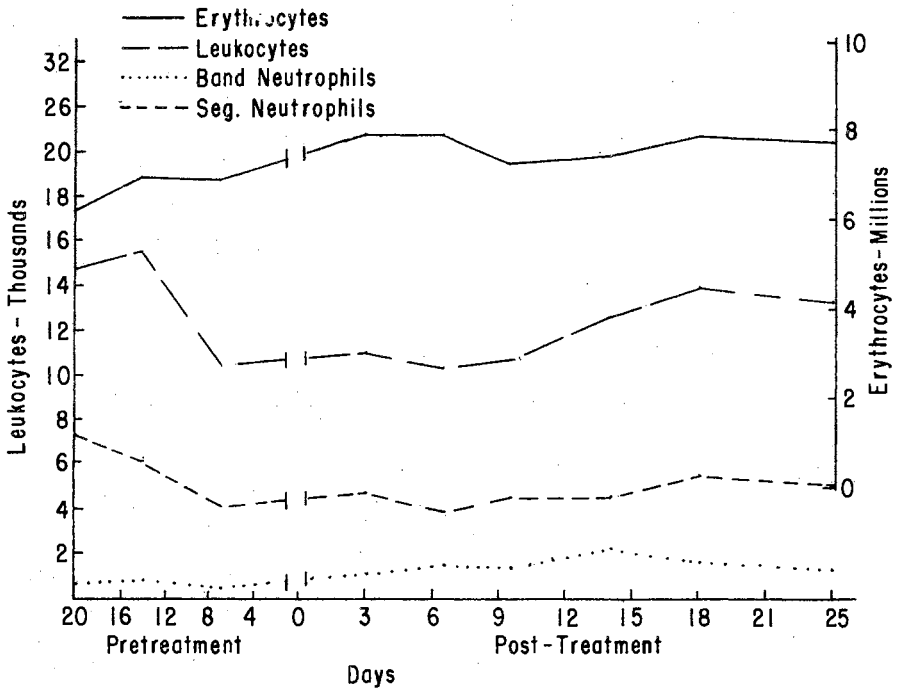

Figure 1. Values of total erythrocytes, leukocytes, band and segmented neutrophils in peripheral blood of healthy cats receiving batyl alcohol.

Elevations persisted through the twenty-fifth day.

There was little variation in total or differential leukocyte counts during treatment; however, an increase in band neutrophils and the presence of neutrophilic metamyelocytes and myelocytes was observed. Slight reticulocytosis associated with slight polychromasia was noted toward the midpoint of the treatment period. A high percentage of erythrocytes of normal cats, when stained with brilliant cresyl blue, contained one or two small, thin, basophilic strands in their cytoplasm. The blood of animals receiving batyl alcohol contained an even higher percentage of erythrocytes with this feature. Some cells were 2 to 3 times normal size and, in these, the strands were more clearly defined and more basophilic. A few such cells contained only faint basophilic granulation. Rubricytes and metarubricytes were noted with greater frequency in specimens collected after batyl alcohol treatment. An increase of Howell-Jolly bodies were present between the third and tenth day after treatment with batyl alcohol was instituted. The presence of small, pale, bluish bodies which resembled Dohle bodies (Weiner and Topley, 1955) was noted occasionally in the cytoplasm of neutrophils of both treated and untreated cats. The bodies were slightly increased in number in the cats receiving batyl alcohol and were associated with a slight increase in size and cytoplasmic granulation of the cells. Anisocytosis, as reported by Schalm (1965) in normal cats, was observed during both pretreatment and post-treatment periods.

Infectious Feline Enteritis. Detailed results of hematologic examinations performed on animals in this group are contained in Tables III and IV and Figures 2 and 3. Five animals were included in this group

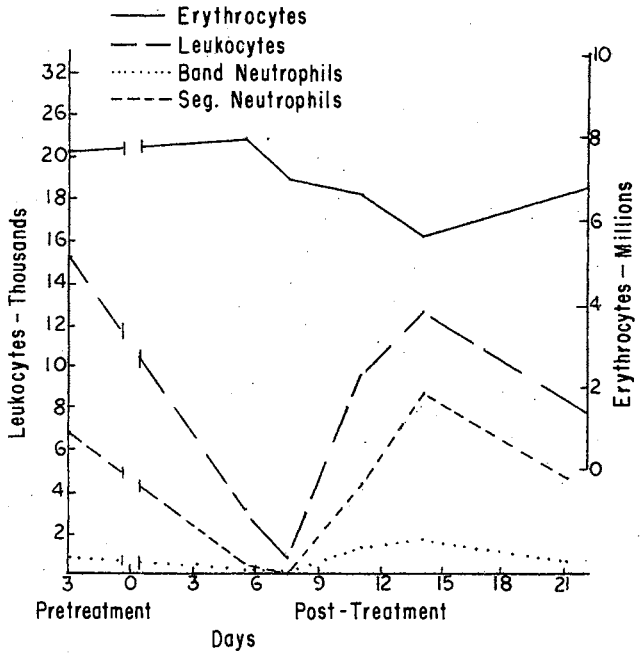

Figure 2. Values of total erythrocytes, leukocytes, band and segmented neutrophils in peripheral blood of cats with spontaneously acquired infectious feline enteritis.

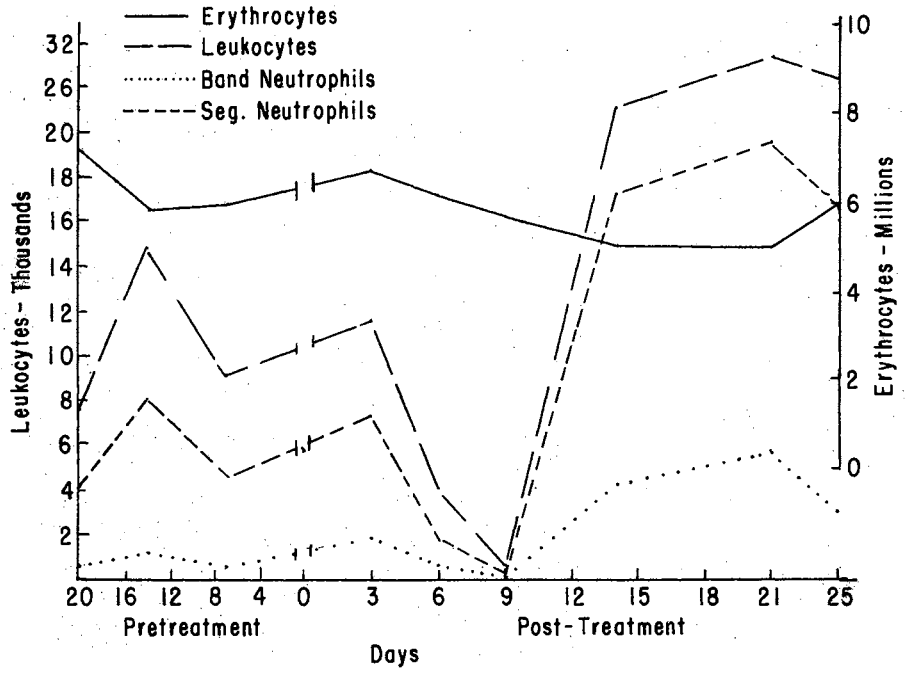

Figure 3. Values of total erythrocytes, leukocytes, band and segmented neutrophils in peripheral blood of cats with experimentally induced infectious feline enteritis.

but the group was subdivided into two segments (Subgroups I and II). Three of the cats (Subgroup I) acquired infectious feline enteritis spontaneously after only one preinfection specimen had been examined. The presentation of data assumes that infection occurred 5 to 6 days prior to the onset of signs. Two cats composed the other subgroup (Subgroup II). These were infected with the virus suspension but developed a concurrent polyserositis probably as a result of the administration of contaminated anesthetic solution prior to inoculation of virus.

Hematologic findings in cats of subgroup I revealed a decrease in hemoglobin from an average of 10.8 gm.% preinfection levels to a minimum of 8.5 gm.% by the fourteenth day after infection. Packed cell volume and erythrocyte counts diminished from 32.0% and 7.81 x 10^6 to 26.5% and 5.59 x 10^6 at their minimum levels.

Depression in the total leukocyte counts was severe, reaching a minimum of 833 cells/mm^3 on the seventh and eighth days. Return to approximately normal total leukocyte counts occurred by the twelfth day postinfection. Segmented neutrophil counts diminished rapidly within 5 to 6 days after the estimated day of infection and were entirely absent on the seventh to eighth days. Levels of immature circulating neutrophils were likewise depressed but to a lesser degree than were the segmented cells. The number of segmented neutrophils had returned to normal levels by the tenth to twelfth days and band neutrophils slightly exceeded preinfection levels at this time. Eosinophils were absent during the period of maximum leukocyte depression.

Reticulocytes and polychromasia were not observed in the preinfection specimens but appeared on the fourteenth day at the same time that nucleated erythrocytes and large erythroid cells containing

supravitally stained basophilic strands or basophilic granulation were observed. Leukocytes presented a number of abnormalities during the experimental period. Dohle bodies were observed in neutrophils during the phase of recovery from leukopenia. In addition, a variable number of neutrophils two to three times normal size were present. These cells appeared to have a slightly bluish, foamy cytoplasm containing reddish granules and their nuclei showed clumping of chromatin and, at times, atypical formations such as nuclear rings and hypersegmentation.

Two cats, composing Subgroup II, were inoculated with 2 ml. of infectious feline enteritis virus suspension. Variation in the parameters of evaluation were quite comparable to those in Subgroup I except for differences in total leukocyte and differential counts which apparently reflected the coexistence of a septic polyserositis observed at necropsy 25 days after inoculation of virus. Leukocyte counts increased remarkably 3 days postinoculation, dropped to a minimum of 775 cells/mm^3, and then increased rapidly to markedly elevated levels by day 14 and through the termination of the experiment. The latter increase was predominantly a neutrophilia which was accompanied by a marked increase in circulating immature neutrophils.

The influence of batyl alcohol treatment on infectious feline enteritis. Detailed results of hematologic examinations performed on this group of animals are contained in Table V and Figure 4. Six cats were inoculated with infectious feline enteritis virus and, beginning three days later, were given daily injections of batyl alcohol. Reduction in hemoglobin from a range of 10.9 gm.% to 10.3 gm.% in preinfection levels to 8.9 gm.% on day 21 postinfection occurred. Data

on packed cell volume (PCV) and erythrocyte counts essentially paralleled that of hemoglobin levels. PCV dropped from the preinfection range of 34.7 - 33.8 vol.% to 26.8 - 27.3 vol.% between the fourteenth and twenty-first days postinfection. During the same period, reduction in erythrocyte counts from the preinfection range 7.39 - 7.16 x $10^6/mm^3$ to 6.15 - 6.05 x $10^6/mm^3$ occurred. Reduction in all these parameters of evaluation was somewhat less in infected cats receiving batyl alcohol than in untreated, infected cats. The data also suggest that the rate at which anemia developed was reduced in the group of treated animals.

Total leukocyte counts were depressed markedly to average levels of 3,280 and 2,300 cells/mm^3 on days 6 and 9 postinfection. This compares with averages of 833 and 775 cells/mm^3 on day 7 or 8 in untreated infected cats. Recovery from leukopenia was well in progress on days 10 to 14. In one cat (No. 6), a pronounced leukocytosis occurred during the recovery phase. Whether this represented a rebound phenomenon or possibly the response to intercurrent sepsis was not established. Band and segmented neutrophils were increased over pretreatment values between the fourth and seventh days postinoculation but both fell precipitously by day 9. Levels of the cells then rose to pretreatment levels by day 14.

Reticulocytes were present in the treated cats throughout the experimental period, 0.01% on days 9 and 14 and 0.35% on day 21. Reticulocytes were not observed during the first 14 days in the blood of untreated cats with infectious feline enteritis. Polychromasia was absent until 21 days postinoculation when it was observed in association with nucleated erythrocytes. A number of abnormalities were observed in

leukocytes, including a high incidence of Dohle bodies, toxic granulation of neutrophils, and a considerable number of oversized granulocytes.

Morphologic Studies of Bone Marrow

Influence of batyl alcohol treatment of the normal cat. The detailed results of differential cell counts in marrow of animals in this group are given in Table VI and Figure 5. During the pretreatment period, erythroid elements constituted 38.8 to 45.0% of the total cells counted. Three days following the initiation of treatment the percentage of erythroid cells had diminished to 34.4 but gradually increased to 38.9 by the ninth day and remained near that level through the twenty-sixth day.

Rubriblasts were the only cells in this series that showed increases over the pretreatment averages of 2.2 to 2.4% compared with 2.5 to 3.7% after treatment. A decrease in the percentage of other nucleated erythroid cells was present following treatment. This was more pronounced in the more differentiated cells. The presence of cells in the prorubricyte class having small, deeply basophilic nuclei and with bluish or slightly basophilic cytoplasm was observed occasionally in some of the animals of this group.

