

therefore expressed in rat-days of urine. The towels were extracted twice for 12 hours with alcohol, the alcohol removed by evaporation and the sludge hydrolyzed for 2 hours with 10% hydrochloric acid. Following hydrolysis, the material was extracted with ether in a continuous extractor for 12 hours. The ether solution was washed with sodium bicarbonate solution and placed in olive oil. The divided dosage method of Marrian was used for the assay.

It happened to be convenient to assay rat placentae for estrin at the same time. One hundred and ninety-two placentae from rats 21 days pregnant were finely ground and refluxed twice for 24 hours with ethyl alcohol. This extract was purified by treatment with petroleum ether and with acetone. It was then divided and one-half subjected to acid hydrolysis. The results of both experiments are shown in Table I.

*Conclusion.* Small, but demonstrable amounts of estrin were found in the urine of pregnant rats; no estrin could be demonstrated in rat placentae.

## 8841 P

### Phagocytic Activity of Bone-Marrow Cells.

I. FOREST HUDDLESON AND MYRTLE MUNGER. (Introduced by W. L. Mallman.)

*From the Department of Bacteriology and Hygiene, Michigan State College.*

In view of the fact that there is a vigorous opsonic response to the parenteral injection of antigenic fractions of *Brucella* cells, an unusual opportunity is offered for measuring the phagocytic activity of the various types of bone marrow cells collected directly from the marrow, or as they are found in the peripheral blood in myelogenous leukemia.

Studies have been made on the phagocytic activity of marrow cells aspirated from the cavity of the femur of normal guinea pigs, and those immunized to *Brucella*, and on marrow cells in the peripheral blood of one human case of chronic myelogenous leukemia.

The cells in the blood of the pigs were measured for their *Brucella* phagocytic activity *in vitro* prior to the collection and examination of marrow cells. The cells in the whole blood of normal pigs

showed no phagocytic activity. The segmented and stab neutrophile forms in the whole blood of the immunized pigs were found to ingest at least 50 or more bacteria; thus indicating the presence of immune opsonins in the serum for Brucella.

The phagocytic activity of marrow cells from normal and immunized guinea pigs was measured *in vitro* in the presence of both normal guinea pig serum and serum containing immune opsonins.

The phagocytic activity of the marrow cells in the peripheral blood of the case of myelogenous leukemia was examined in the presence of the patient's serum and in the presence of a serum obtained from another person possessing a high immune opsonin titer for Brucella. The mixtures of cells, serum and bacteria, were incubated in a water-bath at 37°C. for 30 minutes before making spreads and staining.

The forms of marrow cells from guinea pigs that were examined were: megaloblasts, macro-normoblasts, normoblasts, primitive myeloblasts, myeloblasts, premyelocytes, myelocytes, metamyelocytes, juvenile forms, stab forms, neutrophiles, filamented neutrophiles, eosinophiles and basophiles.

In the leukemia case, only cells of the myelogenous series were studied.

The results obtained follow: Normal guinea pig marrow cells + normal guinea pig serum + bacteria; no cellular ingestion of bacteria noted.

Normal guinea pig marrow cells + immune opsonin serum + bacteria: all filamented neutrophiles contained more than 50 bacteria; the stab form varied in its ingestion capacity; from 10 to more than 50 bacteria were seen in a cell. All other forms of the myelogenous series and the nucleated forms of the erythrocytic series showed no phagocytosis of the bacteria.

Immune guinea pig marrow cells + immune opsonin serum + bacteria: phagocytic picture similar to the one mentioned in the previous paragraph with the exception that an occasional juvenile form was found that had ingested from 1 to 10 bacteria.

Immune guinea pig marrow cells + normal guinea pig serum + bacteria: all filamented and stab neutrophile forms ingested bacteria in numbers varying from 10 to above 50; 10% of the juvenile form ingested less than 15 bacteria; all other forms of the myelogenous series and the nucleated forms of the erythrocytic series showed no phagocytosis.

The leukemic whole blood (0.8% sodium citrate) had a total cell count 200,000 per cmm.; differential count on 100 cells gave myeloblasts 32, myelocytes 13, metamyelocytes 10, juveniles 10, stabs

23, filamented forms 8, lymphocytes 0, monocytes 1, eosinophiles 2, basophiles 1.

Leukemic whole blood + bacteria: no phagocytosis of bacteria seen.

Leukemic blood cells + serum of individual containing immune opsonins + bacteria: all filamented forms showed ingestion of more than 50 bacteria; the ingestion capacity of stab forms varied from zero to more than 50 bacteria per cell; their activity appeared to depend upon the age of the cell. None of the cell forms younger than the stab were observed to take up bacteria.

The inference to be drawn from these observations is that, in infections where mature neutrophils are being rapidly destroyed, the bone marrow in an attempt to replace the cells destroyed, forces out into the peripheral blood a high percentage of young forms which play little if any part in the protection of the individual against the infection. It would appear, therefore, that a too rapid or continuous shift to the left in peripheral blood cells of the myelogenous series is not a desirable condition. Its continuance impairs one of the important defensive mechanisms of the body during infection.

## 8842 P

### Effects of Synthetic Progesterone on Female Genital Tract of the Monkey.\*

FREDERICK L. HISAW AND R. O. GREEP.

*From the Biological Laboratories, Harvard University.*

The corpus luteum hormone corporin as obtained from the corpus luteum will produce premenstrual development of the endometria of castrated monkeys and traumatization of such uteri stimulates the formation of epithelial proliferations characteristic of normal implantation sites.<sup>1, 2</sup> It is also known that oestrin will promote growth of the uterus, cornification of the vagina, development of the sex-skin, and metaplasia of the cervical glands.<sup>3, 4</sup>

---

\* Aided by a grant from the National Research Council Committee on Problems of Sex.

<sup>1</sup> Hisaw, F. L., *Am. J. Obst. Gyn.*, 1935, **29**, 638.

<sup>2</sup> Engle, E. T., Smith, P. E., and Shelesnyak, M. C., *Am. J. Obst. Gyn.*, 1935, **29**, 787.

<sup>3</sup> Overholser, M. D., and Allen, E., *Surg. Gyn. Obst.*, 1935, **60**, 124.

<sup>4</sup> Engle, E. T., and Smith, P. E., *Anat. Rec.*, 1935, **61**, 471.