Brit. J. Exptl Path. 45: 634 (1964) K-2

CK

THE ULTRASTRUCTURE OF ASBESTOS BODIES FROM GUINEA-PIG LUNGS

J. M. G. DAVIS*

From the Department of Pathology, University of Cambridge

Received for publication March 17, 1964

WHEN asbestos fibres are inhaled and lodge in lung tissue many of them become coated with a thick layer of gelatinous material, and the coated fibres are called Asbestos Bodies. It is generally accepted, that the function of the body coating is to protect the tissue from the harmful effects of asbestos dust. Asbestos bodies were probably first observed by Fahr and Feigel (1914) who described strange "crystals" in lung sections from a case of asbestosis. Later Cooke (1924) also reported "curious bodies" in asbestotic lungs, but because of their beaded nature he thought they might be fungi. Stewart and Haddow (1929) believed that the bodies were associated with the disease and coined the term "asbestosis bodies". This term was used universally for many years, but it is now realised that the presence of these bodies in the lung or sputum is only an indication of exposure to asbestos dust and is not diagnostic of the disease itself. For this reason the term "asbestos body" has been substituted for "asbestosis body". Gloyne (1932) demonstrated that each body contained a fibre of asbestos and suggested that the capsule contained iron.

The exact chemical nature of the asbestos body capsule material has been the subject of a considerable amount of speculation and study. McDonald (1927) believed that the coating was primarily a silicic gel formed by the decomposition of asbestos, and Gardner and Cummings (1931) suggested that it was ferrisilicate gel. Koppenhöfer (1935) thought that the asbestos body coating was produced from silicic acid formed from the asbestos fibre after the iron and magnesium had been leached out. In contrast Cooke (1929) suggested that the body coating was iron containing protein material derived from damaged blood cells and Gloyne agreed with this view. The iron protein nature of the capsule was confirmed by Beger (1933) and Sundius and Bygden (1937). Simpson and Strachan (1931) suggested that the body protein was laid down on the asbestos by cells in contact with the fibre and Beattie (1961) expanded this idea suggesting that the body protein was collagen laid down on the asbestos fibre by fibroblasts. Beattie was able to show the presence of proline and hydroxy-proline in hydrolysates of asbestos bodies, which supported the collagen theory, but was unable to determine the exact quantities present. Recently Leach (personal communication) made a complete amino acid analysis of the asbestos body protein and showed that the quantities of proline and hydroxyproline were much too small for the coating to be collagen.

Gloyne (1932) observed that in lungs from persons who had undergone long periods of dust exposure many of the asbestos bodies present showed signs of

*Research Fellowship to the British Asbestosis Research Council.

PLAINTIFF'S EXHIBIT
DOW-278

DOW 06093

STL01075