

Inhibition of the motility by mice dosed with various salts and its recovery by various teas

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Introduction

Recently, various salts with sodium-salt above 99 per cent or with large amounts of mineral composition and potassium-salt has been placed on the market. The composition of commercial salts contains sodium-salt above 90 per cent and about 2-3 per cent minerals. Calcium, magnesium, sodium, potassium, phosphorus, sulfur and chlorine in the mineral composition is known widely to present in animal body. Sodium-salt shows an effective to be stimulating metabolism of cells and secretion by gastric juice. However, humans excrete daily to sodium-salt as urine or sweat. Japanese has been caused various disease of hypertension^{1,2,3)} and kidneys function, intaking salts of 15-20 g per day such substances as drinking water and foods which human must consume all the time.

Author's⁴⁾ previously described that the motility by mice dosed with various teas, such as refined green tea, green tea, oolong tea, coarse tea, etc., increased with the increased rearing period of mice. Thus, teas may be attract the attention of many people, indicating the marked increase of motility by mice.

The present report deals with the inhibition of motility by mice dosed with various commercial salts or sodium-salt and potassium-salt, and its recovery by various commercial teas.

Materials and Methods

Various commercial salts were used Yakishio, Shizuoka-Arashio, Aranami, Okinawa-salt and Kosha-salt. Refined green tea, green tea, oolong tea and coarse tea were purchased from market. These teas weighted out 2 g and extracted at 95°C

for 5 min with boiling water (200 cc). Sodium and potassium-salts were purchased from Wako Chemical Co., Osaka. D, D-mouse (about 30 g) was purchased from Hayashi Chemical Co.

Measurement of the motility by mice carried out both method of swimming and hang-down as described previously.⁴⁾ Swimming method used a thermostat (10,452 cm³) made of polyethylene with an agitator for make a fixed condition of swimming by mouse. The temperature in thermostat was kept constant at 35°C. The endurance limit of mouse by swimming was measured the time of all-out, i.e. neck reflex cause and statement just before death from drowing. Hang-down method was measured the time that mouse hang on a dangler employing hands. Reducing the measurement time of hang-down, we attached a 3 g-weight to mouse and on a dangler horizontally at 70 cm height from the ground surface. Moreover, the fall point of mouse placed an iron-plate heating at 75 °C preventing that mouse fall off on the statement having the strength.

Results and Discussion

Component in various commercial salts

The component in various commercial salt, Yakishio, Shizuoka-Arashio, Aranami, Okinawa-salt and Kosha-salt, were measured by ion chromatography (Dionex, Model 14). The result is shown in Table 1. The components in various commercial

Table 1. Component in various commercial salt, Yakishio, Shizuoka-Arashio, Aranami, Okianawa-salt and Kosha-salt

Salt	Element (%)						
	Cl	S	Br	Ca	K	Mg	Na
A	51.70	1.59	2.36	0.06	0.28	0.07	43.95
B	51.75	2.68	1.46	0.05	0.03	0.00	44.04
C	50.73	2.90	2.37	0.20	0.31	0.33	43.16
D	49.48	6.84	1.25	0.13	0.07	0.15	42.08
E	52.29	0.71	2.03	0.45	0.07	0.00	44.45

A: Yakishio, B: Shizuoka-Arashio, C: Aranami, D: Okinawa-salt, E: Kosha-salt

salt in Table 1 showed sodium-salt above 90 per cent and other trace elements. Potassium quantity in Yakishio and Aranami showed 5-13 times higher than those in Shizuoka-Arashio, Okinawa-salt and Kosha-salt.