Granulocytic cells constituted 42.1 to 43.7% of marrow cells in the pretreatment specimens. The percentage of these cells increased to 43.2 to 47.2 following treatment with batyl alcohol. The increase was primarily the result of elevation in the percentage of segmented neutrophils from an average of 6.2 to 8.3 in untreated cats to values of 8.6 to 15.2 in treated animals. Large metamyelocytes and myelocytes were

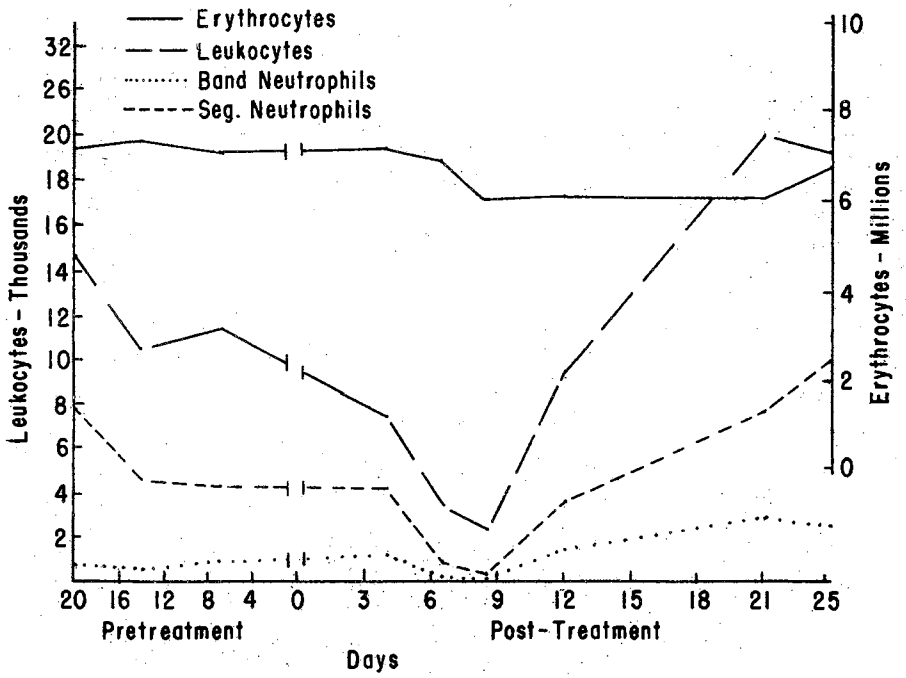

Figure 4. Values of total erythrocytes, leukocytes, band and segmented neutrophils in peripheral blood of cats with infectious feline enteritis treated with batyl alcohol.

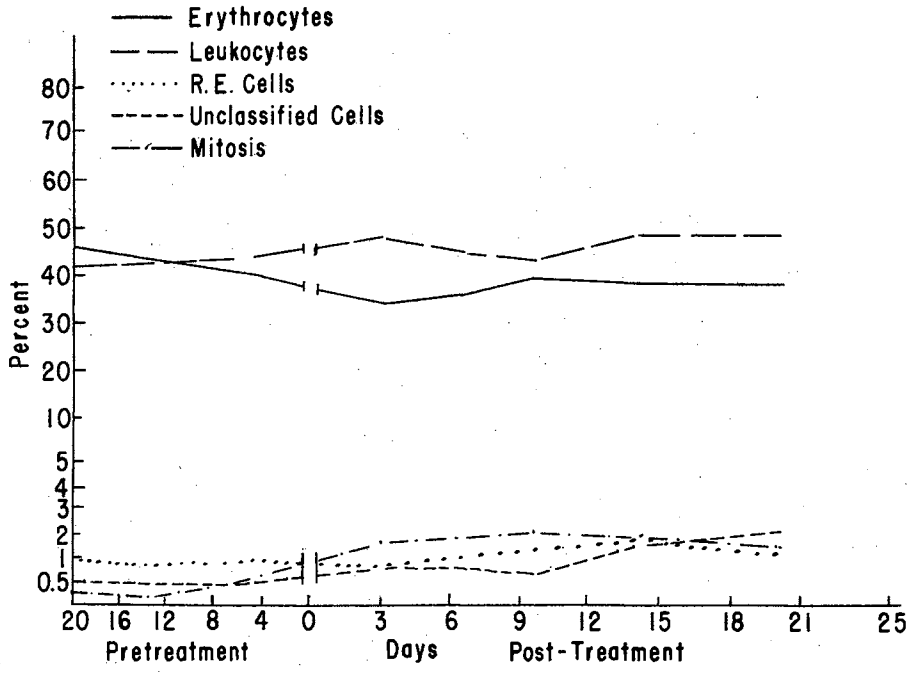

Figure 5. Percentage values of erythroid cells, granulocytic leukocytes, reticulo-endothelial cells, unclassified cells and cells in mitosis in marrow of healthy cats receiving batyl alcohol.

observed in two of these animals. Batyl alcohol treatment did not appear to influence differential counts with respect to lymphocytes, monocytes, plasmocytes and megakaryocytes. Reticuloendothelial cells were slightly increased in specimens from treated animals.

A slight increase in unclassified cells was observed (Fig. 6). They were mostly large, undifferentiated blast cells possessing large, slightly eccentric, round, slightly indented or oval nuclei containing bluish nucleoli. The cells were stained pale blue with poor differentiation between the cytoplasm and nucleus; the nucleus usually was stained less intensely than the cytoplasm. Diffusely distributed reddish granulation of the cytoplasm was frequently present. This was not observed in the normal animals. The myeloid:erythroid (M:E) ratios varied from 0.93:1 to 1.09:1 during the pretreatment period and 1.37:1 to 1.11:1 after treatment. The number of mitotic figures was markedly increased in treated animals (Fig. 7). Both erythroid and myeloid elements contributed to the increase, but the latter predominated. Mitotic hyperactivity was observed in all stages of differentiation.

Cats with infectious feline enteritis. Data obtained in Subgroups I and II, experimentally infected and spontaneously infected animals, are included in these results and are given in detail in Tables VII and VIII and Figures 8 and 9. The average total nucleated erythroid cells was 31.4% during the preinfection stage of the spontaneously infected cats (Subgroup I). A decrease to 5.0% was found in the first sample taken from the diseased cats, estimated to be on the fifth or sixth day postinfection; however, the lowest value was 3.4% on the sixth to eighth day. Percentages above the normal findings, sometimes twice normal,

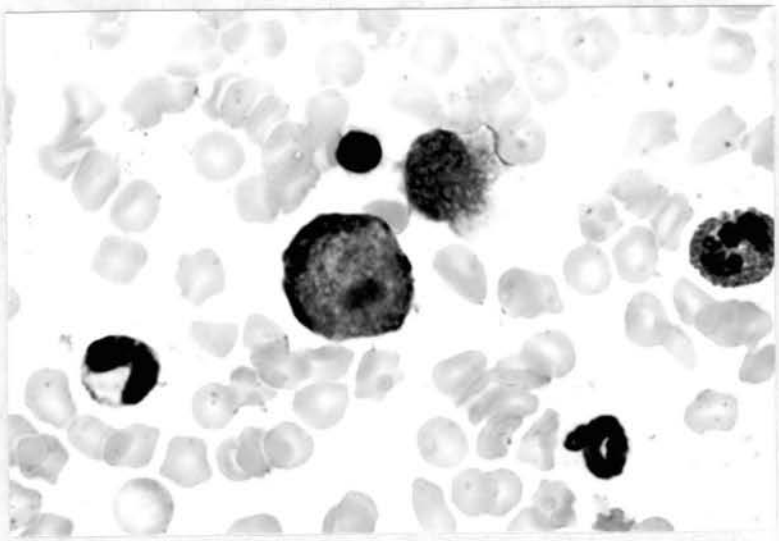

Figure 6. Unclassified cell from bone marrow of healthy cat receiving batyl alcohol. Wright's stain.

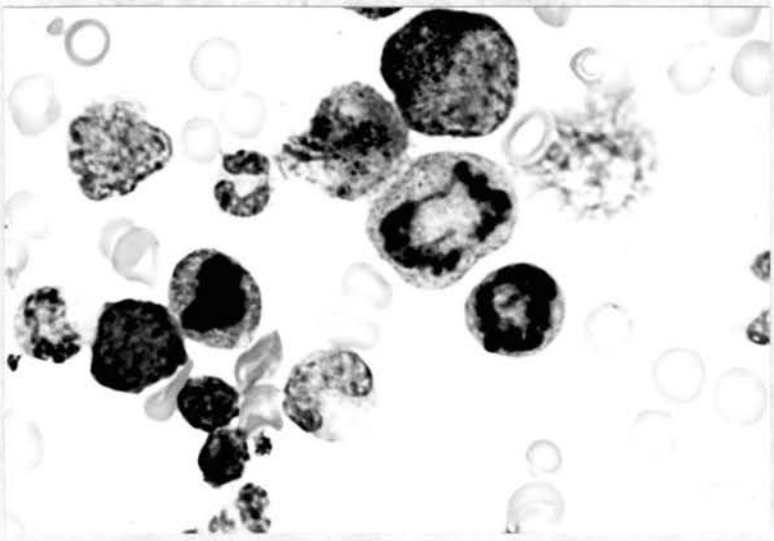

Figure 7. Marrow preparation containing three cells in mitosis. From a healthy cat receiving batyl alcohol. Wright's stain.

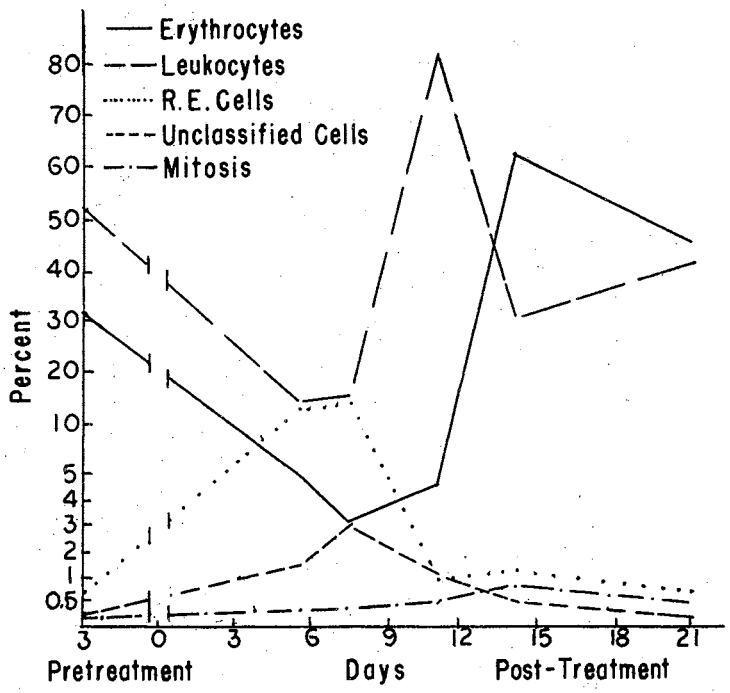

Figure 8. Percentage values of erythroid cells, granulocytic leukocytes, reticulo-endothelial cells, unclassified cells, and cells in mitosis in marrow of cats with spontaneously acquired infectious feline enteritis.

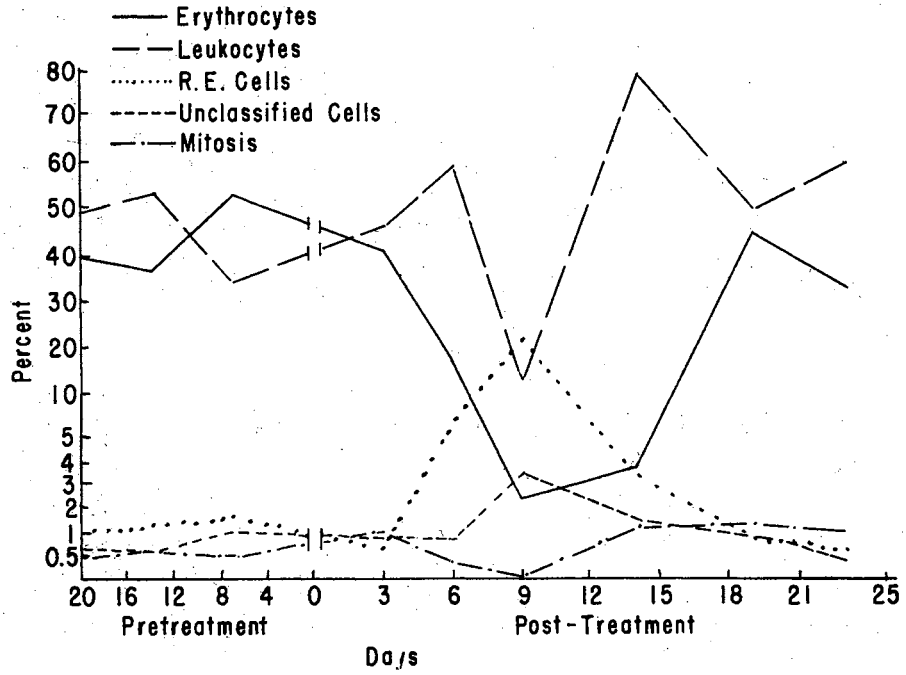

Figure 9. Percentage values of erythroid cells, granulocytic leukocytes, reticulo-endothelial cells, unclassified cells and cells in mitosis in marrow of cats with experimentally induced infectious feline enteritis.

were present on the fourteenth and twenty-first days postinfection. Minimum and maximum values of 0.4 to 2.5% rubriblasts, 0.4 to 7.3% prorubricytes, 0.6 to 23.5% rubricytes and 1.4 to 27.8% in metarubricytes were observed in these animals during development of the disease and throughout the recovery period.

