

## Targeted fat loss through electrical stimulation

Zied Haj Hamida<sup>1</sup>, Roland Savard<sup>1</sup>, Alain S. Comtois<sup>2</sup>, Jean P. Boucher, FACSM<sup>2</sup>. <sup>1</sup>*Sciences Biologiques, UQAM, Montreal, PQ, Canada.* <sup>2</sup>*Kinanthropologie, UQAM, Montreal, PQ, Canada.*

American College of Sports Medicine annual meeting, Indianapolis, 2008.

Human white adipocytes were shown to contain Kv, voltage dependant, channels in high density. No relationship as been made between, Kv channels, membrane potentials and fat cell lipolysis. Our previous results demonstrated that both monopolar (4 mA) and bipolar (4 and 6 mA) electrical stimulations significantly activated in vitro lipolysis. These results justified testing the effect of a 6 mA bipolar electrical stimulation on the reduction of the subcutaneous fat layer at the abdominal and thigh levels.

Two groups of women participated in this study: a stimulation group (SG, n=9) and a training group (TG, n=13). Both the SG and TG groups took part in the same aerobic training program: 3 times per week for 12 weeks. The training consisted of 30 min of treadmill walking at an intensity of 55 to 65% of their VO<sub>2</sub>max, preceded by a 5 min warm-up period and 5 min of cooling down. For the SG group, the participants were also electrically stimulated at the abdomen (level of the umbilicus) and the thigh (anterior aspect) on the right side only, the left side being used as a control. The electrical current was defined as follows: 6 mA bipolar pulses at 1 Hz (500 ms on – 500 ms off). Before the training began (T1), after 6 weeks (T2) and at the end of the training period (T3) all participants were tested for the following variables: body weight, percent body fat (3 skin folds equation and bio-impedance), thickness of the subcutaneous fat layer at the abdomen and the thigh on both sides using ultrasound. A mixed model factorial analysis of variance using the independent groups and the repeated tests was used to reveal statistical significant differences.

All women demonstrated a significant weight loss ( $p < 0.001$ ) and decrease in percent body fat ( $p < 0.001$ ). The thickness of the fat layer at the abdomen at the stimulation site decreased 9.7% more then the control. At the thigh, the specific decrease in the fat layer reached 19.3% more for the stimulation group.

Our results demonstrated that targeted fat loss can be achieved through specific electrical stimulation. These results are explained by the significant levels of lipolysis that are induced by the type of stimulation we developed.