Hang-down and swimming time by mice dosed with various commercial salt

The relationship between rearing period and hang-down time by mice dosed

with various commercial salt as one per cent were investigated. The result is shown in Fig. 1. The hang-down time by mice dosed with various commercial salt showed

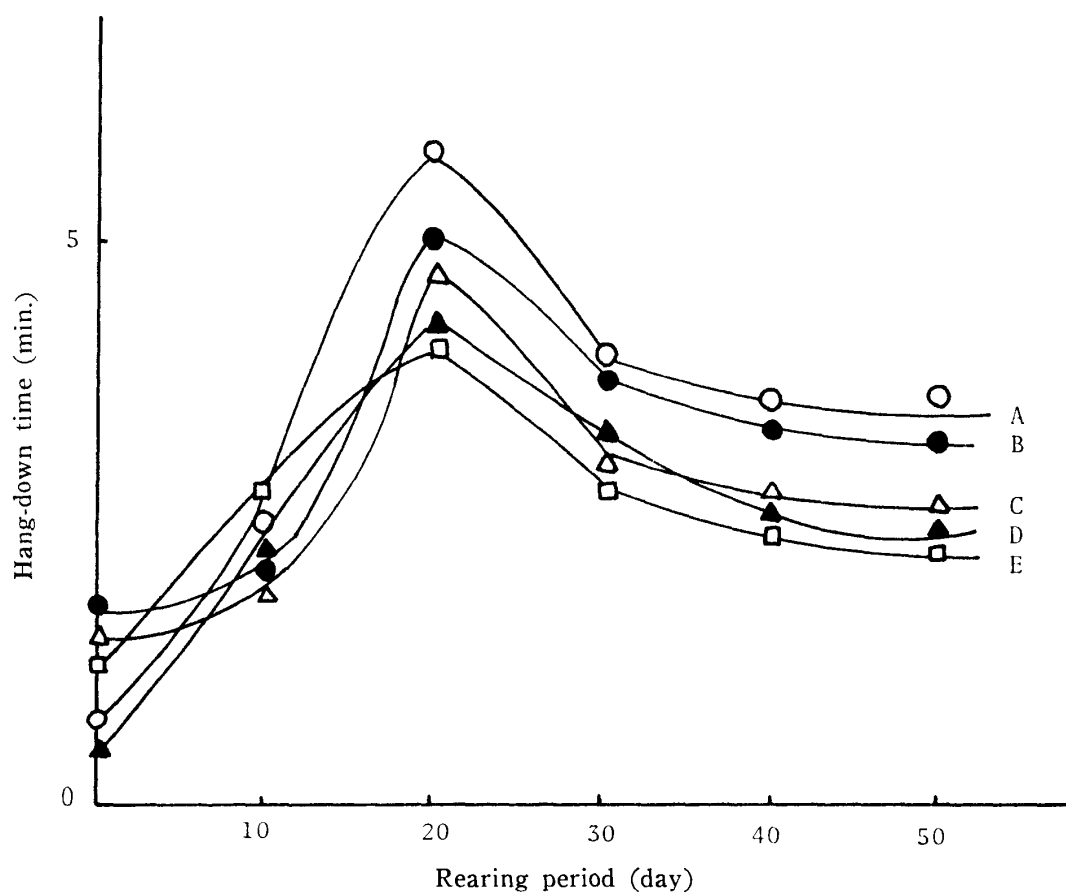


Fig. 1. Effect of various salts on hang-down time of mice.
A: Yakishio, B: Aranami, C: Shizuoka-Arashio,
D: Okinawa-Salt, E: Kosha-Salt.

the maximum values at 20 days of rearing period. The result suggests that mice occurs an metabolic or excited action by each commercial salts. As 25 days of rearing period goes on, an metabolic or excited action of mice was descended and kept at a constant state. Increased hang-down time by mice dosed with Yakishio or Aranami in these commercial salts are considered to be temporary increase of the motility occurring an metabolic or excited action *in vivo*. Chemical properties which are common to Yakishio and Aranami are considered to be exist a lot of potassium compared with other commercial salts in Table 1. This potassium ion may be namely under influence of an metabolic or excited action of mice. The motility by mice dosed with Yakishio or Aranami contains largely potassium tended to increase compared with mice dosed with Shizuoka-Arashio, Okinawa-salt and Kosha-salt. However, the motility after 20 days had a tendency to decrease as the rearing period proceeds.

