Reprinted from Excerpta Medica Monograph:
CURRENT RESEARCH ON GROUP A STREPTOCOCCUS,
Proceedings of a Symposium,
Paris, 16–19 July, 1966

LESIONS PRODUCED IN RABBITS FOLLOWING THE INTRACARDIAC INJECTION OF STREPTOCOCCAL CELL WALL COMPONENTS*

I. GINSBURG, N. ZEIRI and J. H. BOSS

Laboratory for Microbiology and Immunology, Hebrew University Hadassah School of Dental Medicine, Jerusalem, Israel

Rabbits were injected intramyocardially with living Group A streptococci, streptococcal cell walls, C polysaccharide, mucopeptide, L-forms and with silicone particles. The animals were sacrificed 7 days after a single injection.

The heart lesions produced by living streptococci consisted of muscular necrosis with a proliferative granulomatous reaction made of foci of mononuclear cells, histiocytes, fibroblasts and giant cells (Figure 1). The giant cells had a basophilic cytoplasm; some contained an eosinophilic granular substance which showed some of the properties of fibrinoid material (Ginsburg *et al.*, 1960).

Animals injected with trypsinized cell walls showed lesions with a center composed of muscle debris infiltrated with neutrophils. The lesions also contained histiocytes which assumed acinar-like structures with nuclei at the periphery and clear cytoplasm in the center. Some histiocytes contained a central vacuole with a bright refringent foreign material (Figure 2).

Animals injected with C polysaccharide showed small areas of muscle fall-out loosely infiltrated with histiocytes, lymphocytes and some polymorphs. Large multinuclear giant cells which contained tiny basophilic clumps were scattered in the lesions (Figure 3).

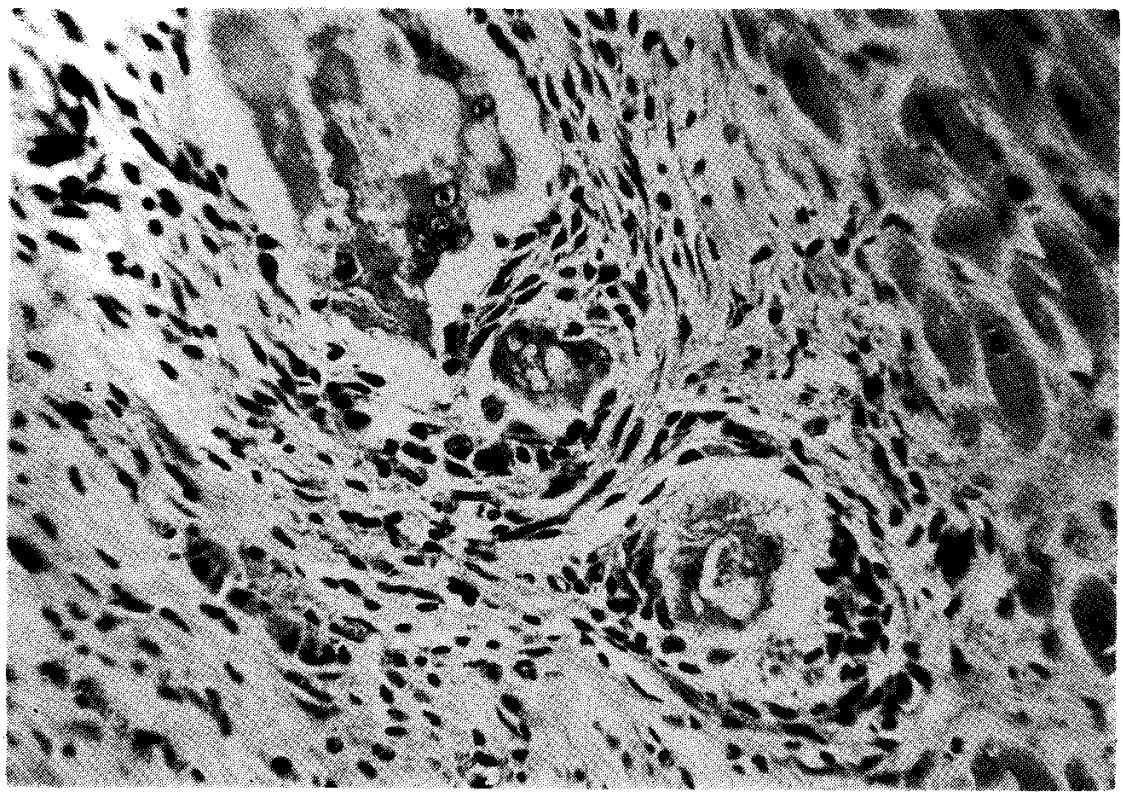

Fig. 1.

