40) Blood pressure, stroke lesions and other phenomena in offspring crossbred from severe hypertensive and normotensive rats. Yoshio Ohta, Kazuo Yamamoto, Nobuko Morita, Hideo Miyake and Kozo Okamoto. Department of Pathology, Kinki University School of Medicine, Osaka-fu 589.

Following successive selective breeding of SHRSP, a strain with extreme hypertension in its early stage of growth was obtained. Previous studies indicated that strains with various blood pressures could be developed through appropriate crossbreeding of SHRSP and WKY (Okamoto, et al.: Jpn Circul J 22:455, 1981), therefore various crosses were made using these SHRSP, WKY and SHC (Imai, et al.: Atherosclerosis 18:59, 1973).

Methods

SHRSP showing extremely severe hypertension (230-250 mmHg in males and 200-230 mmHg in females) at around 10 weeks of age were selected and successive selective breeding performed while giving hydralazine 40mg/l in drinking water from mating to lactation. This strain was called M-SHRSP. Various crosses without special selection were made using M-SHRSP, WKY and SHC. Blood pressure, plasma renin activity (PRA), plasma cholesterol value and etc. of their offsprings were measured. This paper includes data obtained up to 20 weeks of age.

Results and Discussion

1) Continuous crossbreeding of M-SHRSP resulted in 10 generations. 2) Hybrids with blood pressures intermediate to the parental strains were M-SHRSP with WKY hybrids (WT), and WT with WKY or M-SHRSP for three or four generations. The blood pressures of F_3 came very close to those of WKY or M-SHRSP. (See table.) 3) Blood pressures of offsprings (f_1 , f_2) were nearly identical to those of their respective parents. 4) Similar tendencies in blood pressures were also found in M-SHRSP and SHC hybrids. 5) In hybrids developed by continuous crossbreeding of WT with WKY, no stroke lesion was recognized and PRA gradually decreased to below normal. PRA gradually increased and stroke lesion became recognizable following continuous crossbreeding of WT with M-SHRSP. (See table.) 6) The PRA in SHC was 7.6 ± 0.34 ng/hr/ml, much lower than that in M-SHRSP (40.9 ± 12.1 ng/hr/ml). Hybrids with PRA intermediate to the parental strains were M-SHRSP with SHC hybrids (CT and TC), and TC with M-SHRSP hybrids (T-TC). 7) Plasma cholesterol values in CT and TC were intermediate between SHC and M-SHRSP. Furthermore, hybrids developed by backcrossing TC or CT with M-SHRSP or SHC (T-TC or C-CT) showed plasma cholesterol values intermediate to the parental strains.

Summary

1) Following successive selective breeding with appropriate hydralazine therapy, a colony of SHRSP which showed very rapid increases in blood pressures at an early stage of growth as well as a particularly high rate of stroke lesions was obtained. This strain was called M-SHRSP.

2) Using M-SHRSP, it is possible to obtain individual rat colonies which show blood pressures which vary from normotension to extremely severe hypertension.

3) It appears possible to produce strains of rats with various characteristics through different combinations of crossbreeding M-SHRSP, WKY, SHC and/or their offsprings.

A supplementary note: A portion of these results was reported at the Fourth International Symposium on Rats with Spontaneous Hypertension and Related Studies held in Heidelberg on September 2-4, 1981.

		M-SHRSP	WT-T F_4	WT-T F_3	WT-T F_2	WT-T F_1	WT	W-WT F_1	W-WT F_2	W-WT F_3	WKY
Crossbreeding			WT-T F_3 X M-SHRSP	WT-T F_2 X M-SHRSP	WT-T F_1 X M-SHRSP	WT X M-SHRSP	WKY X SHRSP	WKY X WT	WKY X W-WT F_1	WKY X W-WT F_2	
Blood pressure (mmHg)	(f_1)	253±4.0	250±4.0	248±3.8	236±7.0	195±5.6	168±2.0	160±1.5	152±1.0	146±1.0	135±1.9
	(f_2)		246±6.0	238±13.0	232±6.7	199±4.9	174±10.7	156±2.0	151±1.5	142±1.8	
			-	238±2.0	227±4.7	197±3.3	167±3.4	160±2.6	146±3.0	144±1.7	
PRA (ng/hr/ml)		53.6±8.2	37.5	37.2±6.9	37.3±2.4	21.1±2.7	10.8±0.8	10.1±1.5	8.1±0.4	8.3±1.3	16.9±6.4
Incidence of Stroke Lesions (%)		96	88	88	69	42	0	0	0	0	0

Males, 20 weeks of age. M±SE * : As of Dec. 1, 1981.