45) Ultrastructural Changes of the Myocardium of SHRSP derived from the parents of Cardiac Death under Specific Pathogen-Free System. Hideo Ueda, Kyorin University School of Medicine† Central Hospital, JNR, *Tokyo 181. Tadahiko Miyazaki, and Kinya Hayakawa. Central Hospital, JNR, Tokyo 151. Yoshio Suganuma, Naohiro Saito, and Yasushi Kato. Tokyo Institute, Kowa Co., Tokyo 189.

(Introduction) Since 1975 the SHRSP (Okamoto's F38) have been bred under SPF system in Kowa Tokyo Institute. By successive brother-sister mating we gained 87 male and 73 female rats (F4, F5, F6). The incidence of cardiac death increased with each generation. Our previous light microscopic examination showed severe hypertrophy and fatty degeneration of the myocardium in SHRSP of cardiac death. This study has been performed to clarify the ultrastructural changes of the myocardium in SHRSP (F8) derived from the parents died of cardiac failure. (Materials and Methods) In this study, 36-week-old SHRSP derived from the parents died of heart failure and age- and body weight matched control groups (SHRSR and SHRSP derived from the parents died of stroke) were used. The whole hearts were excised and immersed in the cold 2.5% glutaraldehyde. During fixation, the hearts were dissected and small tissue blocks were cut from the both ventricles. The tissue blocks were fixed for 2 hours at 4°C and washed in 0.1 M phosphate buffer solution overnight. They were postfixed in 1% osmium tetroxide in 0.1 M phosphate buffer solution for one hour, dehydrated with a series of graded ethanol solutions and embedded in Epon. Ultra-thin sections were cut from each block with a glass knife on a Porter-Blum MT-1 ultramicrotome. They were mounted on copper grids and double-stained with uranyl acetate and lead citrate. The sections were observed in a Hitachi HS-9 electron microscope. (Results) Common histopathological findings of these hearts were mainly myocardial hypertrophy, myocardial fibrosis, coronary arterial wall thickening, perivascular fibrosis and myocardial infarct. Arterial wall thickening was most remarkable in SHRSP derived from the parents of brain death (common SHRSP) and myocardial hypertrophy was most conspicuous in SHRSP derived from the parents of cardiac death (SHRHP) respectively. Perivascular fibrosis was severer in SHRHP and common SHRSP than in SHRSR. Massive myocardial fibrosis and scattered type of myocardial infarct were found predominantly at the endocardium of the left ventricles in SHRHP and common SHRSP. The most conspicuous finding in SHRHP was severe myocardial fatty degeneration. Numerous lipid droplets of various sizes were found closely applied to the outer mitochondrial membrane. Some mitochondria were vacuolated and others contained many glycogen particles in them. These ultrastructural changes were observed equally on both ventricles. Moderate or severe fatty degeneration was observed only in SHRHP. (Discussion) The blood pressure of SHRHP was higher than that of SHRSR and lower than that of common SHRSP. This study also showed that coronary sclerosis of SHRHP was not severer than that of SHRSR or common SHRSP. Consequently, hypertension and/or coronary sclerosis seemed to be not concerned directly in myocardial fatty degeneration. As fatty degeneration was observed only in children derived from the parents of cardiac death, this myocardial lesion seemed to be hereditary disorder. Therefore, SHRSP of cardiac death seemed to belong to different strain (SHRHP) from SHRSR or SHRSP of brain death (common SHRSP). In SHRSR and common SHRSP, the myocardial fibrosis seemed to be caused by hypertension and/or coronary sclerosis. However, in SHRHP, the myocardial fibrosis seemed to be caused mainly by the fall out of the myocardial cells due to fatty degeneration and to some extent to be caused by the coronary sclerosis. (Conclusion) The most conspicuous finding in SHRHP was diffuse myocardial fatty degeneration which was not caused directly by hypertension and/or coronary arterial sclerosis. Besides fatty degeneration, diffuse myocardial fibrosis and scattered infarction were observed.