In experimentally infected animals (Subgroup II) the total nucleated erythroid cells ranged from 31.4 to 53.3% before infection and dropped to a minimum of 2.4% on the ninth day postinfection. From the ninth day a gradual increase occurred until normal values were restored by the twenty-first day. Rubriblasts and prorubricytes were absent on the ninth day after infection, but normal percentages were restored on the twenty-first day. Numbers of rubricytes and metarubricytes were considerably reduced also, reaching minimum levels by the ninth to the fourteenth postinoculation days. Rubricyte percentages dropped from normals of 12.8 and 19.6, to 0.4 on the ninth day and metarubricytes fell from the range 17.8 and 25.5, to 2.0 and 1.2 on day 9 and 14 respectively. A return to the preinfection values was observed by the twenty-first day postinoculation.

The total cells of the granulocytic series in cats of Subgroup I constituted 52.0% of marrow cells during the preinfection stage. Levels diminished to 14.4% by the fifth to sixth days and 1.5% by the sixth to eighth days postinfection. A rapid increase to higher than normal levels was observed on the tenth to twelfth days. The lowest and maximum percentages were observed on the fifth and eighth and on the fourteenth days postinoculation respectively and were 0.3 to 1.7 myeloblasts, 0.5 to 1.7 promyelocytes, 0.8 to 5.2 myelocytes, 0.9 to 22.1 metamyelocytes,

2.3 to 28.6 band neutrophils and 0.3 to 21.7 segmented neutrophils. Levels of eosinophils were usually lowest in the 14 day specimen and remained somewhat below normal through the twenty-first day. During the height of the disease, myeloid cells of the neutrophilic series were increased in size and possessed increased nuclear mass containing clumped chromatin. A few such cells were irregularly shaped. Vacuolation of the cytoplasm was observed in band and segmented neutrophils. A few cells possessing morphologic characteristics of neutrophilic myelocytes and metamyelocytes, but of much greater size were observed during the convalescent phase. Their cytoplasm was basophilic and their nuclei often contained one or two nucleoli (Fig. 10). Such cells were considered to represent evidence of arrest of normal maturation. Other granulocytic cells possessed rounded nuclei and homogenous or granular cytoplasm and resembled Pelger cells (Fig. 11).

Monocytes comprised 0.2% of the total white cell count during the normal preinfection period in this group of animals. A gradual increase was noted until the sixth to eighth day, when a maximum of 6.9% was reached. These cells possessed irregular nuclei and very foamy cytoplasm. Their morphology was difficult to distinguish from abnormal metamyelocytes and band neutrophils. Monocytes were absent in specimens collected 10 to 12 days postinfection and remained absent through the twenty-first day. Reticulo-endothelial cells frequently contained phagocytized debris. The phagocytic cells typically presented a voluminous, vacuolated cytoplasm and a large nucleus containing prominent nucleoli (Fig. 12). A marked increase in the percentage of these cells (13.5) was noted during the height of the disease. Unclassified cells rose from the preinfection level of 0.3 to 3% on the 6th to 8th days during

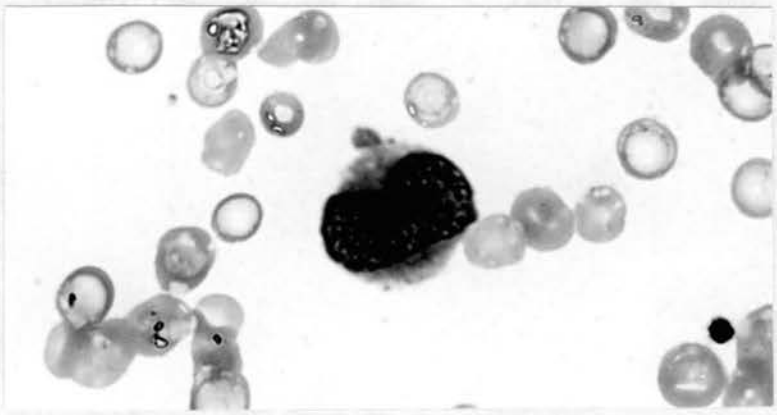

Figure 10. Large cell resembling neutrophilic metamyelocyte from marrow of cat with infectious feline enteritis. Wright's stain.

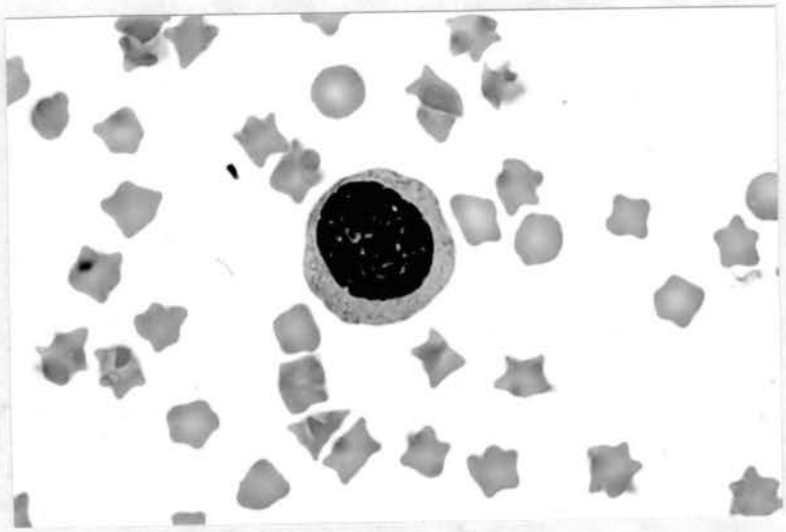

Figure 11. Atypical cell of neutrophilic series resembling Pelger cell. From marrow of cat with infectious feline enteritis. Wright's stain.

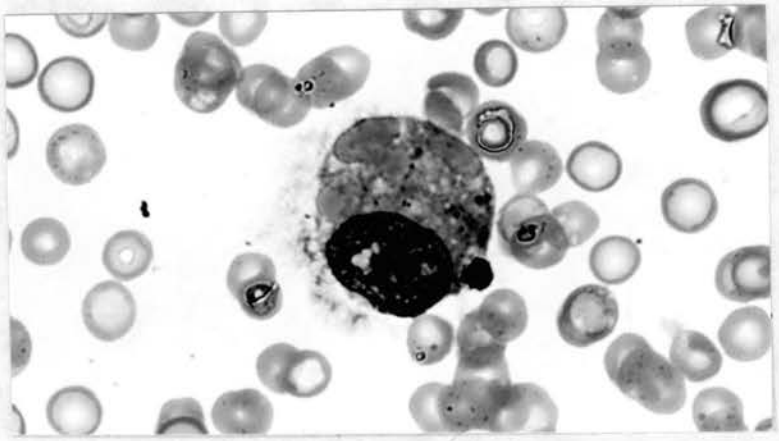

Figure 12. Phagocytic reticulo-endothelial cell from marrow of cat with infectious feline enteritis. Wright's stain.

the disease period. These appeared to be blast forms which were very difficult to classify and often resembled R.E. cells. Cells in mitosis were only slightly more numerous during disease than in the preceding period of health. The myeloid-erythroid (M:E) ratios in Subgroup I were 1.66:1 during the preinfection period, 18.59:1 during the height of the disease, and 0.49:1 during convalescence.

The range in percentage of cells of the granulocytic series during the preinoculation period in cats of Subgroup II was 34.2 to 49.1. The percentage increased to 58.4 on the sixth day postinoculation, but there was a rapid descent to 13.7 by the ninth day. Thereafter, granulocytic cells increased rapidly to greater than normal values (48.0%) on the fourteenth day and remained above normal through the twenty-fifth day. It should be recalled that animals in this group had septic polyserositis. While cells of the neutrophil series were most depressed on the ninth day, the greatest depression of eosinophilic cells was observed on the fourteenth day postinoculation. Reticulo-endothelial cells composed 1.0 to 1.5% of marrow cells during the preinoculation period were increased on day 6 postinoculation, reached 20.0% on day 9, and then dimished to levels near normal by day 14.

Unclassified cells were present in low percentage during the preinoculation period but were increased to 3.4% on the ninth day postinoculation. Monocytes, 0.4% during the preinoculation period, increased to 5.8% by the ninth day after inoculation. Cells in mitosis were absent on the ninth day postinfection but exceeded normal percentages on the fourteenth and twenty-first days. Myeloid:erythroid ratios deviated from the preinoculation range of 0.64:1 and 1.25:1 to 20.00:1

on day 14 but returned to the normal range in the 21 day specimens.

The influence of batyl alcohol treatment on infectious feline enteritis. Detailed results of marrow examinations of animals in this group are given in Table IX and Figure 13. The percentage of cells of the erythroid series varied between 35.1 and 38.9 prior to inoculation with virus. Reduction in these cells to a level of 13.3 and 13.2% was observed on days 8 and 14 postinoculation respectively. This compares with levels which reached minimum values of 3.4 and 2.4% in Subgroups I and II, cats with untreated infectious feline enteritis. The lesser reduction in erythroid elements in treated cats was distributed throughout all developmental stages of the series. Return to preinoculation values occurred by day 21 postinoculation.

Cells of the granulocytic series, which ranged from 43.8 to 49.4% during the preinoculation period, were reduced to 16.5% on day 8 or 9 after inoculation and were elevated to 52.0% on days 10 to 14. Granulocytic cells in the marrow of untreated, diseased cats in Subgroup I were depressed to a minimum of 14.4% and to 13.7% in Subgroup II. The minimum percentage of segmented neutrophils in this group was considerably higher than in cats with untreated infectious feline enteritis (3.76% vs. 0.33%). Maximum depression of eosinophilic cells occurred 10 to 14 days after inoculation.

Reticulo-endothelial cells, representing 0.9 to 1.1% of marrow cells during the preinfection period increased gradually to 7.6% 8 to 9 days postinoculation. Cells which were classified as reticulo-endothelial cells in both batyl alcohol treated and untreated cats were large with a relatively large, eccentrically placed nucleus containing

clumped chromatin and a large nucleolus. The cytoplasm was irregularly shaped, voluminous, variably eosinophilic or slightly basophilic, frequently foamy, and often contained fine reddish granules (Fig. 14). Phagocytized debris was often observed within the cytoplasm. Unclassified cells were increased to 2.8% by the tenth to fourteenth days postinoculation. They were similar in morphology to the cells found in healthy cats treated with batyl alcohol and were observed in all marrow specimens collected between the tenth and twenty-first days (Fig. 6).

The number of mitotic figures was considerably reduced during the height of disease but soon returned to normal. Mitotic activity was more apparent in cells of the granulocytic series than the erythroid series. The marrow of treated and untreated diseased cats collected during the early recovery period contained variable numbers of enlarged neutrophils exhibiting toxic granulation. The myeloid:erythroid ratio of this group of cats ranged from 1.12:1 to 1.40:1 during the preinoculation period and remained near this range until 10 to 14 days postinoculation when it was 4.00:1. The ratio approached normal levels by day 21. The M:E ratio of treated cats did not become nearly as wide as it did in untreated diseased cats.

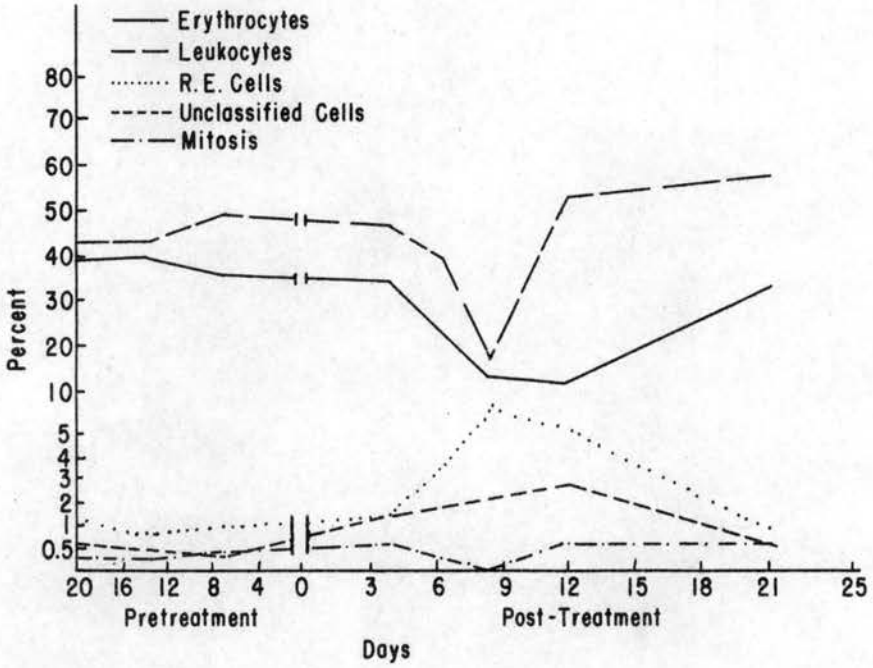

Figure 13. Percentage values of erythroid cells, granulocytic leukocytes, reticulo-endothelial cells, unclassified cells, and cells in mitosis in marrow of cats with infectious feline enteritis treated with batyl alcohol.