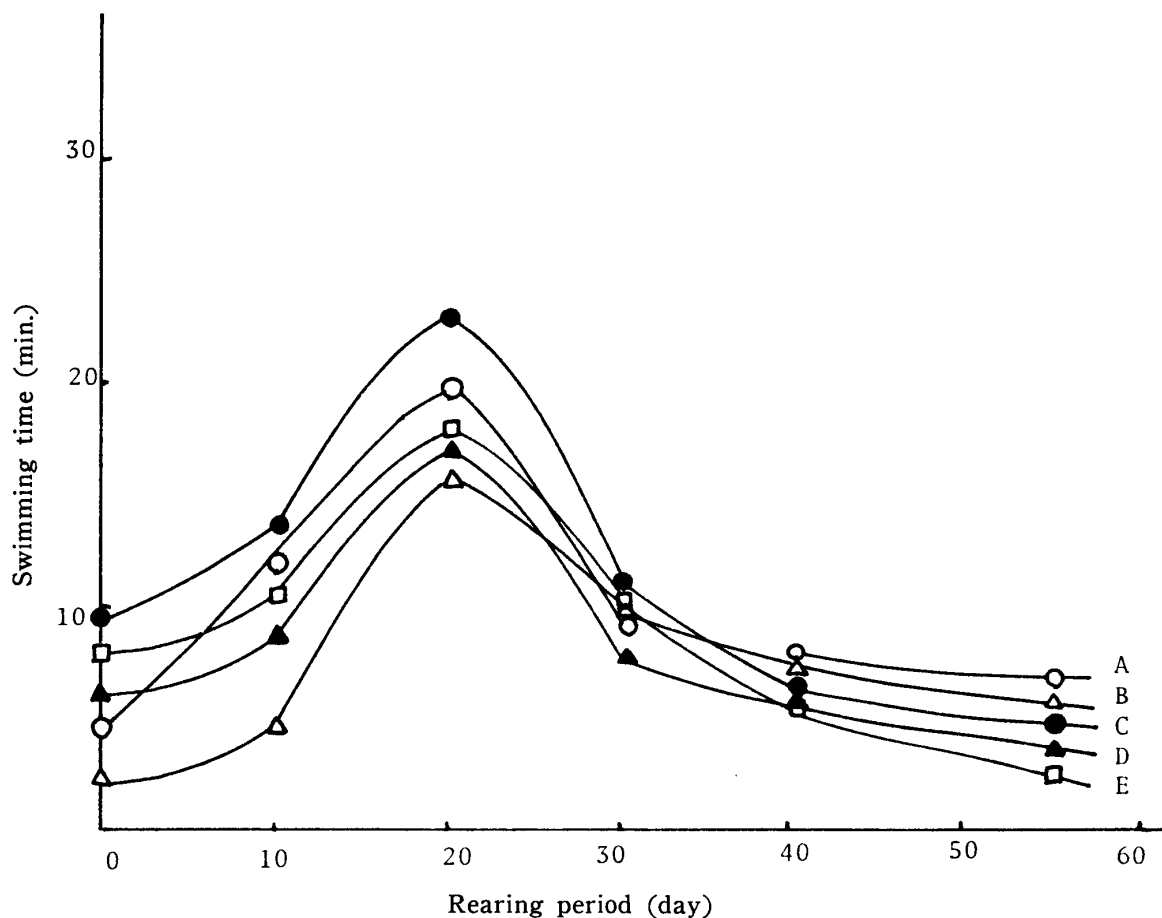


Fig. 2. Effect of various salts on swimming time of mice.
 A: Yakishio, B: Aranami, C: Shizuoka-Arashio,
 D: Okinawa-Salt, E: Kosha-Salt.

The relationship between rearing period and swimming time by mice dosed with various commercial salt showed the maximum values at 20 days of rearing period similar to those of hang-down times (Fig. 2.).

