

211

**Project Energize: Continued improvement in time to run 550 m**

Carolyn Cairncross<sup>1,\*</sup>, Victor Obolonkin<sup>1</sup>, Stephanie McLennan<sup>2</sup>, Kasha Latimer<sup>2</sup>, Elaine Rush<sup>1</sup>

<sup>1</sup> Centre for Child Health, AUT, Auckland, New Zealand

<sup>2</sup> Sport Waikato, Hamilton, New Zealand

**Aim:** The prevalence of childhood obesity is increasing in New Zealand. Since 2004, Sport Waikato has delivered Project Energize, a through-school nutrition and physical activity program, to primary schools in the Waikato. Energize is funded by the Waikato District Health Board. We have previously shown that obesity measures of body mass index, waist-to-height ratio and percentage body fat are negatively associated with the time taken to run 550 m, T<sub>550</sub>. The aim was to compare T<sub>550</sub> in 2015 with the 2011 T<sub>550</sub> reference derived from the T<sub>550</sub> from 5076 Waikato children in the 2011 evaluation of Energize.

**Method:** In 2015 in a representative sample of children by age, gender, socioeconomic status and ethnicity ( $n=5784$ ) T<sub>550</sub> was measured following the 2011 protocol. The Z-score for every child in the 2011 and 2015 evaluations were derived and differences in T<sub>550</sub> between 2011 and 2015 determined using ANOVA.

**Results:** In 2015 overall children ran 550 m faster than in 2011. In particular, run times in 2015 for boys were significantly faster than in 2011 (Z-score mean difference  $-0.12$ , 95% CI  $-0.166$ ,  $-0.077$ ) and for ages 7, 8 and 9 years.

**Conclusion:** In a climate of increasing childhood obesity in New Zealand, the decrease in time to run 550 m confirms that Project Energize continues to be effective. This information can be used to inform and evaluate future interventions to tackle obesity in school children.

<https://doi.org/10.1016/j.orcp.2016.10.212>

214

**Rapid altering light cycles promotes increased hepatic glucose uptake and de novo lipogenesis**

Stewart D. Christie<sup>2,1,\*</sup>, Rebecca J. O-Rielly<sup>2,1</sup>, Claudine L. Frisby<sup>2,1</sup>, Nichola Thompson<sup>2</sup>, Amanda J. Page<sup>2,1</sup>, Gary A. Wittert<sup>2,1</sup>

<sup>1</sup> Nutrition and Metabolism, South Australian Health and Medical Research Institute (SAHMRI), Adelaide, SA, Australia

<sup>2</sup> University of Adelaide, Adelaide, South Australia, Australia

**Aims:** Clock genes that are synchronised to the light-dark cycle can influence cellular processes in the liver. We aimed to determine the effect of rapid alterations in the light-dark cycle on energy balance and liver metabolism.

**Methods:** 8wk old male C57BL/6 mice were separated into 4 groups ( $N=40$ /group, 2 groups standard laboratory diet (SLD), 2 groups high-fat diet (HFD)). After 4wk of 12:12h light:dark, the light cycle was rotated twice a week for one group/diet for 8wk. 8 mice from each group were placed in metabolic monitoring cages. At 12wk mice were killed at 3h intervals ( $N=5$ /group/time point) starting at 1800h.

**Results:** SLD mice in a rotating light cycle (SLD-RL) gained more weight than SLD mice in a normal light cycle (SLD-NL). There was no difference in weight gain between HFD-NL and HFD-RL. Blood glucose levels were higher in RL compared to NL mice in both diet groups. RL mice accessed food more during the light phase (LP) compared to NL mice on both diets but not in the dark phase (DP). SLD-RL mice showed a greater meal size only during the LP compared to SLD-NL mice. HFD-RL mice did not show any difference in meal size compared to HFD-NL mice.

SLD-RL mice had decreased energy expenditure compared to SLD-NL mice during the DP. There was no difference in energy expenditure between HFD-NL and HFD-RL mice.

RL mice had increased hepatic triglycerides compared to NL mice on both diets. Hepatic mRNA expression of Glut2, insulin receptor- $\beta$ , glycogen synthase 2, and Acetyl-CoA carboxylase showed circadian variation in SLD-NL and HFD-NL mice, with upregulation and phase shifts in SLD-RL rhythms. Rhythms were ablated in HFD-RL mice.

**Conclusions:** Rapid light cycle rotation causes increased body mass in SLD-RL mice combined with