the 10 male SHR, heart wt to body wt ratio was 4.81 ± 0.17 , and the wall thickness ratio was 0.92 ± 0.04 . In the 10 male rats of the selectively bred rats (2 litters), the weight ratio was 5.25 ± 1.45 , ranging from 4.07 to 8.96, and the ratio in the wall thickness was 1.21 ± 0.10 , ranging from 1.03 to 1.33. Data in female groups were similar to that of the male. Furthermore, the left ventricular cavity was noticeably small in some of them, whereas it was dilated in some others. The hypertrophy of the heart was usually associated with that of the right ventricle. Light and electron microscopic examination revealed disarrangement of muscle fibers, myofibrils, and irregularly shaped Z-bands. Small vessels with median thickening were also seen in either the hypertrophied or dilated heart. Blood pressure was not elevated in the rats with the hypertrophy. ECG of the rat with cardiac hypertrophy showed almost always large QRS deflection and high T wave with or without axis deviation on the extremity leads, which was the basis of the selection of the rat.

Establishment of the strain with a higher incidence of the abnormalities by successive selective breedings may prove to be useful in the study of the human disease.

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EFFECTS OF ISOPROTERENOL ON THE DEVELOPING HEART IN RATS

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It is supposed that hypertrophic cardiomyopathy may be the result of abnormal responses of developing heart to circulating catecholamines. In this study, isoproterenol (ISO) was administered to pregnant female rats and their offspring was received subsequent injection of ISO. The effects of the drug on the hearts of the offspring were studied morphologically.

50 $\mu\text{g/kg/day}$ of ISO was administered subcutaneously to 21 pregnant female rats for 3 weeks and 25 $\mu\text{g/kg/day}$ of ISO was administered to their offspring from the 2nd day after birth. Isotonic saline was administered to 21 pregnant female rats and their offspring as control. The offspring was killed on the 2nd, 22th, 36th or 50th day after birth. Left ventricular free wall thickness and ventricular septal thickness were measured. Diameters of myocardial fibers were measured and myocardial fiber disarray was assessed.

On the 2nd day after birth, the ventricles of offspring of pregnant rats treated with ISO showed disproportionate septal hypertrophy and frequent myocardial fiber disarray in the ventricular septum. However, on the 22th, 36th and 50th day after birth, the subsequent administration of ISO caused neither disproportionate septal hypertrophy nor fiber disarray and only proportionate ventricular hypertrophy appeared.

These results suggest that the developing heart of fetal rat may possess abnormal responses to circulating catecholamines.

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MYOCARDIAL RELEASE OR UPTAKE OF CATECHOLAMINES AT REST AND DURING EXERCISE IN HYPERTROPHIC CARDIOMYOPATHY

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The role of catecholamines in hypertrophic cardiomyopathy is under intense investigation, and hypertensive heart disease (HHD) has almost same findings in cardiac examinations.

In 18 patients with hypertrophic non-obstructive cardiomyopathy (HCM), 16 patients with HHD and 10 patients with normal controls, Epinephrine (EP) and Norepinephrine (NE) in arterial (A) and coronary sinus (S) blood were studied by DaPlada's radioenzymatic assay, at rest and during exercise. Hemodynamics and cardiac lactate metabolism were studied, too.

There was no significant difference in HR, CI, LVWI and coronary blood flow per 100g of left ventricular muscle except BP between the three groups.

Lactate extraction ratio was significantly low in HCM and HHD compared with control after exercise ($p < 0.05$).

Arterial EP levels were higher in HCM than in control and HHD, at rest and during exercise.

The same tendency was observed in arterial NE levels, and it was significantly high compared with control before and during exercise ($p < 0.05$). The increase during exercise was significant only in HCM ($p < 0.02$).

Myocardial lactate extraction ratio for HCM well correlate to the myocardial uptake of EP ($r = 0.429$, $p < 0.05$).

These observations indicate that there is a systemic excessive sympathoadrenergic stimulation in HCM and catecholamines play an important role on HCM and myocardial metabolic disorders.

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ABNORMAL EXPRESSION OF ONE OF β TYPE MYOSIN ISOZYMES IN VENTRICLES OF PATIENTS WITH DILATED CARDIOMYOPATHY

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We have reported the existence of two β type myosin isozymes (β) in human hearts, and suggested the regulatory factors of the expression of these isozymes should be pressure overload and developmental stage. Here, we now show the existence of another type of β , which is abnormally expressed in ventricles of patients with dilated cardiomyopathy (DCM) compared with those of patients without DCM. A monoclonal antibody, FCH21, was raised against β of fetal calf ventricles. Immunofluorescent studies revealed that FCH21 stained all ventricular myofibers (VM) of a normal rabbit, but it stained only a small number of VM of a hyperthyroid one, further confirming that FCH21 was specific for β type myosin. In human adult hearts (A) obtained at open cardiac surgery, however, FCH21 stained VM heterogeneously (up to 50% of VM), which suggested the existence of another type of β (β_3). The expression of β_3 was independent of that of α . Since β_3 was expressed in all VM of fetal human hearts (F; 10 and 21 weeks gestation), the expression of β_3 should be developmentally regu-