Motility by mice dosed with sodium or potassium-salt solution

The experimental result as described above was recognized to differ on the motility by mice dosed with various commercial salt. It is considered to refer to the quantity of sodium or potassium in various commercial salt. Therefore, the author's were investigated into the relationship between the motility and rearing period by mice dosed with sodium or potassium-salt (w/w%) solution. The result on hang-down time is shown in Fig. 3. Hang-down time by mice dosed with an aqueous solution (ratio of Na^+ and K^+ , 1:1 and 1:0.1) contains large amounts of potassium-salt showed the maximum values at 20 and 40 days of rearing period, and decreased, thereafter, as go past to maximum point. On the other hand, hang-down time by mice dosed with an aqueous solution (ratio of Na^+ and K^+ , 1:0.001) contains ex-

tremely small amounts of potassium-salt increased gradually with rearing period similar to that of water as control.

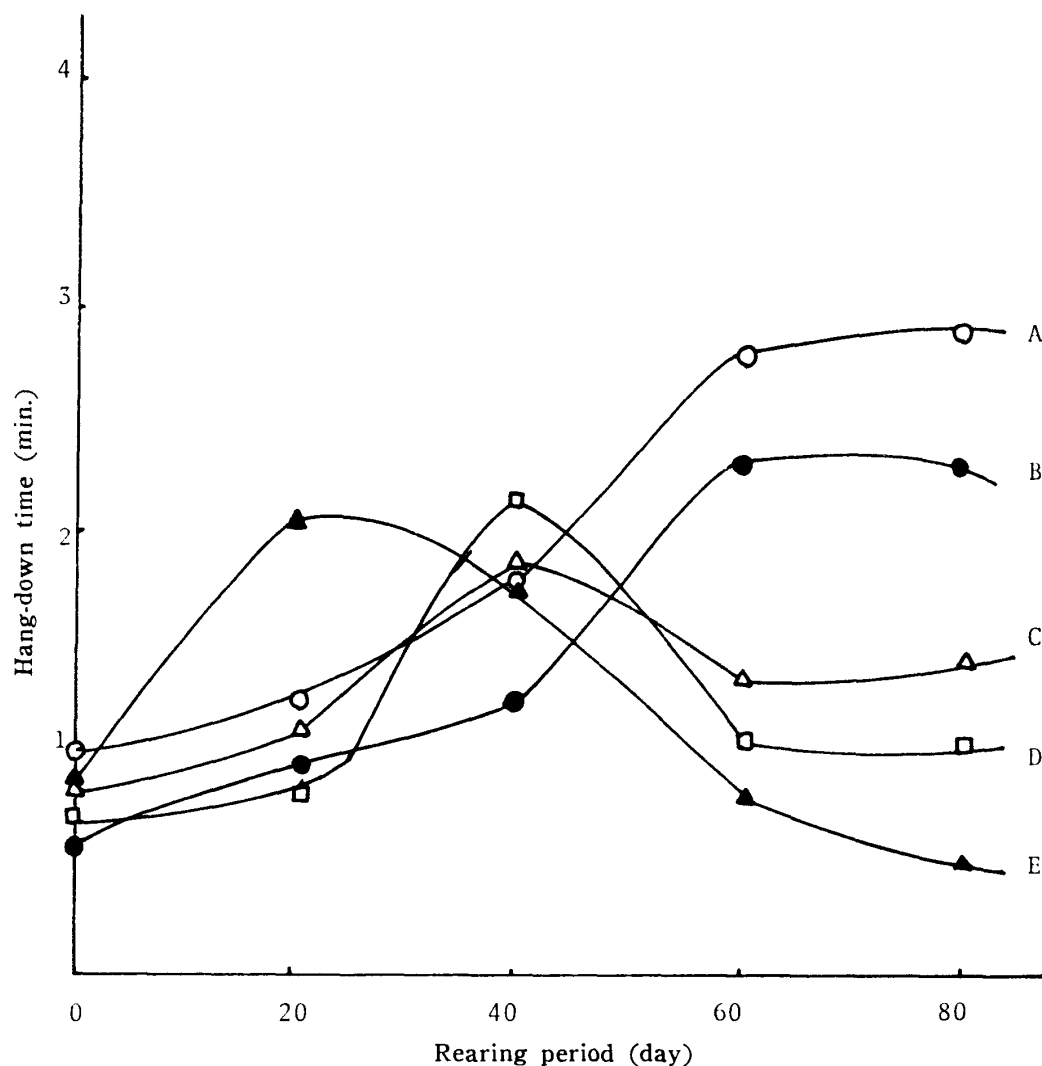


Fig. 3. Effect of the concentration ratio of Na^+ and K^+ on the relationship between rearing period and hang-down time by mice.
Concentration ratio of Na^+ and K^+ ; A: Water (Control), B: 1:0.001, C: 1:0.01, D: 1:0.1, E: 1:1

