PHASE MICROSCOPY STUDIES OF HODGKIN'S DISEASE LYMPH NODES IN RELATION TO HISTOGENESIS OF THE STERNBERG-REED CELL

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The problem of the nature and histogenesis of the Sternberg-Reed cell has occupied the attention of many students of Hodgkin's disease for the past seventy-five years. Various opinions have been expressed, based on examination of fixed and stained tissue sections, smear preparations, and tissue culture. Recent discussions of the conflicting opinions can be found in review articles by Symmers and Hoster and Dratman.

After exploring the possibilities of phase contrast microscopy in cytologic studies of normal and diseased lymphoid tissues, we have arrived at certain conclusions concerning the nature and histogenesis of this cell.

Material and Method of Study

The material consisted of lymph nodes from 20 patients with Hodgkin's disease and a varied group of control lymphoid tissue, including lymphosarcoma, reticulum cell sarcoma, simple lymphoid hyperplasia, pyogenic adenitis, metastatic carcinoma and sarcoma, normal nodes, transudates and exudates, and animal lymphoid tumors.

Fresh nodes were received from the operating room in a dry container within a few minutes of removal. Each node was sectioned immediately, a portion grasped in a forceps and squeezed so as to express a milky fluid. A drop of this fluid was touched to a slide, a coverslip applied and ringed with vaseline or paraffin. Such a preparation is one cell thick and allows clear observation with an oil immersion lens. The living cells float in their natural fluid environment without distortion or artefact due to fixation.

As a rule, only the free cells of the node can be examined by this technic. The fixed reticular components cannot be expressed in the fluid. Fibrous nodes yield a thin, acellular tissue juice. In spite of these limitations, the method offers the advantage of direct and adequate visualization of living cells in their natural fluid environment.

The instrument used for these studies was a Spencer phase microscope. We found that the 1.8 mm., dark contrast medium, oil immersion objective was the most satisfactory for wet smear preparations. The dark contrast of this objective most nearly approximates the appearance of stained preparations and affords clear photographic reproduction.

Our photographs were taken through a Leitz Micro-Ilso attachment on 35 mm. film.

Observations

In preparations of nodes from all sources the structure of the lymphocyte was made clearly visible (fig. 1). Eosinophiles, plasma cells (figs. 1 and 2), monocytes (fig. 4) and phagocytic macrophages (fig. 3) present their own characteristic cytology.

In the Hodgkin's nodes it appeared that a characteristic progression of cytologic changes occurred, all of which could be reconstructed into a pattern which would seem to indicate the transition of the reticulum cell into those pleomorphic forms known as the Sternberg-Reed cells (figs. 5-16). In general, the reticulum cells are enlarged, measuring 20-25 micra in diameter. Nuclear enlargement is disproportionate...
tionate so that the nucleus almost fills the cell. Chromatin accumulates in irregular knots in the indented nucleus and nucleoli become prominent, irregular and often multiple. The appearance of the cytoplasm remains unchanged. The transition from these enlarged reticulum cells with a single, deeply-indented nucleus into binucleate Sternberg-Reed cells appears to entail only minor changes and may well occur by extension of the nuclear indentation to complete separation into two halves. Cytoplasmic granules are conspicuous in both the large mononuclear cell and the Sternberg-Reed cells, especially the latter (figs. 15-16). These granules, so striking by phase contrast, are not seen at all or at best made only imperfectly visible by the usual staining methods.

![Image](https://via.placeholder.com/150)

**Fig. 1 (upper left).**—Lymphocytes and Eosinophils. X 950.

**Fig. 2 (upper right).**—Lymphocytes, Eosinophils and Plasma Cell. X 950.

**Fig. 3 (lower left).**—Phagocytic Macrophage. X 950.

**Fig. 4 (lower right).**—Monocyte. X 950.

**DISCUSSION**

Our studies indicate that Sternberg-Reed cells are formed by morphologic alterations in the reticulum cell. This concept has been previously expressed by many authors and our only contribution to this point of view consists in furnishing corroboration, evidenced by examination of unaltered cells in their natural state.

We found nothing which would indicate that lymphocytes in Hodgkin's disease nodes are morphologically altered. From the point of view of pathologic cytology we feel that Hodgkin's disease is essentially a reticulum cell aberration, with the variation in lymphocyte pattern representing a reaction phenomenon.
HODGKIN'S DISEASE LYMPH NODES

In comparative studies of Hodgkin's nodes and metastatic neoplasms we noted a striking resemblance between Sternberg-Reed cells and isolated tumor cells. The general pattern of the tumor cell smears was quite different from that of Hodgkin's nodes, but frequently one could find isolated cells which were cytologically similar to altered reticulum cells and Sternberg-Reed cells (figs. 17-20).

1. The free reticulum cell in Hodgkin's disease undergoes progressive cytologic alterations leading to the formation of Sternberg-Reed cells.
2. The other free cellular components of Hodgkin's disease nodes are cytologically normal.

SUMMARY
Figs. 11–16.—Various Forms of Sternberg-Reed Cells. × 950

Figs. 17–20.—Cells from Bronchogenic Carcinoma
REFERENCES


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