11) The Operant type learning behaviors in the spontaneously hypertensive rat (SHR) and Stroke Prone SHR. Masahiko NOMURA and Kunihiro OKAMURA. Department of Physiology, School of Medicine. Fujita Gakuen Health Univ. Toyoake, Aichi 470-11, JAPAN.

INTRODUCTION It has been already known that the SHR and SHRSP are more reactive to the stress like an electric shock, which is often used to the escape or avoidance performance compared with the WKY, due to its higher level of activity of the sympathetic nervous system. Thus, we examined the learning behaviors of these three strains of rats by contrast using the operant type Skinner box, in order to characterize the physiological aspects of hypertension under the novel environment. Further more, we intended to know whether the changes of the behaviors are due to the genetic difference among three strains of rats or not.

MATERIAL AND METHODS The WKY, SHR and SHRSP were housed one by one in an individual cage at the age of 11 weeks old. Food was deprived until their body weight down to 85 % of the body weight of ad libitum. And they remained these weight through experimental period. After having been shaped in the Skinner box, the rat got the performance of the lever press task to get the food pellet respectively. After shaping, two learning schedules were given to the three strains of rats. 1). The brightness discrimination learning was examined on the Mult-VII15 Extinction schedule, and the rat was reinforced by the food pellet under the variable interval 15 seconds so that he should press the lever while S+ (1,000 times as bright as S-) was given. With S-, no food pellet was given. The correct response ratio ($R+ / R+ + R-$) was employed as an index of learning acquisition. The acquisition of brightness discrimination learning performance was done when the level of 85 % correct response ratio continued at least for 3 days. 2). The fixed ratio 50 schedule was given (FR-50). One session consisted of 20 trials per a day. The number of response per a minute as the response rate was compared among the three strains of rats.

RESULTS 1). The brightness discrimination learning test: The WKY showed that the number of R+ increased from 110 at the 1st session to 270 at the 30th session, and the number of R- decreased from 100 at the 1st session to 30 at the 30th sessions. So the correct response ratio was more than 85 % after the 23rd session. On the contrary, the SHR showed the number of R+ increased from 100 to 300, and the number of R- kept constant around 80 to 100 through 30 sessions. The SHRSP showed that the number of R+ increased from 120 to 260, and the number of R- decreased from 140 to 70. So the correct response ratio was less than 80 % through 30 sessions in both the SHR and the SHRSP. 2). The FR-50 schedule test: The WKY showed that the response rate increased from 20 at the 1st session to 40 at the 30th session. In contrast, the response rate of the SHR showed from 50 to 70. The SHRSP showed around 20 through 30 sessions.

DISCUSSION The acquisition data of the brightness discrimination learning performance differed much among the WKY, SHR and SHRSP. The SHR and SHRSP did not get the acquisition of the discrimination performance within 30 sessions. On the contrary, the WKY got it at the 23rd session. It depends on no decrease of the number of R- in the SHR, even though the number of R+ increased. It means that the number of errors in the SHR and SHRSP were much larger than that of the WKY. On FR-50 schedule, the SHR showed a much higher response. This means that the SHR showed hyperactivity in the lever-press task, whereas the WKY showed a low activity. The SHRSP showed very low response rate. It means that the highest blood pressure might play to suppress the lever-press response. Thus the change of learning behaviors in the SHR and SHRSP was completely different from that of the WKY.

We will have a conclusion that learning behaviors and blood pressure might correlate each other both in rats and human patients of high blood pressure.