Swimming time by mice dosed with an aqueous solution contains large or small amounts of potassium-salt was recognized an tendency of increase or decrease with rearing period similar to the result of hang-down time as described above. The result is shown in Fig. 4. When the ratio of Na^+ and K^+ were 1:1, 1:0.1 and 1:0.01, the motility of mice showed the maximum values at 20 days of rearing period and decreased, thereafter, with the rearing period of mice. However, swimming time by mice dosed with water as control increased with the rearing period similar to that of hang-down time. The motility of mice in the presence of potassium ion increased by occurring an metabolic or excited action and then indicated rapidly

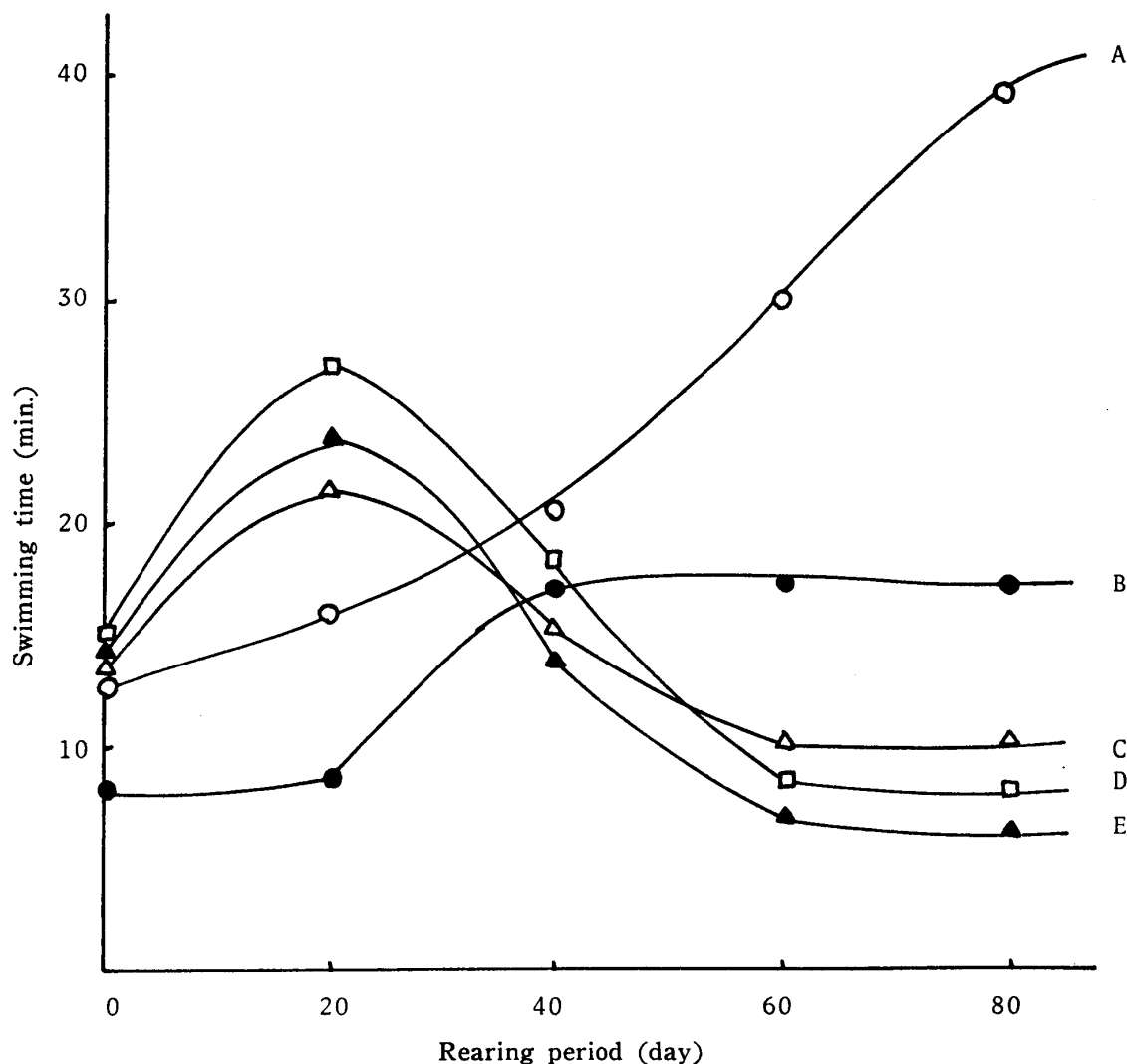


Fig. 4. Effect of the concentration ratio of Na^+ and K^+ on the relationship between rearing period and swimming time by mice.

Concentration ratio of Na^+ and K^+ ; A: Water (Control), B: 1:0,001, C: 1:0.01, D: 1:0.1, E: 1:1

