

and hypolipemic subjects in the arteriosclerotic patients.

2) A possibility is suggested that in the hypolipemic arteriosclerotic patients the increase of influx rate of very low and low density lipoproteins with much linoleic acid into aortic wall may accelerate the atherogenesis.

3) Anti-atherogenesis of high density lipoproteins should be considered in the aspects of progress of the arteriosclerosis.

### 30. Studies on the Role of Ascorbic Acid on Atherosclerosis

Motoaki KISHIKAWA, Takao FUJINAMI, Muneaki SUGIMURA, Kota OKADO  
and Katsuji SENDA

First Division, Department of Internal Medicine, Nagoya City  
University Medical School

As ascorbic acid is essential nutrient for the guinea pig and primate, chronic ascorbic acid deficiency is a more actual problem in the human. In the deficiency, abnormal connective tissue as a primary lesion and altered metabolism of cholesterol in scurvy has been reported. In this study, influences of ascorbic acid deficiency to connective tissue metabolism in the aorta and lipid metabolism were studied.

1. The aortic endothelium, examined with enface preparation and electron microscopy on scorbutic animals for 4 weeks, displayed increased incidence of nuclear swelling and vacuolisation, separation of endothelial cell junction, and reduction of cytoplasmic organelles. An increase of total aortic mucopolysaccharide, essentially increased hyaluronic acid, a decrease of chondroitin sulfate B and a decrease of collagen measured as hydroxyproline were observed.  $\beta$ -Glucuronidase which participated in degradation of mucopolysaccharide was depressed in the aorta and serum in the scorbutic animals.

2. Two groups of scorbutic guinea pigs designated as C-def and C-def+CO were made by feeding with scorbutic diet with or without 5% coconut oil for two weeks. Control animals of the experimental groups were received 25 mg. of ascorbic acid subcutaneously for the same period. Moderate increase of triglyceride and cholesterol ester and  $\beta$ -lipoprotein in the serum of the C-def, and markedly to approximately twice of normal in the C-def+CO were observed. Depression of plasma lipoprotein lipase activity observed in the scorbutic groups was prevented by ascorbic acid administration. Histological examination of the aorta revealed early atheromatous changes of accumulated foam cells in the intima of the C-def+CO.

3. Blood ascorbic acid of patients with atherosclerosis was considerably low as compared with healthy young adults. Administration of ascorbic acid to the patients by dose of 600 mg. daily caused depression of  $\beta$ -lipoprotein in the serum.

Ascorbic acid seems to be essential for maintenance of aortic ground substance

and to be involved directly or indirectly in fat metabolism, since LPL is located in the vascular endothelium. From these findings, it is possible that ascorbic acid contributes to the genesis of atherosclerosis.

### 31. Studies on Arteriosclerosis

#### Experimental Study on Calcium Metabolism of the Aorta

M. YOSHIKAWA, T. FUJITA, H. ORIMO, M. OHHATA and K. OKANO

Department of Geriatrics, Faculty of Medicine,  
University of Tokyo, Tokyo

Calcium content of the aorta has been shown to increase with advancing age. In an attempt to study the role of calcium in the development of arteriosclerosis, rats were chronically treated either with sodium sulfathiazol (SAT) or dihydrotachysterol (DHT) for 4 weeks and the changes in the calcium content as well as the histological findings of the aorta were analysed in these rats. It was found that neither SAT nor DHT caused significant change in the aorta of one month old rat. On the other hand, severe calcification and Mönckeberg type of arteriosclerosis the aorta was found in 4-6 month old rats.

These findings suggest that calcium avidity of the aorta increases with advancing age. Although the mechanism of such an increase in the tissue avidity for calcium is obscure, it is possible that the age-related change in the composition of the aorta might play some role.

Pyrophosphatase, an enzyme which hydrolyses inorganic pyrophosphate, has been shown to inhibit calcification and is considered as a physiological regulator of calcification.

Using a highly sensitive assay method, we have found pyrophosphatase activity in the normal rat aorta.

Pyrophosphatase activity was markedly decreased in the aorta of rat treated with SAT, thus suggesting the possible role of pyrophosphate in inhibiting calcification of the rat aorta.

### 32. Survey of Laboratory Data on Outpatients with Hypertension (XV)

Motohiro MOMOSE, Akinori TAKASAWA, Bunya IMAMURA,  
Morimasa HASEGAWA and Takeshi ASANO