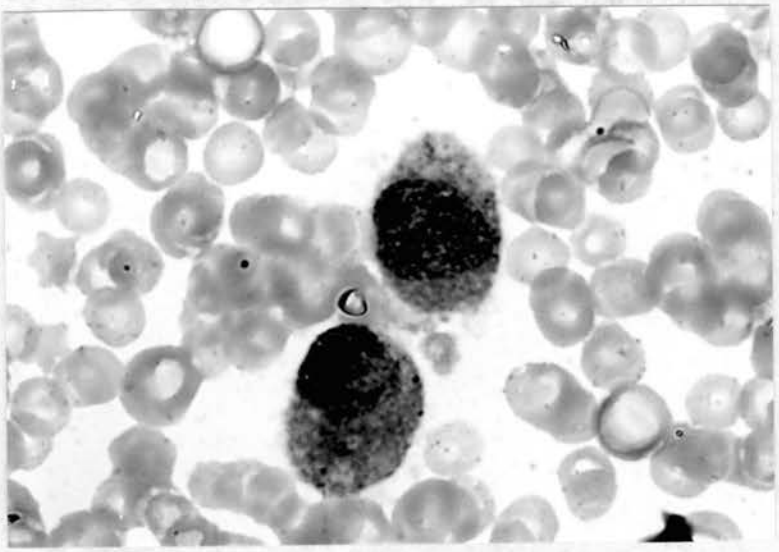

Figure 14. Reticulo-endothelial cells from marrow of cat with infectious feline enteritis and treated with batyl alcohol. Wright's stain.

DISCUSSION AND CONCLUSIONS

Infectious feline enteritis has been reported to be a disease causing aplasia of the bone marrow with severe peripheral leukopenia and slight anemia (Lawrence et al., 1940; Newberne et al., 1957). Emphasis has been placed on hypoplastic changes involving the granulocytic elements. Data obtained in the present experiments indicate that circulating erythrocytes may be diminished as much as 20% with a corresponding reduction in hemoglobin and packed cell volume and severe depression of the erythroid elements of marrow. Rubriblasts and prorubricytes were almost completely absent and there was a marked decrease in rubricytes and metarubricytes in marrow at the height of disease.

The anemia was of normocytic normochromic type and, while perhaps due in part to marrow aplasia, other observations suggest the possibility of blood loss by hemolysis and perhaps by hemorrhage. The presence of hemoglobin, erythrocytes and excessive bile in the urine of three cats supports the latter contentions.

Regeneration of erythroid elements of the marrow began early in the convalescent stage of illness and proceeded rapidly. Replacement of circulating erythrocytes lagged behind the marrow response by a few days. Previous reports based on histologic sections of marrow indicates that aplasia is predominantly granulocytic and that segmented and metamyelocyte neutrophils are most severely depressed. Data obtained in these experiments agree that the more differentiated neutrophilic forms

are most severely depressed, but they also point out a severe reduction in erythroid elements as well. Consequently, it is concluded that marrow aplasia resulting from infectious feline enteritis is not particularly selective as to type of target cell, i.e. leukopoietic or erythropoietic, and that relatively undifferentiated cell types are not as susceptible to destruction by the virus.

The reason for the marked increase in the percentage of reticular cells during the aplastic phase of disease is somewhat debatable. It is probable that the increase was relative and the result of depletion of other cells; however, the possibility that there might have been an absolute increase in number cannot be ruled out. Many of these cells were actively phagocytic and contained erythrocytes, nuclear fragments and other debris. Metaplasia of other primitive marrow cells under the stimulation of a "need" for increased phagocytic capacity during the phase of marrow destruction might have been a contributory cause to the increased percentage of these cells.

Parenteral administration of batyl alcohol to healthy young cats resulted in a recognizable erythropoietic and granulopoietic response. Erythrocytosis has been reported by Sandler (1949) and Linman et al. (1958-59) in normal rats following treatment with batyl alcohol, but neither was able to determine increases of hemoglobin and hematocrit levels associated with erythrocytosis. Linman (1958-59) suggested that erythropoietic stimulation may have been due to hemolysis; making it necessary to postulate an increase in hemoglobin synthesis during the treatment with batyl alcohol when normal levels of hemoglobin and hematocrit are found. Sandler (1949) suggested that batyl alcohol in some

way dissolved in the lipid membrane of the erythroblast exerting direct stimulation which resulted in an increase in the number of erythrocytes and reticulocytes. In the present study, erythropoiesis was manifested by elevation of erythrocyte counts, packed cell volume and hemoglobin levels, and the appearance of nucleated and polychromatic erythrocytes in peripheral blood. The number of Howell-Jolly bodies and erythrocytes containing granulofilamentous material also were increased. Reticulocytosis was not recognized but identification of these forms was difficult due to the presence of granulofilamentous substance in a high proportion of circulating erythrocytes. Alterations in the erythrocytic values and morphology occurred within 3 to 7 days following treatment with batyl alcohol and persisted throughout the experimental period.

The percentage of rubriblasts and prorubricytes containing basophilic cytoplasm in the marrow was elevated for several days. Borsook et al. (1962) suggested that hemoglobin synthesis occurs at a maximal rate in the basophilic erythroblasts and further that during "stimulated" erythropoiesis, the polychromatic erythroblast may undergo mitotic transformation to orthochromatic erythroblasts or omit this division and transform directly to reticulocytes. This may explain the increase in circulating, immature erythroid cells and decrease of metarubricytes in the marrow of normal cats treated with batyl alcohol.

Total leukocyte counts in blood did not increase following administration of batyl alcohol; however, immature neutrophils including band forms and occasional myelocytes and metamyelocytes were observed in the blood of treated cats. Such changes were present on the third and sixth or seventh days after the first injection of batyl alcohol but

not subsequently. All granulocytic elements were increased in the marrow of treated animals for one to two weeks following the commencement of treatment. Segmented neutrophils were markedly increased and myeloblasts and progranulocytes were also increased but to a lesser degree.

The significance of the marked increase in numbers of unclassified cells which occurred after treatment with batyl alcohol is not clear. The existence within many unclassified cells of nuclei which resembled the nuclei of myeloblastic, progranulocytic, or myelocytic cells may represent transition stages between reticulum cells and more differentiated myeloid cells.

Cats infected with infectious feline enteritis virus develops a disease which includes a severe granulocytopenia and anemia. Therapy has been directed toward the control of secondary infections and maintenance of salt and water balance within reasonable levels. A therapeutic agent which would either prevent in degree destruction of marrow elements or which promotes repair after destruction would constitute an improvement over present therapeutic measures. Since batyl alcohol has been demonstrated to possess some of these properties, its application in infectious feline enteritis is a logical and justifiable venture.

The beneficial influence of batyl alcohol treatment of diseased cats is revealed in a number of parameters of evaluation in this study. The depressive effect of virus infection on hemoglobin and hematocrit levels and total erythrocyte counts was not nearly as marked in treated animals as in untreated ones and the postinfection interval until

maximal depression of these values was extended to three weeks rather than two as in the untreated animals. Consistent differences between the groups in reticulocyte counts and in erythrocytes containing granulofilamentous substance were not observed.

The marrow of both treated and untreated subjects collected at the height of disease was characterized by excessive proportions of fluid and a lesser quantity of marrow particles. While absolute quantitation of total cellular elements is not possible, it appeared that the marrow of treated cats was considerably more cellular than untreated ones. All erythroid developmental stages were markedly depressed in the treated animals, but in considerably less degree than the untreated group. Rubriblasts and prorubricytes, absent at the height of untreated disease, persisted in treated cats, but in reduced proportions. Furthermore, the depression in rubricytes and metarubricytes was less marked in the treated group. Consequently, it can be concluded that batyl alcohol provides a degree of protection in erythropoietic capability in the cat infected with infectious feline enteritis virus. It would appear on the basis of the response of the marrow of healthy cats to batyl alcohol injections that the compound possesses a stimulatory effect on erythropoiesis, but evidence for stimulation in treated diseased animals, i.e. young erythrocytic forms, in peripheral blood, was less marked.

The influence of batyl alcohol treatment on granulocytic elements in diseased animals was generally similar to its effect on the erythroid series. Depression of granulocytic cells in peripheral blood was considerably less marked in treated animals than in untreated ones. Granulocytic elements in the marrow were severely depressed in both treated

and untreated cats at the height of disease. The marrow of treated animals, however, was less hypoplastic and contained not only a higher percentage of mature neutrophils, but also showed a better granulopoietic response. The latter was manifested by less depression in all of the granulocytic elements and the presence of a higher percentege of segmented neutrophils indicating more complete granulopoietic maturation. A regenerative shift to the left during the recovery stage and the presence of an increased number of unclassified cells that appear to be between myeloblastic, progranulocytic and myelocytic stages strongly suggest accelerated bone marrow activity.

In contrast to these findings the presence of neutrophils resembling Pelger cells and enlarged immature neutrophilic cells containing one or more nucleoli in the marrow of untreated and much less frequently in treated diseased cats is regarded as evidence that the disease severely retards maturation of myeloid elements.

SUMMARY

The experiments were designed to determine the effect of subcutaneously administered batyl alcohol on a variety of erythrocytic and leukocytic values of the peripheral blood and bone marrow of healthy cats and to evaluate, through utilization of the same parameters, the therapeutic effect of batyl alcohol in cats afflicted with infectious feline enteritis.

The results indicate that batyl alcohol possessed an erythropoietic and, to a lesser degree, a leukopoietic effect when administered to healthy cats. The severity of anemia, granulocytopenia and marrow aplasia which occur in cats with infectious feline enteritis was significantly alleviated in animals receiving batyl alcohol.

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APPENDIX

TABLE II

HEMATOLOGIC DATA - BLOOD OF CATS AFTER TREATMENT WITH HATYL ALCOHOL

	20 DAYS PRETREATMENT							14 DAYS PRETREATMENT							6-8 DAYS PRETREATMENT							3 DAYS POST-TREATMENT							6-7 DAYS POST-TREATMENT						
	CAT NO.							CAT NO.							CAT NO.							CAT NO.							CAT NO.						
	1	2	10	11	12	Avg.	Cells/cmm	1	2	10	11	12	Avg.	Cells/cmm	1	2	10	11	12	Avg.	Cells/cmm	1	2	10	11	12	Avg.	Cells/cmm	1	2	10	11	12	Avg.	Cells/cmm
Hemoglobin	11	11	8.5	10	10.5	10.2		11	11	9.5	10	10	10.3		10.5	11	9.5	10	10	10.2		11.3	11	10.5	11.5	11	11.0		11	11	11.5	11	12.5	11.4	
Hematocrit	35	36	29	31	31.5	32.5		34	34	30.5	31.5	31	32.2		34	35	29.5	29	31.5	31.8		37	34	33	35.5	35	34.9		34	35	35.5	34.5	39	35.6	
Erythrocytes (Million)	6.59	7.34	5.06	5.66	6.54	6.23		7.71	8.16	6.00	6.90	6.15	6.98		6.52	7.72	5.85	6.35	7.84	6.85		9.29	8.91	6.32	6.88	7.85	7.85		7.70	7.55	6.85	7.53	9.53	7.83	
Leukocytes (Thous.)	9.85	16.95	13.75	20.15	14.0	14.94		9.50	13.22	15.25	22.75	16.85	15.51		11.65	13.95	10.30	4.60	9.70	10.04		10.15	7.55	9.70	10.40	17.25	11.05		10.85	9.80	12.65	7.85	10.30	10.29	
Myelocytes Neut.	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0
Metamyelocytes Neut.	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	2	0	0	0.1	10
Band Neutrophils	7	2	7	6	6	5.6	836	3	1	3	16	9	6.4	993	6	9	5	7	4	6.2	622	4	6	10	15	14	9.8	1083	1	2	32	24	11	14.0	1441
Segmented Neutrophils	44	63	36	53	49	49.0	7321	47	50	37	38	33	41.0	6361	37	36	41	55	43	42.4	4257	42	43	40	39	55	43.8	4840	24	30	43	53	41	38.2	3931
Lymphocytes	38	27	34	30	20	29.8	4452	32	32	39	35	41	35.8	5554	45	40	41	30	36	38.4	3855	41	41	39	39	24	36.8	4066	63	60	9	20	31	36.6	3766
Monocytes	3	4	5	6	6	4.8	717	6	5	5	4	5	5.0	776	5	5	2	2	5	3.8	381	0	4	2	1	1	1.6	177	3	1	3	1	4	2.4	247
Eosinophils	8	4	18	5	19	10.8	1614	12	12	16	7	12	11.8	1831	7	10	11	6	12	9.2	924	11	6	9	6	6	7.6	840	9	7	11	2	12	8.2	844
Basophils	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	2	0	0	0	0	0.4	44	0	0	0	0	0	0.0	0
Reticulocytes	0.1	0.2	2.3	1.6	2.9	1.3		0	0.1	1.2	2.6	1.3	1.1		0	0	0.2	0.1	0.1	0.1		0.3	0.1	0.5	0.6	0.2	0.4		0.4	0.4	0.9	0.2	0.2	0.4	
Polychromasia	-	+	+++	++	+++			-	+	++	+++	++			-	-	+	-	-			+	-	++	++	-			+	++	++	+	+		
Anisocytosis	+	+	+	+	+			-	+	+	+	-			+	+	+	+	+			-	+	+	++	-			+	+	+	-	-		
Howell-Jolly Bodies	+	+	+	+	+			+	+	+	+	+			+	+	+	+	+			+	+	++	+++	++			+	++	++	++	++		
Dohle Bodies	-	-	-	-	-			-	-	-	-	+			-	-	-	+	+			-	-	-	-	-			-	-	+	+	++		
Nucleated Red Cells	-	-	+	-	-			-	-	+	-	-			-	-	-	-	-			-	-	-	+	-			-	-	+	-	-		
W.B.C. Abnormalities*	-	-	-	-	-			-	-	-	-	-			-	-	-	-	-			-	-	-	-	-			+	+	+	-	+		

*Giant Leukocytes, Toxic granulation and irregular nuclear shape.

Decimal values are expressed to the nearest tenth or hundredth.