* Supported by USPHS Research Grant No. BSS-CD-IS-2.

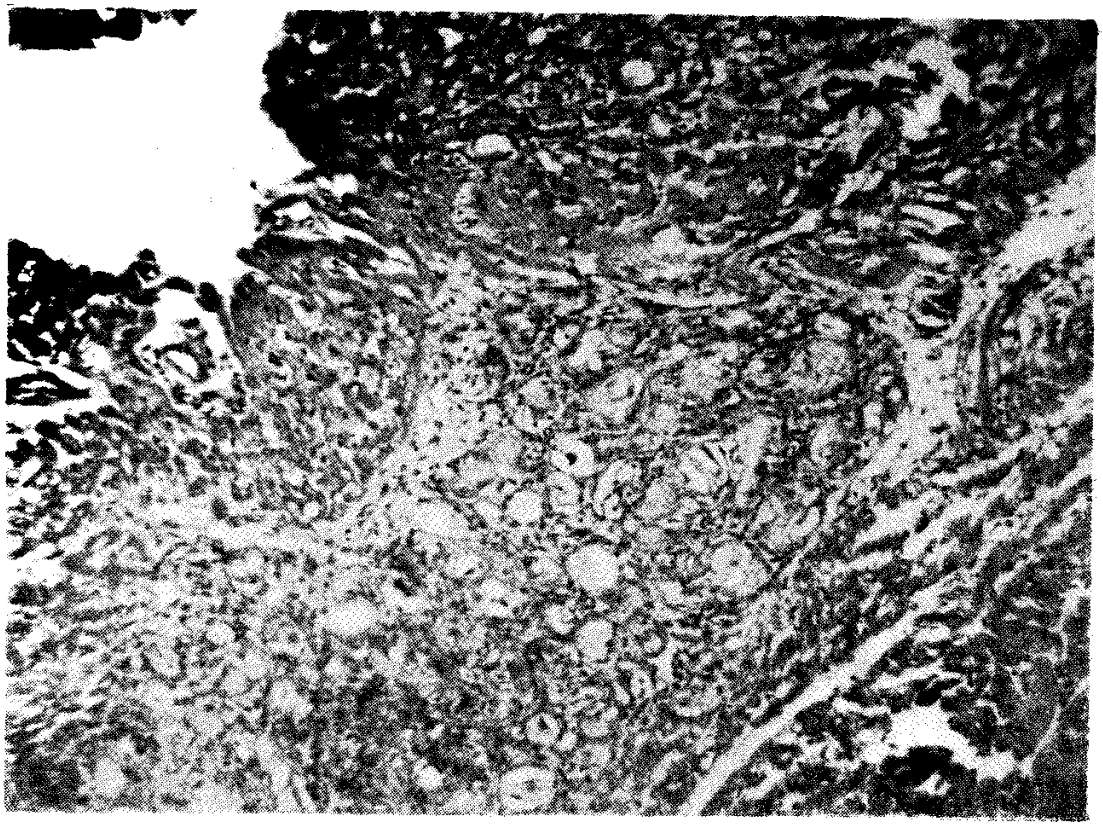

Fig. 2.

