18) Architectural Disturbance Characteristics of Rat's Aorta

— Confrontation among SHRSP, Sclerotic Rabbit and Sclerotic Man — Chikao Arai, Kokichi Takeuchi, Nobuyuki Abe, Mitsuyo Saito, Motoharu Hasegawa*, Yoshitaka Takayama**, Hiroyuki Ito, and Kozo Okamoto.*** Department of Clinical Functional Physiology, Toho University* Department of Medical Engineering, Toho University** Department of Pathology, Kinki University.*** Tokyo-to 143.

We have so far made clear arterial disturbance of SHRSP by histochemical observations and determinations of the architectural components of tunica media. In this report, we examined each aorta comparatively among man, rabbit and SHRSP. Subjects, aged over 40 years, 30 months and over 200 days for men, rabbits and rats, respectively, were composed of healthy normal groups [21 cases, 11 cases and 21 cases(WKY), respectively] and sclerotic groups [100 cases, 9 cases and 57 cases(SP), respectively]. Group of sclerotic men included cases of arteriosclerotic diseases such as hypertension, diabetes, myocardial infarction and cerebral infarction, and group of sclerosed rabbits was prepared by combined application of N₂ gas inhalation, intramuscular noradrenaline injection and oral cholesterol (0.5 g) administration. Cases of SHRSP were those which developed cerebrovascular disorder and died thereof. For each group, comparative determinations were made of a total of 5 components (SMC, EL, CL, GAGs and GP) of tunica media (5th intercostal, thoracic aorta) by microspectrophotometry. Smooth muscle cell(SMC), elastin(EL), collagen(CL), glycosaminoglycans(GAGs) and Glycoprotein(GP) contents were 22.3 (30.8), 40.3 (32.6) and 52.0 (74.7), 30.6 (25.2), 50.8 (35.5) and 53.5 (30.5), 23.3 (31.4), 38.9 (25.0) and 42.0 (40.6), 30.1 (20.7), 28.7 (20.1) and 24.8 (20.5), and 37.8 (37.1), 34.0 (31.6) and 40.4 (54.9) % Extinction for healthy normal groups (sclerotic groups) of men, rabbits and rats, respectively. In healthy normal groups, SMC content was highest for WKY, followed by rabbits and men in this order. With the development of disturbance, it increased for men, decreased slightly for rabbits, and increased remarkably for SP. In healthy normal groups, EL content was also highest for WKY, followed by rabbits and men in this order, while in sclerotic groups it decreased for all of these 3 groups, and especially, to a remarkable extent for SP. In healthy normal groups, CL content was highest for WKY, followed by rabbits and men in this order. With the development of disturbance, it increased for men decreased for rabbits, and showed no difference for rats. In healthy normal groups, GAGs content was quantitatively in the order of man, rabbits and WKY, and decreased with the component of disturbance for all of these 3 groups. GP content increased for SP compared with WKY, which was supposed to be due to a quantitative increase in collagen type V.