

系所組別：體育健康與休閒研究所甲組

考試科目：運動生理學

考試日期：0224，節次：2

※ 考生請注意：本試題不可使用計算機

一、名詞解釋 (30%)

1. blood doping

2. heat injuries

3. high-density lipoprotein (HDL)

4. muscle atrophy

5. lactate threshold

二、請舉例說明如何量測 VO_{2max} (15%)

三、請簡要說明以下兩篇科學文獻的內容，並就你的運動生理知識補充說明相關的運動概念或提供其它運動處方與機轉(55%)

1. Electrolyte-carbohydrate beverage prevents water loss in the early stage of high altitude training (引用自 The journal of medical investigation, 2012; 59(1-2):102-110. (30%)

To prevent water loss in the early stage of high altitude training, we focused on the effect of electrolyte-carbohydrate beverage (EC). Subjects were 16 male university students who belonged to a ski club. They had ski training at an altitude of 1,800 m. The water (WT) group drank only water, and the EC group drank only an electrolyte-carbohydrate beverage. They arrived at the training site in the late afternoon. The study started at 7 pm on the day of arrival and continued until noon of the 4(th) day. In the first 12 hours, 1 L of beverages were given. On the second and third days, 2.5 L of beverages were given. All subjects ate the same meals. Each morning while in fasting condition, subjects were weighed and blood was withdrawn for various parameters (hemoglobin, hematocrit, sodium, potassium and aldosterone). Urine was collected at 12 hour intervals for a total 60 hours (5 times). The urine volume, gravity, sodium and potassium concentrations were measured. Peripheral oxygen saturation and heart rate were measured during sleep with a pulse oximeter. Liquid intakes in both groups were similar, hence the electrolytes intake was higher in the EC group than in the WT group. The total urine volume was lower in the EC group than in the WT group, respectively ($p < 0.05$). Plasma volume decreased in the WT group and increased in the EC group but a significant difference was not observed in the final value. Aldosterone concentration tended to be less in the EC group than in the WT group. Electrolyte-carbohydrate beverage in the early stage of high altitude training may be effective in decreasing urinary output and preventing loss of blood plasma volume.

(背面仍有題目,請繼續作答)

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2. Neuropsychological and neurophysiological effects of strengthening exercise for early dementia: a pilot study. (引用自 *Neuropsychology, Development, and Cognition. Section B, Aging, Neuropsychology and Cognition*, 2012; 19(3):380-401. (25%))

Research demonstrates a positive effect of aerobic exercise on cognitive functioning in older adults. Unfortunately, aerobic exercise is often contraindicated for older adults due to cardiovascular and functional limitations. Low-intensity strengthening exercise may offer a practical alternative, but the neuropsychological benefits and potential neurophysiological mechanisms are less well understood. The current study evaluated the effects of a 10-week strengthening exercise intervention on cognitive functioning and EEG in a sample of 13 older adults with early dementia, and 9 normative controls. Results revealed beneficial effects of strengthening exercise on verbal memory coupled with frontal beta and delta power asymmetries and N200 amplitude asymmetry. Results point to increased cognitive efficiency following 10 weeks of strengthening exercise. The findings suggest it is feasible to conduct a strengthening intervention with early dementia patients, and to gather neuropsychological and neurophysiological data to evaluate outcomes. Strengthening exercise may serve as a useful alternative to aerobic exercise.