Table 1. Powder data for pressure-induced fibrous sulfur-selenium ($S_{0.56}$ $Se_{0.44}$); CuKα radiation. Abbreviations: w, weak; m, medium; s, strong; v, very.

hkl	*d*(Å) Calc.	*d*(Å) Obs.	I_{rel}
100	6.80	6.80	vw
110	3.93	3.93	vs
111, $\bar{1}21$	2.99	2.99	vs
201, 021	2.74	2.73	s
210, 120	2.57	2.56	m
300	2.27		
211, $\bar{1}21$ / 231, $\bar{1}31$	2.25	2.25	ms
102, 012	2.19	2.19	m
301, 031	2.03	2.03	s
220	1.96	1.95	w
202, 022	1.91	1.91	w
310, $\bar{1}30$	1.885	1.879	w-m
221, $\bar{2}41$	1.806	1.803	m
131, $\bar{3}11$ / $\bar{1}41$, $\bar{3}41$	1.746	1.742	s
$\bar{2}12$, $\bar{1}22$ / 132, $\bar{2}32$	1.718	1.718	s
302, 032	1.618	1.615	w
401, 041	1.595	1.591	w
320, 230	1.560	1.555	m
103, 013	1.502	1.505	w-m
410, 140	1.483	1.477	w-m
321, 231 / $\bar{2}51$, $\bar{3}51$	1.478		
203, 023	1.403	1.404	vvw
402, 042	1.369	1.370	vvw
330	1.308	1.305	w
501, 051	1.304		
420, 240	1.285	1.283	w
$\bar{4}12$, $\bar{1}42$ / $\bar{1}52$, $\bar{4}52$	1.248	1.248	w
$\bar{5}11$, $\bar{1}51$ / $\bar{1}61$, $\bar{5}61$	1.180	1.177	vw
403, 043	1.141	1.141	vw
104, 014	1.139		
$\bar{4}22$, $\bar{2}42$ / $\bar{2}62$, $\bar{4}62$	1.123	1.122	vw
114, $\bar{1}24$	1.108	1.106	w-m
$\bar{5}21$, $\bar{2}51$ / $\bar{2}71$, $\bar{5}71$	1.060	1.056	w
$\bar{2}14$, $\bar{1}24$ / 134, $\bar{2}34$	1.053		

old and having been irradiated with 35-kv x-rays for about 1500 hours still remains unaltered in any observable manner. When examined about 3 months after it was made, the "single" crystal of the sulfur-selenium phase on which x-ray data had been collected had altered. It had gone partially to the fibrous sulfur (II) type phase.

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References and Notes

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2. R. E. Marsh, L. Pauling, J. D. McCullough, *Acta Cryst.* **6**, 71 (1953).
3. W. R. Busing, K. O. Martin, H. A. Levy, *Oak Ridge National Laboratory Report ORNL-TM-305* (1962).
4. The values given for the helix radius and average S-Se distance should be taken as tentative Limits of error for these are now approximately ± 0.05 Å.
5. We thank P. B. Crandall for technical assistance.

22 November 1966

Leukocyte Mitosis: Suppression in vitro Associated with Acute Infectious Hepatitis

Abstract. *Inhibition of mitosis in vitro was observed in leukocytes from patients with acute infectious hepatitis. Similarly, in cultures of normal leukocytes, after the addition of small amounts of serum from patients with hepatitis, mitosis was suppressed. Although the incidence of mitosis became normal in leukocytes from convalescent patients, there were chromosomal abnormalities.*

The effect of infectious hepatitis on the chromosomes of cells in human peripheral blood was studied during a recent epidemic of this disease, in which more than 100 cases were recognized. Many were symptomatic; others were discovered during a survey of tests for liver functions [primarily for serum glutamic oxalacetic transaminase (SGOT)]. Specimens of blood and serum were obtained from 16 patients, some of whom had been previously karyotyped. Additional samples were obtained from patients at the Massachusetts General, Boston City, and St. Elizabeth's Hospitals. Serums from eight patients with noninfectious hepatic disease and comparable abnormalities of liver function served as controls. Normal specimens were obtained from healthy students and employees in the same institutions.

The standard method of Moorhead *et al.* (*1*) for culturing leukocytes and preparing chromosomes was used, with two modifications; eight drops of whole blood were added to the culture medium in place of the 1.0 ml of plasma, and the cells were exposed to colcemid for 2 hours instead of the 6 hours suggested by Moorhead. In every case all stained cells were studied. The percentage of leukocytes in metaphase was derived from a count of at least 200 cells.

The initial studies were performed with preparations of peripheral leukocytes obtained from patients with acute infectious hepatitis (hereafter referred to as the direct method). In another method (indirect) 0.1 ml of the serum to be tested was added to cultures of leukocytes obtained from healthy individuals. Preparations to which no serum was added served as culture controls.

No metaphase figures, as judged by the direct method, were seen in specimens obtained from 12 patients with acute infectious hepatitis. Most of the leukocytes present were contracted and deeply stained or macerated. Chromatin clumping occurred in a few cells, but there was no other sign of mitosis. Eight to 20 percent of cells taken from patients before they developed hepatitis had metaphase figures. Thirteen to 20 percent of leukocytes from convalescent patients after liver function tests had become normal had metaphase figures. However, these chromosomes showed an unusual sticky quality as well as multiple breaks, deletions, and additions (Fig. 1).

Serums from nine patients with infectious hepatitis repeatedly inhibited the development of metaphase figures in normal leukocytes. The incidence of metaphase figures in these preparations ranged from 0 to 0.5 percent of the cells examined. In contrast, control cultures revealed 8 to 20 percent of the leukocytes in metaphase.

Using the indirect method, dilutions of four serums that inhibited leukocyte mitosis were tested. In each case, the serums diluted up to one part in 1000 inhibited mitotic activity. Serums from normal, healthy individuals and eight patients with noninfectious hepatic disease did not suppress metaphase figures in leukocyte cultures; 12 to 20 percent of the leukocytes were in metaphase.

The blood and serum of patients with acute infectious hepatitis have a factor that inhibits leukocyte mitosis and mitosis of normal leukocytes in culture. The inhibition of leukocyte mitosis does not seem to be mediated by elevated concentrations of SGOT or

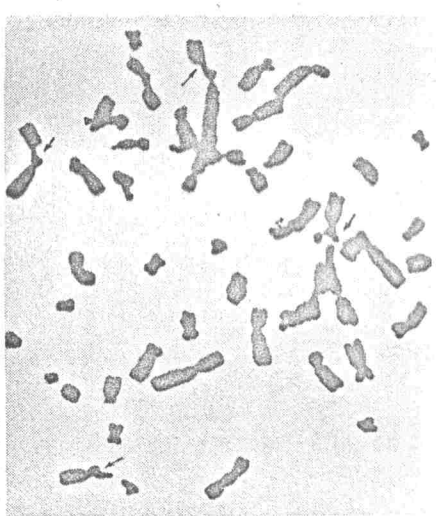

Fig. 1. Increased stickiness and other chromosomal aberrations. Several breaks are indicated by arrows (× 1200).