TABLE II (Continued)

	9-10 DAYS POST-TREATMENT							13-15 DAYS POST-TREATMENT							16-20 DAYS POST-TREATMENT							25 DAYS POST-TREATMENT			
	CAT NO.							CAT NO.							CAT NO.							CAT NO.			
	1	2	10	11	12	Avg.	Cells cmm	1	2	10	11	12	Avg.	Cells cmm	1	2	10	11	12	Avg.	Cells cmm	1	2	Avg.	Cells cmm
Hemoglobin	10	11	11	11.5	11	10.9		11.5	12.5	10	10	11	11.0		11.5	12	10.5	11	12.5	11.5		11	12	11.5	
Hematocrit	32	34	34.5	34.5	34	33.8		35	35.5	29	29	31.5	32.0		34	35	32.5	32.5	39	34.6		34	37	35.5	
Erythrocytes	6.95	7.82	7.37	6.90	7.14	7.23		6.90	7.86	7.20	6.41	7.40	7.15		6.90	7.80	7.32	6.84	9.82	7.73		7.06	8.28	7.67	
Leucocytes	6.75	9.95	10.25	11.35	15.10	10.68		12.65	6.75	10.40	16.95	16.30	12.61		14.15	8.60	14.65	14.75	17.80	13.99		14.65	11.80	13.22	
Myelocytes Neut.	0	0	0	0	0	0.0	0	0	0	3	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0.0	0
Metamyelocytes Neut.	0	0	0	0	0	0.0	0	0	0	0	0	1	0.8	100	0	0	0	0	0	0.0	0	0	0	0.0	0
Band Neutrophils	8	6	16	19	13	12.4	1324	23	13	14	20	13	16.6	2093	17	15	8	8	10	11.6	1623	10	11	10.5	1388
Segmented Neutrophils	23	25	58	51	54	42.2	4507	17	35	42	45	41	36.0	4540	40	33	38	41	44	39.2	5484	40	36	38.0	5024
Lymphocytes	56	60	16	18	21	34.2	3653	50	42	31	24	37	36.8	4640	30	37	42	28	33	34.0	4757	34	35	34.5	4561
Monocytes	1	1	2	4	3	2.2	235	2	1	1	3	6	2.6	328	5	5	2	1	4	3.4	476	7	3	5.0	661
Eosinophils	12	8	8	8	9	9.0	961	8	9	9	8	2	7.2	908	8	10	10	22	9	11.8	1651	9	15	12.0	1586
Basophils	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0	0	0.0	0
Reticulocytes	0.2	0.1	0.2	0.1	0.2	0.2		2.0	0.3	0.3	0.1	0.6	0.7		0.9	0.5	0.7	0.1	0.5	0.5		0.6	0.3	0.5	
Polychromasia	-	+	-	+	+			+++	+	+	+	++			++	++	++	+	++			++	+		
Anisocytosis	+	+	+	+	-			-	+	+	-	+			-	+	+	+	+			+	+		
Howell-Jolly	+	+	+	++	+			-	+	+	+	+			-	++	+	+	+			+	-		
Dohle Bodies	-	-	+	-	+			-	-	+	-	+			+	+	-	+	-			-	-		
Nucleated Red Cells	-	-	-	+	-			++	-	+	+	-			-	-	+	-	+			+	+		
W.B.C. Abnormalities	-	-	-	-	-			-	-	+	++	+			++	++	-	-	-			-	-		

TABLE XIII

HEMATOLOGIC DATA - SUBGROUP I - BLOOD OF CATS WITH SPONTANEOUS FELINE ENTERITIS

	2-3 DAYS PRETREATMENT					5-6 DAYS POST-TREATMENT					7-8 DAYS POST-TREATMENT					10-12 DAYS POST-TREATMENT					14 DAYS POST-TREATMENT				21 DAYS POST-TREATMENT			
	CAT NO.					CAT NO.					CAT NO.					CAT NO.					CAT NO.				CAT NO.			
	13	14	15	Avg.	Cells/mm³	13	14	15	Avg.	Cells/mm³	13	14	15	Avg.	Cells/mm³	13	14	15	Avg.	Cells/mm³	13	14	Avg.	Cells/mm³	13	14	Avg.	Cells/mm³
Hemoglobin	11.5	11	11.5	11.3		10.5	11	11	10.8		9.5	9	12	10.2		9.5	10		9.7		9	8	8.5		10	9.5	9.7	
Hematocrit	35	32	33	33.3		32	31.5	31.5	31.7		28.5	27.5	35.5	30.5		30	28.5		29.2		27.5	25.5	26.5		32	32	32.0	
Erythrocytes	7.35	7.59	7.75	7.56		7.87	8.46	7.12	7.81		7.17	5.76	8.06	6.99		6.95	6.30		6.62		5.80	5.39	5.59		7.16	6.31	6.73	
Leucocytes	13.60	14.25	18.40	15.42		1.90	1.70	5.60	3.07		0.70	1.40	0.40	0.83		7.00	12.00		9.50		8.45	16.90	12.67		6.05	9.65	7.85	
Myelocytes Neut.	0	0	0	0.0	0	0	0	0	0.0	0	4	0	0	1.3	11	0	0	D	0.0	0	0	0	0.0	0	0	0	0.0	0
Metamyelocytes Neut.	0	0	0	0.0	0	0	0	0	0.0	0	3	0	0	1.0	8	2	4	I	3.0	285	0	0	0.0	0	0	0	0.0	0
Band Neutrophils	5	5	7	5.7	872	0	8	0	2.7	81	9	0	0	3.0	25	13	12	E	12.5	1187	11	12	11.5	1457	6	7	6.5	510
Segmented Neutrophils	44	43	46	44.3	6833	1	44	1	15.3	470	0	0	0	0.0	0	46	45	D	45.5	4322	55	77	66.0	8362	52	67	59.5	4671
Lymphocytes	42	44	35	40.3	6217	98	45	80	74.3	2278	80	98	80	86.0	716	34	38		36.0	3420	27	8	17.5	2217	36	20	28.0	2198
Monocytes	1	4	2	2.3	359	0	2	0	0.7	20	0	0	4	1.3	11	5	1		3.0	285	3	2	2.5	317	3	3	3.0	235
Eosinophils	7	4	9	6.7	1026	1	1	19	7.0	214	4	2	16	7.3	61	0	0		0.0	0	4	1	2.5	317	3	3	3.0	235
Basophils	1	0	1	0.7	101	0	0	0	0.0	0	0	0	0	0.0	0	0	0		0.0	0	0	0	0.0	0	0	0	0.0	0
Reticulocytes	0	0	0	0.0		0	0	0	0.0		0	0	0	0.0		0	0		0.0		1.8	0.8	1.3		1.4	1.1	1.2	
Polychromasia	-	-	-			-	-	-			-	-	-			-	-				+++	++			+++	+++		
Anisocytosis	+	+	-			-	++	+			++	+	+			+	+				+	++			+	-		
Howell-Jolly	+	+	+			++	+	++			+	-	-			+	+				+	+			+	+		
Döhle Bodies	+	-	-			-	+	++			-	-	-			+	+				+++	+			-	-		
Nucleated Red Cells	-	-	-			-	-	-			-	-	-			-	-				-	+			+	+		
[illegible] Abnormalities*	-	-	-			+	+	+			++	-	+			+++	++				-	-			-	-		

*Giant white cells, Toxic granulation, irregular nuclear shape.

Decimal values are expressed to the nearest tenth or hundredth.

TABLE IV

HEMATOLOGIC DATA - SUBGROUP II - BLOOD OF CATS WITH EXPERIMENTAL FELINE ENTERITIS

	20 DAYS PRETREATMENT				14 DAYS PRETREATMENT				8-6 DAYS PRETREATMENT				3 DAYS POST-TREATMENT				6 DAYS POST-TREATMENT				9 DAYS POST-TREATMENT				14 DAYS POST-TREATMENT				21 DAYS POST-TREATMENT				25 DAYS POST-TREATMENT			
	CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.			
	7	8	Avg.	Cells /cmm	7	8	Avg.	Cells /cmm	7	8	Avg.	Cells /cmm	7	8	Avg.	Cells /cmm	7	8	Avg.	Cells /cmm	7	8	Avg.	Cells /cmm	7	8	Avg.	Cells /cmm	7	8	Avg.	Cells /cmm	7	8	Avg.	Cells /cmm
Hemoglobin	9	10.5	9.8		8.5	9	8.8		8.5	9	8.8		9.5	10.5	10.0		8.5	8.5	8.5		7.5	7.5	7.5		8	7.5	7.8		6.5	7.5	7.0		8.5	8.5	8.5	
Hematocrit	28.5	31	29.7		27	28	27.5		27	28	27.5		27	29	28.0		25	26	25.5		21.5	22	21.7		21	21	21.0		21	23	22.0		28	26.5	27.2	
Erythrocytes (Million)	6.60	7.97	7.28		5.86	5.80	5.83		5.31	6.53	5.92		6.47	6.79	6.63		5.75	6.68	6.21		5.80	5.55	5.67		4.54	5.50	5.02		4.25	5.76	5.00		5.73	6.20	5.96	
Leukocytes (Thous.)	5.25	10.05	7.65		6.65	23.45	15.05		5.20	13.25	9.22		11.25	12.20	11.72		5.20	3.05	4.12		0.70	0.85	0.77		9.95	37.50	23.72		21.30	40.50	30.90		18.15	36.10	27.12	
Myelocytes Neut.	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	2	0	1.0	237	1	0	0.5	154	1	0	0.5	136
Metamyelocytes Neut.	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	2	3	2.5	593	9	2	5.5	1699	6	6	6.0	1627
Band Neutrophils	7	7	7.0	535	5	11	8.0	1204	8	4	6.0	553	17	14	15.5	1816	24	17	20.5	845	20	0	10.0	77	26	10	18.0	4269	25	12	18.5	5716	17	6	11.5	3118
Segmented Neutrophils	62	53	57.5	4398	47	62	54.5	8202	57	49	53.0	4086	61	68	64.5	7559	53	40	46.5	1915	40	0	20.0	155	61	86	73.5	17434	50	77	63.5	19621	61	63	62.0	16814
Lymphocytes	14	32	23.0	1759	28	17	22.5	3386	21	19	20.0	1844	15	10	12.5	1465	15	39	27.0	1112	40	84	62.0	480	5	1	3.0	712	12	8	10.0	3090	6	20	13.0	3525
Monocytes	13	4	8.5	650	6	3	4.5	677	7	14	10.5	968	5	4	4.5	528	7	3	5.0	206	0	8	4.0	31	4	0	2.0	474	2	0	1.0	309	3	2	2.5	678
Eosinophils	4	4	4.0	306	14	7	10.5	1580	7	14	10.5	968	2	4	3.0	352	1	1	1.0	41	0	8	4.0	31	0	0	0.0	0	1	1	1.0	309	6	3	4.5	1220
Basophils	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0
Reticulocytes	0.4	0	0.2		0.1	0.1	0.1		1.1	0.5	0.8		0.9	0.1	0.5		0	0	0.0		0	0	0.0		0	0	0.0		1.8	0.4	1.1		1.3	0.1	0.7	
Polychromasia	+	-			+	-			++	+			++	-			-	-			-	-			-	-			++	+			++	++		
Anisocytosis	+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+		
Howell-Jolly Bodies	+	+			+	+			+	+			+	+			+	+			+	+			+	-			+	-			+	+		
Dohle Bodies	-	+			+	-			+	-			+	+			+++	+++			++	++			-	++			++	+			+++	++		
Nucleated Red Cells	-	-			-	-			-	-			-	-			-	+			-	-			-	-			+	++			+	+		
W.B.C. Abnormalities*	+	+			-	-			+	-			+	+			+	+			+++	+			++	+			-	-			++	++		

*Giant white cells, Toxic granulation, irregular nuclear shape.

Decimal values are expressed to the nearest tenth or hundredth.

