Functional characterization of ATP7B mutant hepatic cell lines after copper exposure

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Wilson disease (WD) is caused by mutations of the ATP7B gene encoding a liver copper (Cu) transporter. The effect of anti-copper treatment for survival of hepatic cells expressing different ATP7B mutations is yet to be determined. The most common WD mutations p.H1069Q, p.R778L and p.C271* and mutations from Western India were studied. Expression of ATP7B, survival of cells, apoptosis and protein trafficking were determined. Low temperature increased ATP7B protein expression in several mutants. Intracellular ATP7B localization was significantly impaired in the mutants. Mutants were classified as high, moderate and no survival based on their viability on exposure to toxic copper. Survival of mutant p.H1069Q and to a lesser extent p.C271* improved by DPA treatment, while mutant p.R778L showed a pronounced response to Zn treatment. Overall, D-penicillamine (DPA) treatment resulted in higher cell survival as compared to Zn treatment; however, only combined Zn+DPA treatment fully restored cell viability. The data indicate that the basic impact of a genotype might be characterized by analysis of mutant hepatic cell lines.

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Physical exercise for overweight/obese adolescents: Impact on metabolic and anthropometric variables

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Introduction: Obesity is acquiring epidemic proportions. Among many organic complications found in obese adolescents, metabolic syndrome is a major problem. Physical exercises seem to help to improve the condition. This study was developed to evaluate a 12 week aerobic exercise program effects on metabolic and anthropometric variables in overweight and obese adolescents.

Methods: It was a longitudinal clinical trial comparing 2 groups of overweight or obese adolescents. The control group (CG, n=17, 6 boys, 11 girls; 13.29±2.22 years of age) participated in biweekly meetings with an interdisciplinary educational group for a period of 12 weeks. The test group (TG, n=15; 7 boys, 8 girls; 12.73±2.37 years of age) participated not only in these biweekly meetings but also in a supervised program of aerobic exercise (moderate intensity, 12 weeks, 60 min. sessions 3x/week). Anthropometric variables, blood pressure, total cholesterol (TC) and fractions were obtained before and after the 12 weeks intervention period and analyzed for the comparison of means using the Student's t-test.

Results: The CG displayed an increase in weight, height, BMI, waist circumference, triglycerides, TC and VLDL (p<0.05). The TG displayed a reduction in BMI, in waist circumference and SBP and an increase in height and in TC (p<0.05). The difference between the two groups was significant for weight, height, BMI, waist circumference and systolic blood pressure (p<0.05).

Discussion: A 12 weeks program of aerobic exercises has positive effects on the metabolic and anthropometric variables related to metabolic syndrome in overweight or obese adolescents.

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