THE INFLUENCE OF RAIN ON RUNNERS ENERGY METABOLISM IN THE COLD
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(Introduction) Since the marathon runners run over a long time, runners’ performance tends to be influenced by environmental factors. Especially rain may put the runner running in the cold into the more severe condition. However, very few studies have been reported on the influence of rain during exercise. The purpose of this study was to investigate the runner’s energy metabolism in the cold rainy condition.

(Methods) Seven healthy males [age: 23 ± 2 (SD) yr, height: 168.6 ± 7.5 cm, mass: 65.9 ± 8.1 kg, VO2max: 52.0 ± 5.7 ml/kg/min] exercised on a treadmill at 70% VO2max intensity for 30 min in the climatic chamber which can set up temperature, humidity, rain and wind. Each subject performed treadmill running on two conditions; 1) at 5°C of ambient temperature and 50% of relative humidity with 40mm/h of rain during exercise (RAIN); 2) at 5°C and 50% of rh without rain (CONTROL). Subjects exercised in the head wind equal to the running speed. Blood samples were drawn from a superficial vein.

(Results) During exercise, oxygen consumption rate and plasma lactate concentration were significantly higher in RAIN than that in CONTROL (p<0.05). HR and RPE were not significantly different between the two conditions. Total energy expenditure during exercise was significantly higher in RAIN than that in CONTROL (p<0.05). Respiratory exchange ratio was significantly higher in RAIN than in CONTROL at the 5th and 30th min of exercise (p<0.05). Mean skin temperature was significantly lower in RAIN than that in CONTROL at the 5th and 30th min of exercise (p<0.05). Mean esophageal temperature was not significantly different between the two conditions. There was no significant difference in plasma glucose, adrenaline, serum triglyceride, free fatty acid concentrations.

(Discussion) The higher oxygen consumption rate and plasma lactate level in RAIN indicate that rain increases runners energy demand and causes fatigue earlier running in the cold at a moderately high intensity.

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