decrease. The fact suggests that mice dosed with large amounts of potassium changed easily into the state of hyperpiesia compared with mice dosed with extremely small amounts of potassium.

Recovery of the motility of hypertensive mice by various commercial teas

Author's were investigated to the recovery of motility by hypertensive mice dosed with various commercial teas. Commercial teas used to a refined green tea, green tea, oolong tea and coarse tea of four kinds. The result is shown in Fig. 5. Hand-down time by mice dosed with an aqueous solution of 2% sodium-salt showed the maximum values at 40 days of rearing period, and decreased gradually with rearing period. The hang-down time by mice showed the minimum values at 60 days of rearing period, and subsequently the state of a fixed values. When various

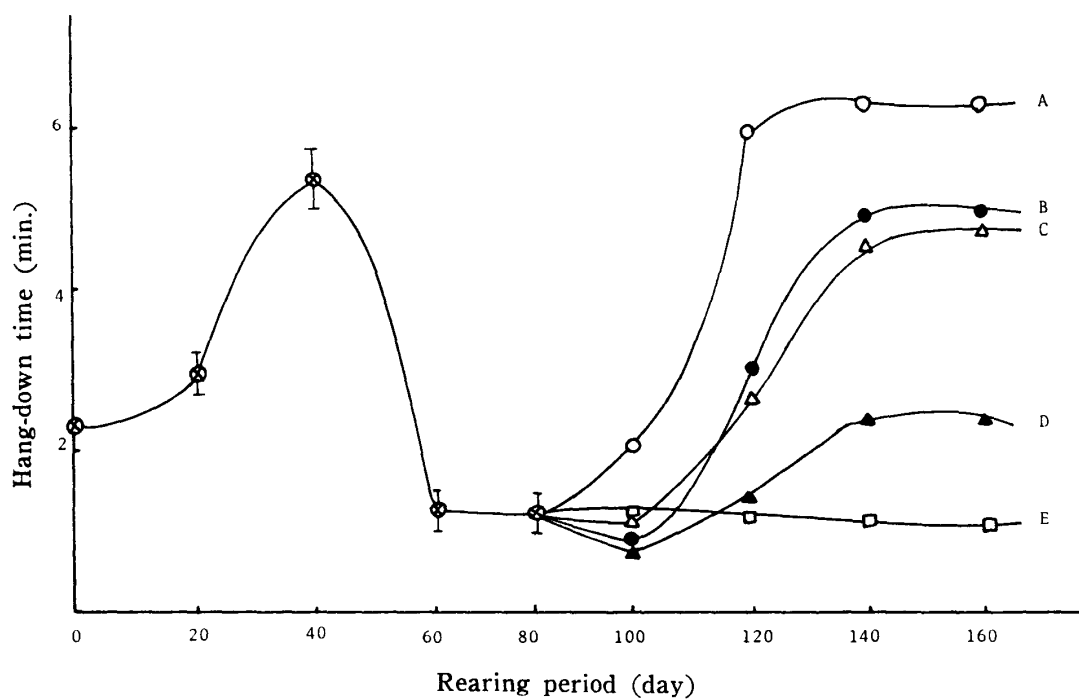


Fig. 5. Effect of various commercial teas on the motility of hypertensive mice. A: Refined green tea, B: Green tea, C: Oulong tea, D: Coarse tea, E: Water (Control)