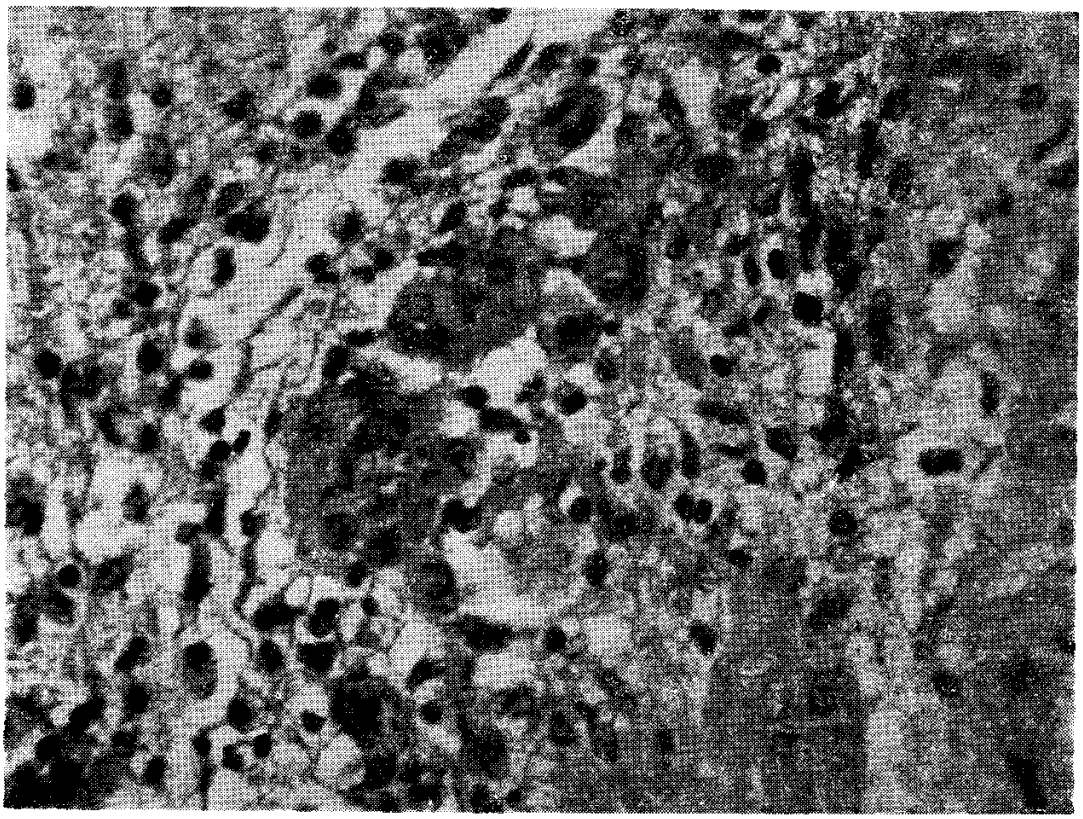

Fig. 3.

Animals injected with mucopeptide showed lesions in which there was a subtotal destruction of the myocardium. In such areas confluent sections, of various sizes, of a granulomatous process were found. Within the granulomatous area we found a multitude of eosinophilic to basophilic clumps of structureless material. The clumps were surrounded by a well developed reactive tissue composed of histiocytes, round cells, fibroblasts and neutrophils.