TABLE V

HEMATOLOGIC DATA - BLOOD OF CATS WITH INFECTIOUS FELINE ENTERITIS AND BATYL ALCOHOL TREATMENT

	20 DAYS PRETREATMENT								14 DAYS PRETREATMENT								6-8 DAYS PRETREATMENT								4 DAYS POST-TREATMENT							
	CAT NO.								CAT NO.								CAT NO.								CAT NO.							
	1	2	3	4	5	6	Avg.	Cells mm³	1	2	3	4	5	6	Avg.	Cells mm³	1	2	3	4	5	6	Avg.	Cells mm³	1	2	3	4	5	6	Avg.	Cells mm³
Hemoglobin	11	11	10.5	10.5	10	9	10.3		11	11	10.5	11	11.5	10	10.8		10.5	11	11	11	11	11	10.9		12	12	11	10.5	9.5	9	10.7	
Hematocrit	35	36	34.5	34	32.5	31	33.8		34	34	35	35	35.5	33	34.4		34	35	36.5	35	33	34.5	34.7		36	35	36	32	33	28.5	33.4	
Erythrocytes (Millions)	6.59	7.34	7.95	7.44	7.27	6.85	7.24		7.71	8.16	7.34	6.88	7.56	6.69	7.39		6.52	7.72	7.76	6.78	7.17	7.01	7.16		8.14	7.73	7.76	6.79	7.00	5.88	7.21	
Leukocytes (Thous.)	9.85	16.95	16.45	16.35	16.00	12.05	14.61		9.50	13.22	6.45	7.45	8.10	18.55	10.54		11.65	13.95	8.85	17.60	6.85	8.95	11.31		9.50	7.00	6.80	4.80	4.30	11.10	7.25	
Myelocytes Neut.	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0
Metamyelocytes Neut.	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	1	0	0	0	0.2	79	0	0	0	0	0	0	0.0	0
Band Neutrophils	7	2	7	6	6	8	6.0	876	3	1	9	5	8	8	5.7	601	6	9	11	8	8	8	8.3	939	12	8	20	15	16	16	14.5	1051
Segmented Neut.	44	63	44	42	50	48	48.5	7084	47	50	43	34	33	58	44.2	4661	37	36	42	27	32	58	38.7	4376	69	62	52	54	51	58	57.7	4183
Lymphocytes	38	27	44	37	38	32	36.0	5259	32	32	37	50	43	26	36.7	3870	45	40	30	53	46	26	40.0	4523	21	18	25	23	24	21	20.3	1472
Monocytes	3	4	2	5	1	7	3.7	540	6	5	4	4	4	2	4.2	443	5	5	6	6	4	2	4.7	531	2	2	1	1	4	2	2.0	145
Eosinophils	8	4	3	10	5	5	5.8	847	12	12	7	7	12	6	9.3	981	7	10	10	6	10	6	8.2	927	6	10	2	6	5	3	5.3	384
Basophils	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0
Reticulocytes	0.1	0.2	0.1	0.1	0	0.3	0.1		0	0.1	0	0.1	0	0.5	0.1		0	0	0	0.3	0	0.5	0.1		0.2	0	0	0	0	0.3	0.1	
Polychromasia	-	+	+	-	-	+			-	+	-	-	-	++			-	-	-	+	-	++			-	-	-	-	-	+		
Anisocytosis	+	+	+	+	+	+			-	+	+	+	+	+			+	+	+	+	+	+			+	-	+	+	+	+		
Howell-Jolly Bodies	+	+	+	+	+	+			+	+	+	+	+	+			+	+	+	+	+	+			+	+	+	+	+	+		
Dohle Bodies	-	-	-	-	-	+			-	-	+	+	-	-			-	-	-	-	-	+			+++	+++	+++	+++	+++	+++		
Nucleated Red Cells	-	-	+	-	-	-			-	-	-	-	-	-			-	-	-	-	-	-			-	-	-	-	-	-		
W.B.C. Abnormalities	-	-	-	-	-	-			-	-	-	-	-	-			-	-	-	-	-	-			-	-	+	-	-	++		

TABLE V (Continued)

	6-7 DAYS POST-TREATMENT								8-9 DAYS POST-TREATMENT								10-14 DAYS POST-TREATMENT								21 DAYS POST-TREATMENT								25 DAYS POST-TREATMENT				
	CAT NO.								CAT NO.								CAT NO.								CAT NO.								CAT NO.				
	1	2	3	4	5	6	Avg.	Cells/cmm	1	2	3	4	5	6	Avg.	Cells/cmm	1	2	3	4	5	6	Avg.	Cells/cmm	1	2	3	4	5	6	Avg.	Cells/cmm	1	2	6	Avg.	Cells/cmm
Hemoglobin	11.5	11.5	9.5	9.5	9.5	9.5	10.2		10.5	11	9	8	9	8	9.2		9	10.5	6	8.5	9.5	11	9.1		8	12.5		8.5	8.5	7	8.9			11	8.5	9.7	
Hematocrit	40	38	31	29	30	28	32.7		34.5	35.5	27	24	27.5	24	28.7		28	34.5	19	23.5	28	28	26.8		22	40		27	26	21.5	27.3			36	24.5	30.2	
Erythrocytes	8.78	9.06	5.67	5.66	5.92	6.14	6.87		7.07	7.13	5.85	5.15	5.89	5.33	6.07		5.23	8.20	4.55	5.10	5.61	8.21	6.15		5.88	9.08		5.35	5.02	4.96	6.05			9.00	4.28	6.64	
Leucocytes	4.00	4.50	1.50	2.10	1.70	5.90	3.28		3.45	5.50	0.70	2.4	1.00	0.75	2.30		1.05	6.65	6.00	18.80	8.10	20.75	9.32		3.25	7.45		20.20	7.10	61.55	19.91			1.05	29.00	19.02	
Myelocytes Neut.	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	4	0	0	1	0.8	75	6	0		0	0	0	1.0	199		0	0	0.0	0
Metamyelocytes Neut.	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	16	1	0	3	3.3	308	26	0		4	3	1	6.8	1359		0	6	3.0	571
Band Neutrophils	16	15	0	21	10	9	11.8	387	1	16	0	1	4	0	3.7	85	0	15	16	11	16	26	14.0	1304	37	6		9	7	13	14.4	2867		11	15	13.0	2473
Segmented Neutrophils	47	45	0	5	5	67	28.2	925	9	39	0	0	0	0	8.0	184	0	35	4	67	63	59	38.0	3542	12	19		47	40	72	38.0	7566		34	68	51.0	9700
Lymphocytes	25	27	84	64	67	21	48.0	1574	80	35	92	87	72	100	77.7	1787	100	38	58	17	18	9	40.0	3728	13	54		28	41	12	29.6	5893		43	9	26.0	4945
Monocytes	1	3	0	1	1	1	1.2	39	0	4	0	1	12	0	2.8	64	0	1	2	3	2	2	1.7	158	6	11		4	5	1	5.4	1075		5	0	2.5	475
Eosinophils	11	10	16	9	17	2	10.8	354	10	6	8	11	12	0	7.8	179	0	11	0	1	1	0	2.2	205	0	10		6	5	1	4.2	836		7	2	4.5	856
Basophils	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0	0	0		2	0	0	0.4	80		0	0	0.0	0
Reticulocytes	0.2	0.1	0	0	0	0.1	0.1		0	0.1	0	0	0	0	0.0		0	0.1	0	0	0	0	0.0		0	0.4		1.1	0.5	0.1	0.4			0.2	0.3	0.3	
Polychromasia	-	-	-	-	-	-			-	-	-	-	-	-			-	-	-	-	-	-			-	+		++	+	+				+	+		
Anisocytosis	+	+	+	-	+	+			+	-	+	+	+	+			+	-	+	+	+	+			+	+		+	+	+				+	+		
Howell-Jolly	+	+	+	+	+	+			+	+	+	++	+	+			+	-	+	+	+	+			+	+		+	+	+				+	+		
Dohle Bodies	+++	+++	++	+++	++	++			+++	+++	-	-	+	-			-	+++	-	+	++	-			+	+		+	+	+				+	++		
Nucleated Red Cells	-	-	-	-	-	-			-	-	-	-	-	-			-	-	-	-	-	-			-	-		-	-	+				-	+		
W.B.C. Abnormalities	-	-	-	-	-	++			-	-	-	-	++	-			-	+	-	-	+	+			+	-		-	-	+				-			

KILLED

DIED ON 21st DAY

TABLE VI

DIFFERENTIAL CELL COUNTS - BONE MARROW OF CATS
AFTER BATYL ALCOHOL TREATMENT

	20 DAYS PRETREATMENT							14 DAYS PRETREATMENT							6-8 DAYS PRETREATMENT							3 DAYS POST-TREATMENT							6-7 DAYS POST-TREATMENT							9-10 DAYS POST-TREATMENT					
	CAT NO.							CAT NO.							CAT NO.							CAT NO.							CAT NO.							CAT NO.					
	1	2	10	11	12	Avg.	%	1	2	10	11	12	Avg.	%	1	2	10	11	12	Avg.	%	1	2	10	11	12	Avg.	%	1	2	10	11	12	Avg.	%	1	10	11	12	Avg.	%
Rubriblasts	15	15	12	9	10	12.2	2.4	11	11	11	12	11	11.2	2.2	12	20	9	10	8	11.8	2.4	18	5	19	10	12	12.8	2.6	20	13	14	17	15	15.8	3.2	13	9	13	16	12.7	2.5
Prorubricytes	24	35	22	32	31	28.8	5.8	18	22	26	31	31	25.6	5.1	16	22	25	30	28	24.2	4.8	15	15	33	25	26	22.8	4.6	20	32	24	33	25	26.8	5.4	17	19	18	29	20.7	4.1
Rubricytes	66	80	92	75	88	80.2	16.0	57	45	97	84	85	73.6	14.7	60	16	83	112	90	72.0	14.4	32	51	118	79	81	72.2	14.4	40	113	57	74	75	71.8	14.4	36	75	76	103	72.5	14.5
Metarubricytes	96	73	132	98	122	104.2	20.8	90	73	125	121	120	105.8	21.2	95	64	76	106	114	91.0	18.2	60	56	61	82	63	64.4	12.9	20	65	72	86	64	61.4	12.3	83	73	114	85	88.2	17.6
Myeloblasts	12	10	8	8	7	9.0	1.8	9	13	7	8	8	9.0	1.8	10	20	8	8	6	10.4	2.1	19	6	13	7	7	10.4	2.1	20	12	13	12	10	13.4	2.7	14	6	7	10	9.2	1.8
Promyelocytes	19	15	8	16	10	13.6	2.7	22	14	6	13	9	12.8	2.6	20	14	13	14	10	14.2	2.8	16	13	10	10	7	11.2	2.2	25	16	15	18	20	18.8	3.8	19	14	6	15	13.5	2.7
Myelocytes Neut.	31	17	9	17	11	17.0	3.4	27	16	8	15	10	15.2	3.0	26	32	13	16	19	21.2	4.2	30	20	18	13	13	18.8	3.8	25	18	11	19	24	19.4	3.9	19	19	12	17	16.7	3.3
Metamyelocytes Neut.	59	53	46	59	38	51.0	10.2	56	58	33	47	45	47.8	9.6	58	76	55	45	18	50.4	10.1	66	62	30	46	37	48.2	9.6	45	53	72	31	52	50.6	10.1	41	36	47	26	37.5	7.5
Band Neut.	46	73	89	91	73	74.4	14.9	50	76	69	83	72	70.0	14.0	45	70	90	55	54	62.8	12.6	42	85	53	78	74	66.4	13.3	60	62	85	57	43	61.4	12.3	68	40	51	49	52.0	10.4
Segmented Neut.	32	40	29	28	26	31.0	6.2	60	54	33	21	23	38.2	7.6	44	70	39	15	39	41.4	8.3	67	48	61	57	49	56.4	11.3	35	20	48	59	54	43.2	8.6	74	88	61	60	70.7	14.1
Myelocytes Eos.	10	9	3	6	4	6.4	1.3	7	12	5	4	4	6.4	1.3	13	2	5	8	5	6.6	1.3	6	10	9	3	12	8.0	1.6	20	5	7	1	6	7.8	1.6	4	4	10	6	6.0	1.2
Metamyelocytes Eos.	4	2	0	0	3	1.8	0.4	2	3	4	2	5	3.2	0.6	3	2	3	1	1	2.0	0.4	4	6	1	2	9	4.4	0.9	0	3	3	1	3	2.0	0.4	1	5	5	2	3.2	0.6
Band Eos.	5	1	2	2	2	2.4	0.5	5	5	3	0	1	2.8	0.6	3	4	2	2	1	2.4	0.5	5	9	2	1	1	3.6	0.7	5	2	1	1	3	2.4	0.5	6	2	1	1	2.5	0.5
Segmented Eos.	1	4	3	5	2	3.0	0.6	9	10	6	2	2	5.8	1.2	11	14	12	3	0	6.0	1.2	18	13	2	4	2	7.8	1.6	17	3	0	1	2	4.6	0.9	11	1	1	2	3.7	0.7
Basophils	1	1	0	1	1	0.8	0.2	2	1	1	0	0	0.8	0.2	1	2	0	1	1	1.0	0.2	1	2	0	0	2	1.0	0.2	0	0	0	0	0	0.0	0.0	1	0	1	0	0.5	0.1
Lymphocytes	64	59	36	43	57	51.8	10.4	62	77	57	46	63	61.0	12.2	62	60	67	64	97	70.0	14.0	84	72	55	69	78	71.6	14.3	110	64	60	71	83	77.6	15.5	79	84	53	52	67.0	13.4
Monocytes	0	0	0	0	0	0.0	0.0	1	3	0	0	0	0.8	0.2	1	4	0	0	3	1.6	0.3	1	3	1	1	0	1.2	0.2	25	1	0	0	1	5.4	1.1	5	1	0	0	1.5	0.3
Plasmocytes	1	1	1	0	3	1.2	0.2	2	2	0	1	2	1.4	0.3	1	0	0	2	2	1.0	0.2	1	1	0	1	0	0.6	0.1	0	0	1	1	2	0.8	0.2	2	0	0	3	1.2	0.2
Megakaryocytes	3	2	2	2	1	2.0	0.4	1	1	2	2	1	1.4	0.3	2	2	2	1	1	1.6	0.3	2	1	1	1	4	1.8	0.4	0	1	1	1	1	0.8	0.2	0	1	2	1	1.0	0.2
R. E. Cells	6	5	3	4	6	4.8	1.0	4	3	3	4	5	3.8	0.8	9	4	3	3	1	4.0	0.8	6	7	4	2	4	4.6	0.9	5	4	5	1	4	3.8	0.8	3	8	6	8	6.2	1.2
Unclassified Cells	2	3	1	3	4	2.6	0.5	3	1	2	2	2	2.0	0.4	8	2	3	3	1	2.4	0.5	2	10	1	1	8	4.4	0.9	0	7	3	7	4	4.2	0.8	1	3	2	6	3.0	0.6
Mitosis	3	2	2	1	1	1.8	0.4	2	0	2	2	1	1.4	0.3	5	0	3	1	1	2.2	0.4	5	5	8	8	11	7.4	1.5	8	6	8	9	9	8.0	1.6	5	12	14	9	10.0	2.0
M:E Ratio							0.93:1							0.98:1							1.09:1						1.37:1							1.27:1						1.11:1

Decimal values are expressed to the nearest tenth or hundredth.

