

through one horn of the uterus. The results showed that: (1) In normal rabbits and in spayed animals large numbers of macrophages soon appeared at the site of the injury, but this response was essentially of a local nature and there was no great increase of the cells at a distance from the ligature or in the opposite uterine horn, but (2) in the animals in which progestational proliferation had been induced, the reaction to an irritant, such as a silk ligature placed in one horn, was greatly increased. In this case large numbers of deeply-staining macrophages were found not only at the site of the injury but throughout both uterine cornua.

It is thus apparent that when the rabbit's uterus undergoes the tissue differentiation and vascular changes induced by the ovarian hormones estrin and progesterin, it acquires the power of responding much more actively with macrophages to traumatic stimuli.

During pregnancy in the human, fixed macrophages are found in large numbers in the uterus (Hornung³), and in the broad ligament (Hofbauer⁴), and they are generally considered as important factors in the defensive mechanism against local infection. It would seem justifiable, therefore, to attempt the treatment of pelvic inflammatory conditions with ovary-stimulating hormones, as originally recommended by Klein.⁵

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Further Studies on Immunity to Diphtheria Among Central and Polar Eskimos.*

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Inasmuch as immunity to various diseases is often found among persons in whom no previous exposure to infection has been established, several authors have postulated the existence of a physiolog-

³ Hornung, R., *Zentrbl. f. Gynack.*, 1924, **48**, 2170.

⁴ Hofbauer, J., *Bull. Johns Hopkins Hosp.*, 1926, **38**, 255.

⁵ Klein, P., *Z. f. Geburtsh. u. Gynack.*, 1929, **95**, 371.

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ical process of "serological ripening" to explain this phenomenon.^{1, 2, 3, 4, 5}

The widespread immunity to diphtheria among Eskimos was repeatedly quoted as an instance of such phenomenon and seemed particularly suitable for study. Materials collected by one of us (P.H.) from 7 groups of these people in 1930 were examined, and the results already reported⁶ indicated that it was a true antitoxic immunity, and suggested the importance of carriers. Additional materials were collected in 8 such communities during the summer of 1931 by one of us (P.H.) and examined.

From the 214 available throat cultures, 34 strains of diphtheria-like organisms were isolated, but it was not possible to demonstrate toxin production at the time of isolation (after 60-80 days maintenance on artificial media). Three strains were morphologically and culturally typical (apparently "R") organisms, while the remainder gave atypical fermentation reactions. The throat flora in general was similar to that found in persons living in other latitudes.^{7, 8}

The results of Schick tests (Table I) and serum antitoxin titrations (Table II) showed in general a somewhat higher incidence of susceptibility (Schick positive) than is found among persons living in regions where clinical diphtheria is more common. This is seen by a comparison of these results with the included Schick figures, compiled from von Groer's data⁹ for Vienna and the antitoxin titrations of a St. Louis group, respectively.

TABLE I.

| Group | Year | No. tested | % Schick Positive | | % Schick negative | |
|------------------|------|------------|-------------------|---------|-------------------|---------|
| | | | 3-18 yrs. | 18 yrs. | 3-8 yrs. | 18 yrs. |
| Eskimos | 1931 | 110 | 38 | 39 | 62 | 61 |
| % of whole group | | | | 38 | | 62 |
| Vienna | 1919 | | 32 | 37 | 68 | 63 |
| % of whole group | | | | 33 | | 67 |

TABLE II.

| Group | Year | No. tested | No. possessing antitoxin and units per cc. | | | | | | | | |
|-----------|------|------------|--|------|------|------|------|------|-----|-----|-----|
| | | | None | 1/90 | 1/90 | 1/66 | 1/45 | 1/22 | 1/9 | 1/4 | 1/4 |
| Eskimos | 1931 | 39 | 18 | | 1 | 1 | 1 | 3 | 8 | 5 | 2 |
| St. Louis | 1932 | 48 | 20 | 4 | 7 | 3 | 2 | 2 | 2 | 4 | 4 |

¹ von Groer, *Verhand. der Gesellsch. f. Kinderheilk.*, 1913, **30**, 182.

² Hirszfeld *et al.*, *Klin. Woch.*, 1929, **55**, 1046.

³ Heinbecker and Irvine-Jones, *J. Immunol.*, 1928, **15**, 395.

⁴ Bay-Schmith, *Klin. Woch.*, 1929, **8**, 974.

⁵ Friedeberger *et al.*, *Deut. med. Woch.*, 1929, **55**, 132.

⁶ Wells and Heinbecker, *Proc. Soc. Exp. Biol. and Med.*, 1931, **28**, 887.

⁷ Shibley *et al.*, *J. Exp. Med.*, 1926, **43**, 415.

⁸ Bloomfield, *Johns Hopkins Hosp. Bull.*, 1921, **32**, 33.

⁹ von Groer *et al.*, *Z. f. Immunität.*, 1919, **28**, 327.

In the few instances (18) where the amount of serum available was sufficient, adequately controlled complement-fixation tests were performed by the method of Krah and Witebsky,¹⁰ using a lecithinized alcoholic extract of a mixture of 8 known virulent strains of *C. diphtheriae*. Five of these sera gave complete fixation. After absorption with known diphtheria organisms they showed no fixation, suggesting the presence of a specific antibody for *C. diphtheriae*.

Since it has been suggested that immunity to diphtheria is genetically associated with blood groups² we secured Schick data and blood groupings in 17 families (83 persons), but our evidence does not support the view of such a linkage.

Our findings indicate that resistance to diphtheria among Eskimos in these localities depends on the presence of antitoxin and suggest that carrier conditions, as well as latent specific infections, are the probable sources of this immunity.

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Nucleinate-Induced Extramedullary Myelopoiesis.

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Experimental studies¹ established the direct action of the nucleinate molecule and of the nucleotides comprising it on the myeloid centers in bone marrow. Peripheral leucocytoses sometimes reaching 100,000 per cu. mm. and persisting for 3 to 4 days followed large single intravenous dosages (1 gm.) of these materials in normal rabbits.

More recent studies² have shown that daily injections of 0.35 gm. each of the pentose nucleotides in rabbits for a brief period (5 to 7 days) will produce an hyperplasia of the myeloid tissues in marrow, as proved by serial biopsies, with a definite absolute increase in granulocytes in the general circulation. During the succeeding 7 weeks the peripheral count returned gradually to the preinjection level and the bone marrow resumed its normal myeloplasia.

¹⁰ Krah and Witebsky, *Z. f. Immunität.*, 1930, **66**, 59.

¹ Doan, C. A., Zervas, L. G., Warren, S., and Ames, O., *J. Exp. Med.*, 1928, **47**, 403.

² Doan, C. A., *J. Am. Med. Assn.*, 1932, in press.