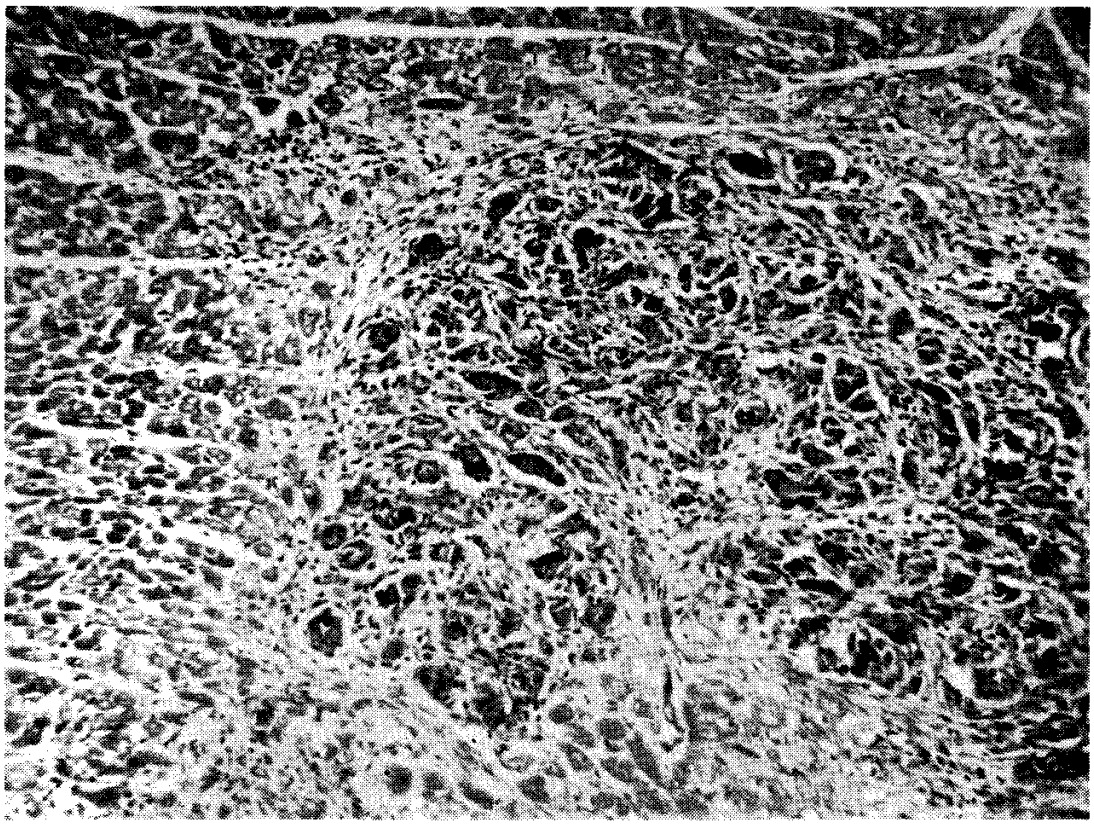

Fig. 4.

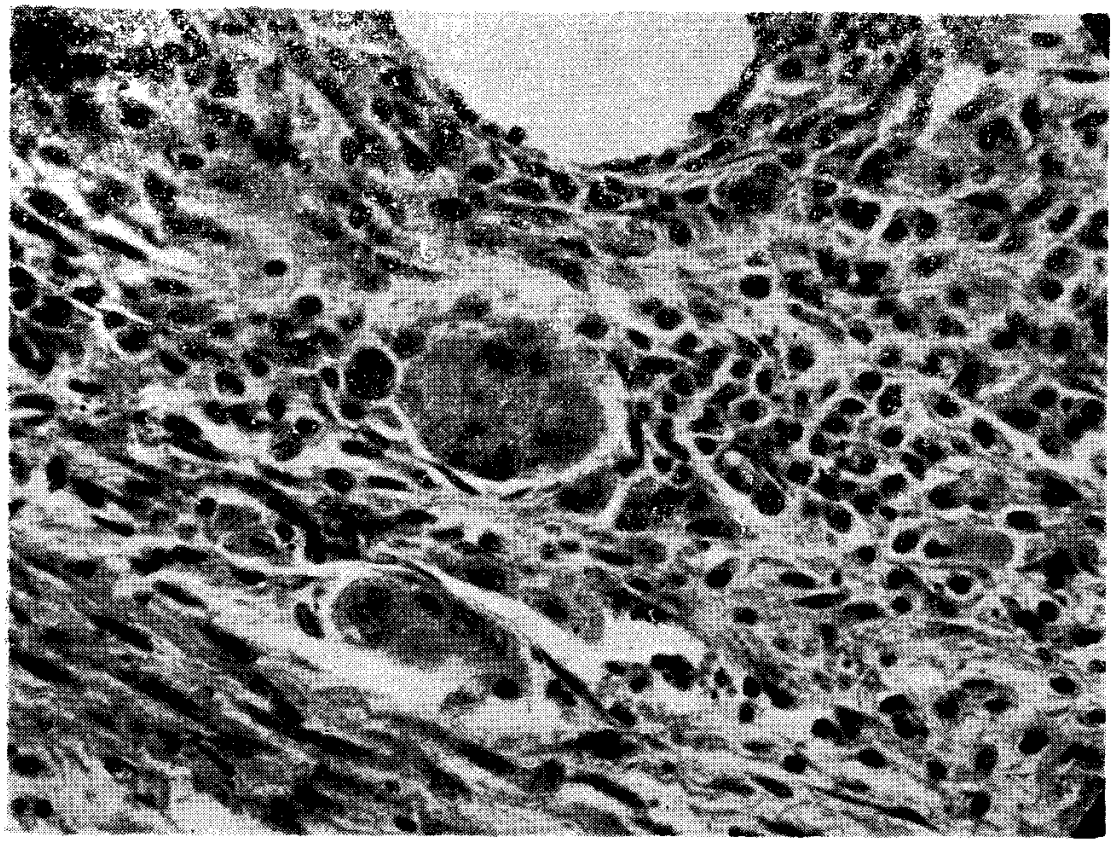

Fig. 5.