TABLE VI (Continued)

	13-15 DAYS POST-TREATMENT							16-20 DAYS POST-TREATMENT						
	CAT NO.							CAT NO.						
	1	2	10	11	12	Avg.	%	1	2	10	11	12	Avg.	%
Rubriblasts	15	10	14	13	15	13.4	2.7	20	11	4	13	14	12.4	2.5
Prorubricytes	24	24	18	28	29	24.6	4.9	29	21	13	22	26	22.2	4.4
Rubricytes	47	84	49	58	79	63.4	12.7	38	71	58	71	76	62.8	12.6
Metarubricytes	62	53	96	98	118	85.4	17.1	54	95	69	113	120	90.2	18.0
Myeloblasts	15	7	9	10	9	10.0	2.0	20	9	3	9	9	10.0	2.0
Promyelocytes	29	8	8	8	11	12.8	2.6	21	17	7	7	12	12.8	2.6
Myelocytes Neut.	25	11	9	9	13	13.4	2.7	27	21	4	16	18	17.2	3.4
Metamyelocytes Neut.	55	57	59	38	18	45.4	9.1	65	65	50	42	43	53.0	10.6
Band Neut.	71	65	60	57	48	60.2	12.0	84	70	85	53	54	69.2	13.8
Segmented Neut.	60	58	107	78	77	76.0	15.2	59	27	103	55	49	58.6	11.7
Myelocytes Eos.	7	3	4	9	4	5.4	1.1	7	6	3	2	1	3.8	0.8
Metamyelocyte Eos.	1	6	1	4	1	2.6	0.5	3	3	1	1	5	2.6	0.5
Band Eos.	3	3	1	4	1	2.4	0.5	4	2	3	3	1	2.6	0.5
Segmented Eos.	7	15	2	11	3	7.6	1.5	6	3	8	8	3	5.6	1.1
Basophils	1	0	0	0	0	0.2	0.1	0	0	0	0	1	0.2	0.1
Lymphocytes	63	61	40	43	46	50.6	10.1	52	42	56	59	48	51.4	10.3
Monocytes	1	2	0	0	0	0.6	0.1	0	1	0	0	1	0.4	0.1
Plasmocytes	2	0	0	2	1	1.0	0.2	1	2	1	0	4	1.6	0.3
Megakaryocytes	1	1	1	1	1	1.0	0.2	1	3	2	0	1	1.4	0.3
R. E. Cells	6	5	11	7	11	8.0	1.6	6	7	1	9	3	5.2	1.0
Unclassified Cells	0	16	4	15	4	7.8	1.6	1	16	24	7	3	10.2	2.0
Mitosis	5	11	7	7	11	8.2	1.6	2	8	5	10	8	6.6	1.3
							1.26:1							1.25:1

TABLE VII

DIFFERENTIAL CELL COUNTS - SUBGROUP I - BONE MARROW OF CATS WITH SPONTANEOUS INFECTIOUS FELINE ENTERITIS

	2-3 DAYS PRETREATMENT					5-6 DAYS POST-TREATMENT					6-8 DAYS POST-TREATMENT					10-12 DAYS POST-TREATMENT					14 DAYS POST-TREATMENT				21 DAYS POST-TREATMENT			
	CAT NO.					CAT NO.					CAT NO.					CAT NO.					CAT NO.				CAT NO.			
	13	14	15	Avg.	%	13	14	15	Avg.	%	13	14	15	Avg.	%	13	14	15	Avg.	%	13	14	Avg.	%	13	14	Avg.	%
Rubriblasts	10	6	8	8.0	1.6	0	6	0	2.0	0.4	5	5	0	3.3	0.7	4	0		2.0	0.4	16	9	12.5	2.5	9	7	8.0	1.6
Prorubricytes	19	15	23	19.0	3.8	0	6	0	2.0	0.4	6	5	0	3.7	0.7	7	2		4.5	0.9	40	33	36.5	7.3	32	17	24.5	4.9
Rubricytes	56	47	90	64.3	12.9	0	12	0	4.0	0.8	4	5	0	3.0	0.6	12	1		6.5	1.3	102	133	117.5	23.5	100	95	97.5	19.5
Metarubricytes	81	70	45	65.3	13.1	0	41	10	17.0	3.4	6	10	5	7.0	1.4	18	0		9.0	1.8	176	102	139.0	27.8	109	123	116.0	23.2
Myeloblasts	10	4	10	8.0	1.6	0	5	0	1.7	0.3	10	0	0	3.3	0.7	10	7		8.5	1.7	6	4	5.0	1.0	4	5	4.5	0.9
Promyelocytes	14	5	9	9.3	1.9	0	7	0	2.3	0.5	9	0	0	3.0	0.6	9	8		8.5	1.7	7	5	6.0	1.2	11	5	8.0	1.6
Myelocytes Neut.	21	7	14	14.0	2.8	0	12	0	4.0	0.8	32	5	0	12.3	2.5	15	37		26.0	5.2	7	6	6.5	1.3	11	10	10.5	2.1
Metamyelocytes Neut.	57	46	53	52.0	10.4	0	14	0	4.7	0.9	86	5	0	30.3	6.1	77	144		110.5	22.1	30	29	29.5	5.9	52	60	56.0	11.2
Band Neut.	91	93	87	90.3	18.1	5	35	5	15.0	3.0	25	10	0	11.7	2.3	145	141		143.0	28.6	53	82	67.5	13.5	69	76	72.5	14.5
Segmented Neut.	53	90	43	62.0	12.4	5	50	5	20.0	4.0	0	5	0	1.7	0.3	127	90		108.5	21.7	27	40	33.5	6.7	59	46	52.5	10.5
Myelocytes Eos.	12	11	6	9.7	1.9	0	6	0	2.0	0.4	2	0	0	0.7	0.1	4	0	DIED	2.0	0.4	1	4	2.5	0.5	4	7	5.5	1.1
Metamyelocyte Eos.	3	4	3	3.3	0.7	0	5	10	5.0	1.0	1	0	5	2.0	0.4	0	1		0.5	0.1	0	0	0.0	0.0	0	2	1.0	0.2
Band Eos.	3	4	3	3.3	0.7	5	7	10	7.3	1.5	2	0	10	4.0	0.8	1	0		0.5	0.1	0	0	0.0	0.0	0	3	1.5	0.3
Segmented Eos.	7	6	3	5.3	1.1	10	6	15	10.3	2.1	1	5	10	5.3	1.1	2	0		1.0	0.2	1	3	2.0	0.4	2	2	2.0	0.4
Basophils	1	2	6	3.0	0.6	0	0	0	0.0	0.0	2	0	0	0.7	0.1	0	0		0.0	0.0	0	0	0.0	0.0	1	0	0.5	0.1
Lymphocytes	51	86	86	74.3	14.9	385	253	330	322.7	64.5	164	395	295	284.7	56.9	60	52		56.0	11.2	22	35	28.5	5.7	29	36	32.5	6.5
Monocytes	1	0	2	1.0	0.2	10	10	10	10.0	2.0	63	25	15	34.3	6.9	0	0		0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0
Plasmacytes	1	0	0	0.3	0.1	5	0	5	3.3	0.7	2	0	10	4.0	0.8	0	0		0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0
Megakaryocytes	1	1	1	1.0	0.2	0	0	0	0.0	0.0	1	0	0	0.3	0.1	1	0		0.5	0.1	1	2	1.5	0.3	0	0	0.0	0.0
R. E. Cells	5	2	5	4.0	0.8	60	22	90	57.3	11.5	58	25	120	67.7	13.5	5	3		4.0	0.8	8	4	6.0	1.2	4	3	3.5	0.7
Unclassified Cells	1	1	2	1.3	0.3	10	3	10	7.7	1.5	15	0	30	15.0	3.0	1	8		4.5	0.9	1	4	2.5	0.5	1	1	1.0	0.2
Mitosis	2	0	1	1.0	0.2	5	0	0	1.7	0.3	6	0	0	2.0	0.4	2	6		4.0	0.8	2	5	3.5	0.7	3	2	2.5	0.5
M:E Ratio					1.66:1					2.88:1					4.41:1					18.59:1							0.49:1				0.87:1

Decimal values are expressed to the nearest tenth or hundredth.

TABLE VIII

DIFFERENTIAL CELL COUNTS - SUBGROUP II - BONE MARROW OF CATS WITH EXPERIMENTAL INFECTIOUS FELINE ENTERITIS

	20 DAYS PRETREATMENT				14 DAYS PRETREATMENT				6-8 DAYS PRETREATMENT				3 DAYS POST-TREATMENT				6 DAYS POST-TREATMENT				9 DAYS POST-TREATMENT				14 DAYS POST-TREATMENT				21 DAYS POST-TREATMENT				25 DAYS POST-TREATMENT			
	CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.				CAT NO.			
	7	8	Avg.	%	7	8	Avg.	%	7	8	Avg.	%	7	8	Avg.	%	7	8	Avg.	%	7	8	Avg.	%	7	8	Avg.	%	7	8	Avg.	%	7	8	Avg.	%
Rubriblasts	17	10	13.5	2.7	10	13	11.5	2.3	12	14	13.0	2.6	8	10	9.0	1.8	7	1	4.0	0.8	0	0	0.0	0.0	5	3	4.0	0.8	8	13	10.5	2.1	9	7	8.0	1.6
Prorubricytes	28	21	24.5	4.9	17	23	20.0	4.0	24	32	28.0	5.6	14	12	13.0	2.6	13	11	12.0	2.4	0	0	0.0	0.0	8	3	5.5	1.1	28	26	27.0	5.4	16	13	14.5	2.9
Rubricytes	84	47	65.5	13.1	46	82	64.0	12.8	101	95	98.0	19.6	63	84	73.5	14.7	45	32	38.5	7.7	0	4	2.0	0.4	3	5	4.0	0.8	107	89	98.0	19.6	55	70	62.5	12.5
Metarubricytes	145	42	93.5	18.7	61	117	89.0	17.8	127	128	127.5	25.5	90	125	107.5	21.5	24	37	30.5	6.1	4	16	10.0	2.0	1	11	6.0	1.2	48	121	84.5	16.9	74	85	79.5	15.9
Myeloblasts	11	12	11.5	2.3	9	12	10.5	2.1	6	9	7.5	1.5	12	8	10.0	2.0	13	1	7.0	1.4	0	0	0.0	0.0	21	8	14.5	2.9	7	8	7.5	1.5	13	10	11.5	2.3
Promyelocytes	6	23	14.5	2.9	14	22	18.0	3.6	8	11	9.5	1.9	24	13	18.5	3.7	22	1	11.5	2.3	0	2	1.0	0.2	21	9	15.0	3.0	8	8	8.0	1.6	23	10	16.5	3.3
Myelocytes Neut.	10	22	16.0	3.2	13	21	17.0	3.4	7	14	10.5	2.1	21	15	18.0	3.6	21	2	11.5	2.3	0	2	1.0	0.2	39	13	26.0	5.2	16	14	15.0	3.0	22	17	19.5	3.9
Metamyelocytes Neut.	53	60	56.5	11.3	80	35	57.5	11.5	51	37	44.0	8.8	73	34	53.5	10.7	133	55	94.0	18.8	6	1	3.5	0.7	130	107	118.5	23.7	87	47	67.0	13.4	87	65	76.0	15.2
Band Neut.	55	98	76.5	15.3	121	55	88.0	17.6	55	56	55.5	11.1	91	58	74.5	14.9	115	88	101.5	20.3	22	0	11.0	2.2	133	100	116.5	23.3	118	88	103.0	20.6	117	100	108.5	21.7
Segmented Neut.	24	55	39.5	7.9	69	36	52.5	10.5	34	33	33.5	6.7	32	41	36.5	7.3	41	59	50.0	10.0	62	0	31.0	6.2	62	130	96.0	19.2	30	55	42.5	8.5	36	77	56.5	11.3
Myelocytes Eos.	8	18	13.0	2.6	7	8	7.5	1.5	4	6	5.0	1.0	5	7	6.0	1.2	9	3	6.0	1.2	2	0	1.0	0.2	4	1	2.5	0.5	3	2	2.5	0.5	9	3	6.0	1.2
Metamyelocytes Eos.	4	3	3.5	0.7	3	3	3.0	0.6	0	4	2.0	0.4	2	3	2.5	0.5	1	2	1.5	0.3	4	0	2.0	0.4	0	0	0.0	0.0	0	1	0.5	0.1	1	0	0.5	0.1
Band Eos.	4	5	4.5	0.9	5	3	4.0	0.8	0	2	1.0	0.2	3	6	4.5	0.9	2	3	2.5	0.5	6	5	5.5	1.1	0	0	0.0	0.0	0	0	0.0	0.0	1	0	0.5	0.1
Segmented Eos.	12	6	9.0	1.8	9	5	7.0	1.4	3	1	2.0	0.4	4	4	4.0	0.8	5	7	6.0	1.2	8	15	11.5	2.3	0	0	0.0	0.0	2	2	2.0	0.4	1	2	1.5	0.3
Basophils	0	2	1.0	0.2	0	0	0.0	0.0	1	0	0.5	0.1	0	0	0.0	0.0	1	0	0.5	0.1	2	0	1.0	0.2	1	1	1.0	0.2	0	1	0.5	0.1	0	0	0.0	0.0
Lymphocytes	28	56	42.0	8.4	29	43	36.0	7.2	51	35	43.0	8.6	42	59	50.5	10.1	36	102	69.0	13.8	222	315	268.5	53.7	45	50	47.5	9.5	20	10	15.0	3.0	25	25	25.0	5.0
Monocytes	2	0	1.0	0.2	0	0	0.0	0.0	0	4	2.0	0.4	2	2	2.0	0.4	2	21	11.5	2.3	20	38	29.0	5.8	7	12	9.5	1.9	2	0	1.0	0.2	2	0	1.0	0.2
Plasmocytes	0	1	0.5	0.1	1	1	1.0	0.2	1	2	1.5	0.3	2	2	2.0	0.4	2	0	1.0	0.2	2	0	1.0	0.2	1	2	1.5	0.3	1	0	0.5	0.1	1	1	1.0	0.2
Megakaryocytes	2	5	3.5	0.7	1	2	1.5	0.3	1	1	1.0	0.2	2	1	1.5	0.3	2	1	1.5	0.3	2	0	1.0	0.2	2	1	1.5	0.3	2	1	1.5	0.3	2	1	1.5	0.3
R. E. Cells	3	7	5.0	1.0	2	11	6.5	1.3	6	9	7.5	1.5	3	4	3.5	0.7	2	66	34.0	6.8	116	90	103.0	20.6	9	26	17.5	3.5	4	4	4.0	0.8	4	2	3.0	0.6
Unclassified Cells	2	4	3.0	0.6	1	4	2.5	0.5	6	4	5.0	1.0	3	6	4.5	0.9	1	7	4.0	0.8	22	12	17.0	3.4	2	11	7.5	1.5	1	6	3.5	0.7	1	3	2.0	0.4
Mitosis	2	3	2.5	0.5	2	4	3.0	0.6	2	3	2.5	0.5	4	6	5.0	1.0	3	1	2.0	0.4	0	0	0.0	0.0	6	5	5.5	1.1	8	4	6.0	1.2	1	9	5.0	1.0
M:E Ratio			1.25:1				1.44:1				0.64:1				1.23:1				0.43:1				5.45:1				20.00:1				1.12:1				1.80:1

