termined by real-time PCR. Also, duodenum and jejunum was ligated and water-soluble heme or hemin iron was administered to measure the uptake of iron into mucosal cells and portal vein blood.

Results: Levels of expression of HO-1 and Fpn1 mRNA were high in the duodenum, and these were upregulated in iron-deficient rats. In the duodenum, iron uptake was about 30% after loading with water-soluble heme iron, but hemin was not absorbed. Levels of expression of Hcp1 and Flvcr1 mRNAs were high in the jejunum, and iron uptake was also high after loading with hemin in this section. Hcp1 and Flvcr1 mRNAs were not upregulated by iron deficiency.

Conclusions: In the duodenum and jejunum of the small intestine, different iron absorption mechanisms for water-soluble heme iron and hemin are considered to exist.

Keywords: heme iron absorption, HCP1, Flvcr, iron deficiency, hemin

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PLASMA FREE FATTY ACID CONCENTRATIONS IN SCHOOLCHILDREN WITH AND WITHOUT ABDOMINAL OBESITY

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Background and objectives: In adults with abdominal obesity (AO), increased concentration of free fatty acids (FFAs) is associated with cardiometabolic risk factors. However, this association remains controversial in children. This study aimed to compare plasma FFAs concentration in children with and without AO, and to examine FFAs associations with cardiometabolic risk factors.

Methods: Twenty-nine children with AO were matched, one by one, according to sex and age, with 29 non-obese peers. Abdominal obesity was classified using the ninety percentile from the IDEFICS-Study (Identification and prevention of Dietary- and lifestyle-induced health EFfects In Children and infantS). Fasting plasma glucose, insulin, and lipids were determined by colorimetric and enzymatic methods. Plasma FFAs were analyzed by gas chromatography.

Results: Seventeen boys and twelve girls with similar average age (7.1 ± 2.6 vs 7.2 ± 2.7 y; p>0.05) were included in each group. Children with AO showed higher body mass index (BMI) (19.7 vs 15.4 kg/m2; p<0.001), waist circumference (64.9 vs 53.7 cm; p<0.001), systolic blood pressure (98.6 vs 93.5 mmHg; p<0.01) and fasting insulin (70.2 vs 42.4 pmol·L; p<0.05). There were not significant differences in plasma total FFAs concentration between groups. However, children with AO had higher palmitoleic acid (0.94 vs 0.70 wt%; p<0.05) and dihomo-gamma linoleic acid (2.76 vs 2.07 wt%; p<0.05). Palmitoleic and dihomo-gamma linoleic acids correlated (p<0.05) with BMI (r=0,397; r=0,296, respectively) and waist circumference (r=0,380; r=0,276, respectively). Myristic and palmitoleic acids correlated (p<0.05) with high-density lipoprotein cholesterol (r=-0.408; r=-0.572, respectively).

Conclusions: These findings suggest that abdominal obese children have different plasma FFAs concentrations than non-obese peers, and the associations of FFAs with cardiometabolic risk factors are present in childhood.

Keywords: Students, body mass index, cardiometabolic risk factors, palmitoleic acid, dihomo-gamma linoleic acid.

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THE EFFECT OF EXERCISE-TO-REST PERIOD RATIO ON THE RECUPERATION OF STORED FUEL FROM EXERCISE IN EXERCISE TRAINED RATS

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Background and objectives: Replenishment of body's fuel store after exercise is a key process for the next bout of exercise. This study was conducted to examine the effect of exercise-to-rest period ratio and physical training on the recuperation of stored fuel.

Methods: Forty rats weighing 95-105 g were randomly assigned to either non-exercise training (NT) or regular exercise training (T) groups for 5 weeks and were subdivided into two groups: non-exercise(NE), exercise and recuperation group(ER). NE group were sacrificed without exercise and ER group were sacrificed after 1 hour rest from exercising for 0.5(ER2:1), 1(ER1;1), 2(ER1:2) hours.

Results: Liver glycogen level was increased in ER group and was reached to the highest level at ER1:1 ratio while it was not different between NE group and ER group in NT animal. Muscle glycogen level was increased at ER2:1 ratio and returned to the level of NE in NT animal while it was reached to the highest level at ER2:1 ratio and decreased but still higher than those of the level of NE in T animal. Free fatty acid level was reached highest level at ER2:1 ratio and decreased and was lower than those of NE at ER1:1 and ER1:2 ratio in NT animal while it was reached to the highest level at ER2:1 ratio and decreased but was not lower than those of NE at ER1:2 ratio in T animal. Muscle triglyceride level of of ER group was lower than that of NE group regardless of the different exercise-to-rest period ratio in NT animal while it was decreased and lower than that of NE group at ER2:1 and ER1:1 ratio but returned to that of NE in T animal. Muscle protein level was decreased at ER2:1 and started to be increased but was not reached to the level of NE group in NT animal while it was de-