

## Calcareous Pericarditis in Mice of Several Genetically Related Strains. (28950)

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Calcareous pericarditis in hearts of DBA mice was reported by Hare and Stewart(1). Because the incidence of this lesion increased with age and appeared to be influenced by the amount of roughage in the diet it was hypothesized that the degenerative changes represented a response to malnutrition. The present authors have found calcareous degeneration in several related strains of mice which could indicate genetic susceptibility.

Genetically(2) the mice were derived from an out cross between dilute-brown and mixed albino strain (Bagg albino) which became established as the Strong A strain (by pedigreed matings). The original C strain was derived from crossing of the DBA  $\times$  A. Numerous lines with different color combinations were obtained from the original strain and have been maintained to the present time as independent lines. These lines include the widely used C3H as well as the CBA and CHI. Female virgin mice and retired female breeders were used in the present study.

All animals were fed commercial mouse chow and given tap water *ad libitum*. The mice were killed at 17 months of age or when death seemed imminent. The hearts were fixed with 10% formalin. Paraffin sections were made and stained with hematoxylin and eosin.

**Results and discussion.** When animals were autopsied, calcium on the surface of the heart was often observed as white flecks which felt metallic when scraped with a knife. A summary of these observations is presented in Table I. In DBA mice, primary involvement of the pericardium (Fig. 1), as recorded by Hare and Stewart, was seen under microscopic examination. The degenerated or hyalinized connective tissue and myocardial fibers with calcification present, were

similar to the lesions described by Hare and Stewart(1). In the C mice (Fig. 2) and the sublimes derived from that line the myocardium was involved with only an occasional exception. Furthermore, no hyalinization, little necrosis, but some hypertrophy of fibers with large nuclei were observed. Due to the limited number of animals used in the 2-year period during which observations were made, valid incidence of this lesion in various strains cannot be reported.

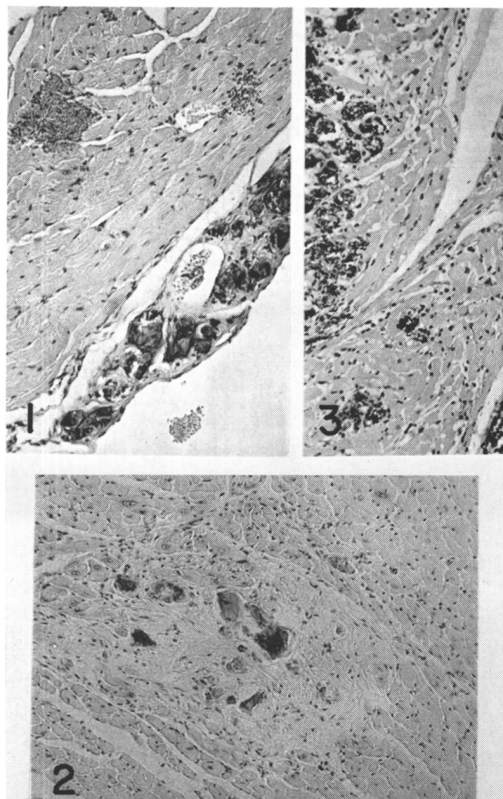


FIG. 1. Heart of DBA mouse. Calcium deposits in pericardium extending deeply into muscle of right ventricle.  $\times 100$ .

FIG. 2. Heart of strain C mouse. Fibrous, little necrosis, and multifocal calcium deposits involving myocardium. Hematoxylin and eosin.  $\times 100$ .

FIG. 3. Heart of Swiss mouse. Spontaneous diffuse calcium present in portion of epicardium and outer area of myocardium.  $\times 100$ .

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TABLE I. Calcium Lesions in Mice of Related Strains and in Swiss Mice.

| Strain       | Hearts with calcium | No. of animals examined | % with calcium |
|--------------|---------------------|-------------------------|----------------|
| DBA/2        | 60                  | 74                      | 81             |
| C/St         | 39                  | 56                      | 70             |
| C3H/St       | 19                  | 56                      | 34             |
| DBA/St       | 6                   | 26                      | 22             |
| CHI/St       | 4                   | 29                      | 14             |
| Swiss ICR/Ha | 10                  | 112                     | 9              |

The diffusion of calcium along the epicardium and outer layers of myocardium of Swiss mice (Fig. 3) presented a distribution pattern different from that of the mice previously described. In Swiss mice calcium deposits were less evident and pericardium seemed less involved than in the other strains.

In experiments on the effect of tobacco diets on rodents(3), DBA mice given commercially available tobacco products mixed with ground Purina diet gained less weight than control animals and 9 of 34 mice so treated had calcareous pericarditis as opposed to 1 of 20 control animals which received the Purina chow without the tobacco products. The difference in final weight of the DBA

mice was statistically significant at the 0.05% level of probability. Results obtained in the tobacco experiments are consistent with the hypothesis that the lesion seen in DBA mice may represent a response to malnutrition. The presence of calcareous deposits in the hearts of all of these related strains of mice suggests the possibility that the development of this lesion is influenced by genetic susceptibility. Calcareous pericarditis is increased by dietary restrictions as indicated by a lower final weight of tobacco fed mice than the control DBA mice.

*Summary.* Calcium was found in the hearts of mice of related strains, including DBA and C strains. The distribution of calcium foci in the pericardium and myocardium of the related strains differs from the distribution in Swiss mice. It is proposed that these related mice have a genetic susceptibility to this lesion.

1. Hare, W. V., Stewart, H. L., *J. Nat. Cancer Inst.*, 1956, v16, 889.

2. Strong, L. C., *ibid.*, 1955, v15, 1417.

3. DiPaolo, J. A., *Nature*, 1962, v195, 1316.

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### Effect of Certain Compounds on Solubility of Cholesterol in Coconut Oil.\*‡

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Several investigators have reported that cholesterol is absorbed from the gastrointestinal tract only when dissolved in fat(2,3,4). Recently Wilkens *et al*(5) have reported a correlation coefficient of 0.982 between the solubility of cholesterol in a series of natural fats and the hypercholesterolemic effect of these fats in man. Wilkens *et al* have suggested as a working hypothesis "... that the solubility of cholesterol in different fats may

be the characteristic property which determines their effect on the serum cholesterol concentration." Thus, they would suggest that the continued ingestion of corn oil is associated with relatively low levels of blood cholesterol because the solubility of cholesterol in corn oil is relatively low. Conversely, they would suggest that continued ingestion of coconut oil is associated with relatively high levels of blood cholesterol because the solubility of cholesterol in coconut oil is relatively high.

If the hypothesis of Wilkens *et al* is the explanation for the effect of different fats on serum cholesterol concentration, it is appar-

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‡ A preliminary report of this work has been presented(1).