Decimal values are expressed to the nearest tenth or hundredth.

TABLE IX

DIFFERENTIAL CELL COUNTS - BONE MARROW OF CATS WITH INFECTIOUS FELINE ENTERITIS AND ETHYL ALCOHOL TREATMENT

	20 DAYS PRETREATMENT								14 DAYS PRETREATMENT								6-8 DAYS PRETREATMENT							
	CAT NO.								CAT NO.								CAT NO.							
	1	2	3	4	5	6	Avg.	%	1	2	3	4	5	6	Avg.	%	1	2	3	4	5	6	Avg.	%
Rubriblasts	15	15	16	15	20	11	15.3	3.1	11	11	21	16	18	19	16.0	3.2	12	20	19	16	19	11	16.2	3.2
Prorubricytes	24	35	26	28	29	21	27.2	5.4	18	22	32	27	24	33	26.0	5.2	16	22	26	34	29	20	24.5	4.9
Rubricytes	66	80	78	56	52	46	63.0	12.6	57	45	70	65	50	95	63.7	12.7	60	16	45	60	40	65	47.7	9.5
Metarubricytes	96	73	98	84	83	100	89.0	17.8	90	73	92	92	94	95	89.3	17.9	93	64	78	91	67	127	87.0	17.4
Myeloblasts	12	10	15	13	15	9	12.3	2.5	9	13	13	13	15	11	12.3	2.5	10	20	13	15	15	7	13.3	2.7
Promyelocytes	19	15	12	15	14	13	14.7	2.9	22	14	21	18	14	17	17.7	3.5	20	14	19	24	15	5	16.7	3.3
Myelocytes Neut.	31	17	16	15	18	12	18.2	3.6	27	16	20	22	23	19	21.2	4.2	26	32	22	21	22	9	22.0	4.4
Metamyelocytes Neut.	59	53	44	38	44	53	48.5	9.7	56	58	58	51	44	41	51.3	10.3	58	76	47	35	56	51	53.8	10.8
Band Neut.	46	73	43	46	68	88	60.7	12.1	50	76	50	44	57	66	57.2	11.4	45	70	51	57	57	75	59.2	11.8
Segmented Neut.	32	40	35	70	32	71	46.7	9.3	60	54	26	31	28	40	39.8	8.0	44	70	71	41	86	59	61.8	12.4
Myelocytes Eos.	10	9	4	7	4	10	7.3	1.5	7	12	4	4	7	8	7.0	1.4	13	2	7	2	3	3	5.0	1.0
Metamyelocytes Eos.	4	2	1	4	3	1	2.5	0.5	2	3	1	4	3	1	2.3	0.5	3	2	3	1	2	1	2.0	0.4
Band Eos.	5	1	3	2	4	2	2.8	0.6	5	5	1	1	4	3	3.2	0.6	3	4	3	2	3	2	2.8	0.6
Segmented Eos.	1	4	8	4	4	8	4.8	1.0	9	10	6	4	3	4	6.0	1.2	11	14	7	7	9	6	9.0	1.8
Basophils	1	1	1	0	0	0	0.5	0.1	2	1	0	1	1	0	0.8	0.2	1	2	1	1	1	1	1.2	0.2
Lymphocytes	64	59	85	89	91	42	71.7	14.3	62	77	71	88	94	40	72.0	14.4	62	60	71	79	66	51	64.8	13.0
Monocytes	0	0	2	3	5	0	1.7	0.3	1	3	3	6	4	0	2.8	0.6	1	4	5	2	2	0	2.3	0.5
Plasmocytes	1	1	1	4	1	1	1.5	0.3	2	2	1	1	1	0	1.2	0.2	1	0	3	0	0	0	0.5	0.1
Megakaryocytes	3	2	1	0	2	1	1.5	0.3	1	1	2	2	3	1	1.7	0.3	2	2	2	2	2	0	1.7	0.3
R. E. Cells	6	5	6	5	7	4	5.5	1.1	4	3	4	5	6	4	4.3	0.9	9	4	3	5	3	3	4.5	0.9
Unclassified Cells	2	3	3	1	2	6	2.8	0.6	3	8	1	3	4	2	2.3	0.5	3	2	1	3	1	2	2.0	0.4
Mitosis	3	2	2	1	2	1	1.8	0.4	2	0	3	2	3	1	1.8	0.4	5	0	3	2	2	2	2.3	0.5
M:E Ratio								1.12:1								1.12:1								1.4[illegible]

	4 DAYS POST-TREATMENT								6-7 DAYS POST-TREATMENT								8-9 DAYS POST-TREATMENT							
	CAT NO.								CAT NO.								CAT NO.							
	1	2	3	4	5	6	Avg.	%	1	2	3	4	5	6	Avg.	%	1	2	3	4	5	6	Avg.	%
Rubriblasts	10	10	11	17	19	7	10.7	2.1	18	6	20	16	4	6	11.7	2.3	0	22	0	7	5	0	5.7	1.1
Prorubricytes	21	21	11	24	12	17	17.7	3.5	26	13	5	40	3	4	15.2	3.0	15	44	20	6	15	0	16.7	3.3
Rubricytes	62	101	22	60	25	56	54.3	10.9	48	56	50	42	1	27	37.3	7.5	45	83	0	16	10	0	25.7	5.1
Metarubricytes	50	91	94	118	93	81	87.8	17.6	53	60	70	55	21	40	49.8	10.0	10	43	0	9	25	25	18.7	3.7
Myeloblasts	16	6	24	20	10	9	14.2	2.8	17	9	10	15	7	11	11.5	2.3	5	20	0	28	5	0	9.7	1.9
Promyelocytes	23	14	11	9	12	16	14.2	2.8	11	20	10	12	1	15	11.5	2.3	0	15	0	15	10	0	6.3	1.3
Myelocytes Neut.	18	16	18	12	17	19	16.7	3.3	18	17	5	10	5	20	12.5	2.5	0	22	0	10	0	0	5.3	1.1
Metamyelocytes Neut.	56	56	39	21	64	63	49.8	10.0	53	92	10	13	6	77	41.8	8.4	0	51	0	12	5	0	11.3	2.3
Band Neut.	78	53	95	28	77	90	70.2	14.0	93	74	10	12	33	90	52.0	10.4	25	44	0	3	5	0	12.8	2.6
Segmented Neut.	46	7	87	20	62	52	45.7	9.1	68	20	25	7	51	95	44.3	8.9	50	37	0	1	5	20	18.8	3.8
Myelocytes Eos.	15	11	10	2	6	10	9.0	1.8	7	6	0	4	7	10	5.7	1.1	0	14	0	3	0	0	2.8	0.6
Metamyelocytes Eos.	4	7	2	0	1	4	3.0	0.6	0	7	0	7	4	1	3.2	0.6	0	4	0	1	0	5	1.7	0.3
Band Eos.	5	2	2	1	2	4	2.7	0.5	0	2	5	4	3	3	2.8	0.6	20	4	0	2	0	0	4.3	0.9
Segmented Eos.	10	5	4	3	7	7	6.0	1.2	5	4	20	8	27	9	12.2	2.4	20	1	0	11	5	25	10.3	2.1
Basophils	0	1	0	1	1	0	0.5	0.1	2	1	0	0	1	1	0.8	0.2	0	3	0	3	0	0	1.0	0.2
Lymphocytes	53	81	56	131	86	58	74.5	14.9	63	67	190	212	275	85	149.2	29.8	253	75	420	318	370	350	297.0	57.8
Monocytes	10	2	5	6	2	5	5.0	1.0	30	6	0	15	9	0	10.0	1.8	1	4	25	9	6	5	5.0	1.0
Plasmocytes	2	2	2	1	1	0	1.3	0.3	0	4	5	4	0	0	2.2	0.4	0	1	0	5	0	0	1.0	0.2
Megakaryocytes	1	1	1	3	3	2	1.8	0.4	1	1	5	1	0	1	1.5	0.3	0	1	0	5	0	0	1.0	0.2
R. E. Cells	5	2	8	18	3	2	6.8	1.4	6	7	46	27	28	7	18.5	3.6	20	4	60	19	60	65	38.0	7.6
Unclassified Cells	3	8	1	3	21	1	6.2	1.2	3	9	10	7	20	11	10.0	2.0	5	6	0	17	25	10	10.5	2.1
Mitosis	4	4	1	4	3	1	2.8	0.6	4	2	0	0	1	4	1.8	0.4	0	0	0	0	0	0	0.0	0.0
M:E Ratio								1.36:1								1.72:1								1.25:1

Decimal values are expressed to the nearest tenth or hundredth.

TABLE IX (Continued)

	10-14 DAYS POST-TREATMENT								21 DAYS POST-TREATMENT							
	CAT NO.								CAT NO.							
	1	2	3	4	5	6	Avg.	%	1	2	3	4	5	6	Avg.	%
Rubriblasts	20	13	11	6	2	3	9.2	1.8		10		10	14	5	9.7	1.9
Prorubricytes	10	40	5	6	3	7	11.8	2.4		28		19	26	6	19.7	3.9
Rubricytes	0	137	4	2	4	4	25.2	5.0		91		34	71	14	52.5	10.5
Metarubricytes	10	79	9	9	7	4	19.7	3.9		101		62	122	40	81.2	16.2
Myeloblasts	15	4	13	18	16	17	13.8	2.8		5		20	8	13	11.5	2.3
Promyelocytes	20	8	2	13	8	9	10.0	2.0		8		18	6	4	9.0	1.8
Myelocytes Neut.	15	10	15	17	21	26	17.3	3.5		19		16	10	31	19.0	3.8
Metamyelocytes Neut.	5	55	24	44	76	154	59.7	11.9		79		44	50	136	77.2	15.4
Band Neut.	0	47	6	122	164	106	74.2	14.8		78		109	72	121	95.0	19.0
Segmented Neut.	0	12	2	215	157	120	84.3	16.9	DIED	27	KILLED	63	59	102	62.7	12.5
Myelocytes Eos.	0	1	2	5	5	2	2.5	0.5		4		17	5	1	6.7	1.3
Metamyelocyte Eos.	0	3	0	0	0	0	0.5	0.1		2		3	1	1	1.7	0.3
Band Eos.	0	1	0	0	0	0	0.2	0.0		1		3	1	0	1.2	0.2
Segmented Eos.	5	1	0	0	1	1	1.3	0.3		0		10	3	1	3.5	0.7
Basophils	0	0	0	0	0	0	0.0	0.0		0		1	0	1	0.5	0.1
Lymphocytes	155	74	338	28	17	38	108.3	21.7		36		56	32	21	36.2	7.2
Monocytes	75	3	16	3	1	0	16.3	3.3		1		1	0	0	0.5	0.1
Plasmocytes	5	1	5	1	0	1	2.2	0.4		1		0	1	0	0.5	0.1
Megakaryocytes	0	1	0	0	2	1	0.7	0.1		1		2	1	0	1.2	0.2
L. E. Cells	90	1	45	6	10	3	25.8	5.2		1		6	10	1	4.5	0.9
Unclassified Cells	70	2	0	4	6	3	14.2	2.8		2		2	6	1	2.7	0.5
Mitosis	5	7	3	1	0	1	2.8	0.6		5		4	2	1	3.0	0.6
								4.00:1								1.76:1

VITA

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