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Poster 42

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Enhancement of swimming endurance by oral administration of clustered water.

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In the past 6 years, it was observed that one kind of US patented structured water called clustered water (CW) may enhance swimming endurance and performance in US Olympic swimmers. To understand the possible mechanisms of action, the effect of chronic administration of CW on swimming capacity was investigated in mice. Clustered water (CW) was provided by CSI, USA; the control water was distilled water (DW) purchased from Watson Co. Hong Kong, China. HPLC analysis indicated that the purity was not significantly different between CW and DW at 254 nm and 380 nm wavelength. A total of 42 male KM mice (20-22g) were divided into three groups and administered 0.5 ml of DW, 1/3 of dilution of CW (dCW) or CW by gavage daily for 30 days, respectively. Thirty minutes after the last gavage, mice were weighted on the tail (5% of body weight) in a 25oC pool. The total swimming period measured was to exhaustion, as an index of the swimming endurance. The hepatic glycogen (HG) and blood urea nitrogen (BUN) were also measured. The group fed dCW or CW showed significantly greater swimming capacity (min) than the control group DW [DW: 16.26±8.49 vs dCW: 24.01±9.9 ($p<0.0423$), CW: 38.42±29.97 ($p<0.0162$)]. In another experiment, after 30 days administration of dCW, CW and DW, it was found that HG (g/100 g liver) in dCW and CW were significantly increased [DW: 4.13±1.19 vs dCW: 6.52±1.96 ($p<0.002$) and CW: 6.73±1.55 ($p<0.0002$)]. In the third experiment, after 30 days administration of dCW, CW and DW, mice were forced to swim 90 min without attached weight in a 30oC pool. Thirty min after swimming, BUN was measured. The data indicated that BUN (mg/ml) was significantly decreased in dCW and CW group compare with DW group [DW: 0.238±0.044 vs dCW: 0.203±0.026 ($p<0.0270$) and CW: 0.179±0.034 $p<0.0013$)]. The experiment has been repeated and confirmed. CONCLUSION: CW is a new kind of functional water. This study clearly showed that CW significantly enhanced the swimming endurance in a forced swimming model. Enhancement of HG and decrease of BUN by oral administration of CW may partially be the mechanism. Previously we observed that the consumption of CW significantly improved cellular hydration compare with DW in a randomized, multiple centers, double-blind trial (Wang et al. Asia Pac J Clin Nutr. 2004;13:S128.). Improvement of cellular hydration of CW mayplay an important role in the enhancement of endurance capacity.

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