In such areas, different numbers of foreign body giant cells were present, some of which had engulfed the foreign material (Figure 4).

Animals injected with streptococcal L-forms showed areas of myocardial necrosis. The periphery of such areas is composed of proliferating fibroblasts. There is a second zone

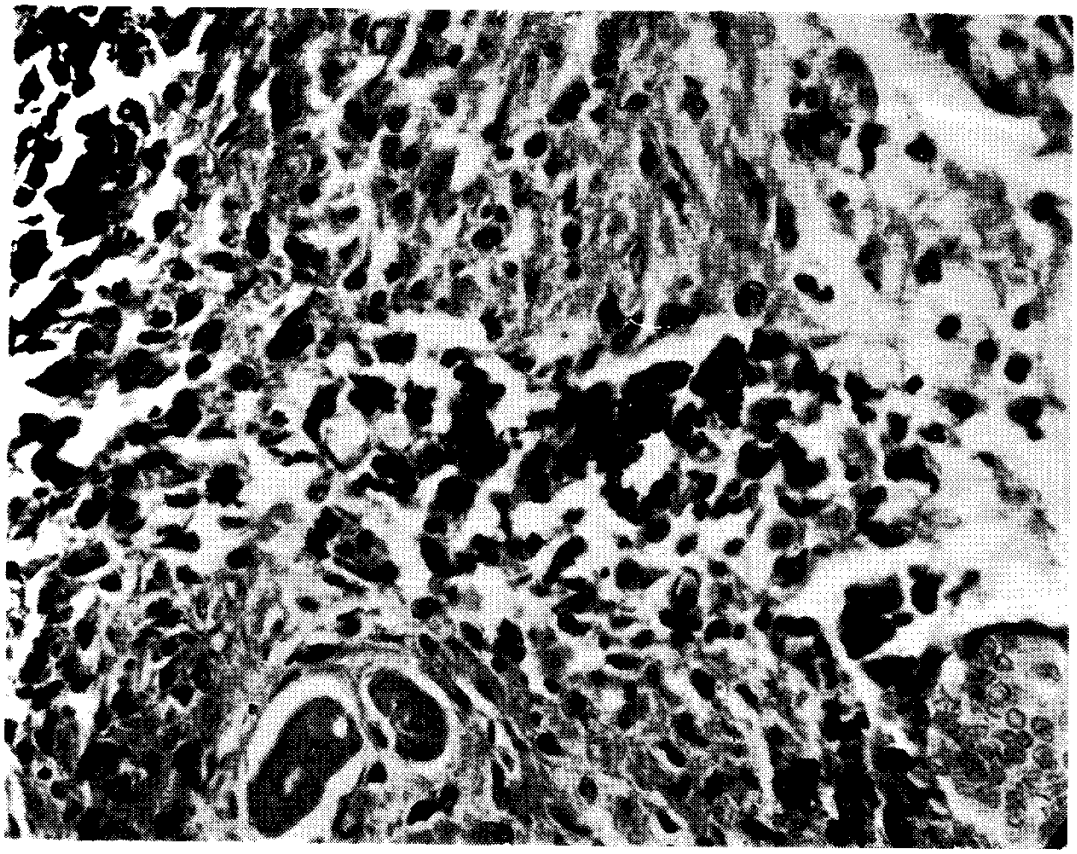

Fig. 6.

containing a few lymphocytes, while its periphery is composed of fibroblasts, histiocytes and a number of giant cells containing within their cytoplasm a granular eosinophilic material (Figure 5).

Animals injected with silicone particles showed a young scar tissue with free silicone particles scattered within the proliferating fibroblasts. Few of the cells had silicone particles in their cytoplasm (Figure 6). These results indicate that the heart muscle reacts in a very similar way to the injection of streptococcal cell wall components, which differs from the lesions induced by inert particles. The significance of these lesions and their possible relation to heart lesions in man will be discussed.

REFERENCE

GINSBURG, I., LAUFER, A. and ROZENBERG, S. (1960): Cardiac lesions produced in rabbits by the intramyocardial injections of various micro-organisms. *Brit. J. exp. Path.*, *41*, 19.