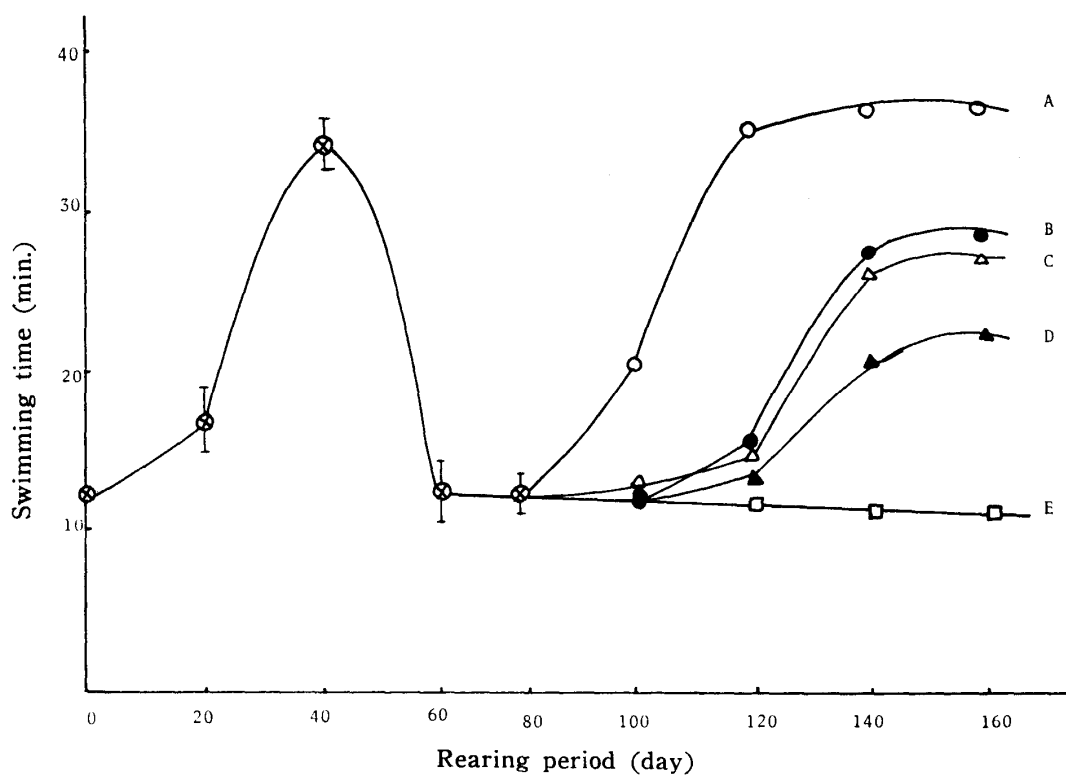


Fig. 6. Effect of various commercial teas on the motility of hypertensive mice. A: Refined green tea, B: Green tea, C: Oulong tea, D: Coarse tea, E: Water (Control)

commercial teas instead of an aqueous solution of 2 % sodium-salt were dosed for mice from 75 days of rearing period, the recovery of motility by hypertensive mice increased in the order water as control, coarse tea, oolong tea, green tea and refined green tea.

In the case of swimming time, the recovery of motility by mice dosed with various commercial teas instead of an aqueous solution of 2 % sodium-salt increased in the order water as control, coarse tea, oolong tea, green tea and refined green tea similar to those of hang-down time. The result is shown in Fig. 6. These result may be explained that the components, i.e. amino acid, caffeine, etc., in each teas were under influence of the motility by hypertensive mice.

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