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The effects of transcranial direct current stimulation on food craving

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Transcranial direct current stimulation (tDCS) is a noninvasive intervention to modulate cortical activity. The dorsolateral prefrontal cortex (DLPFC) plays an important role in the regulation of food intake. We previously showed that repeated tDCS of the DLPFC reduces caloric intake and body weight gain independent of electrode polarity in animal studies.

In the present experiment we aimed to reduce food craving and appetite with a single session of tDCS in obese rats. The rats with sham or active tDCS were exposed to free excess to high fat diet and fructose solution to drink. Food and fluid intake were measured before and after a single 20 minute application of anodal tDCS of the right prefrontal cortex, or cathodal tDCS of the left prefrontal cortex, or sham stimulation.

Anodal but not cathodal tDCS reduced appetite for fructose. Conversely, cathodal but not anodal tDCS decreased craving for high fat diet. Caloric intake in both stimulated groups was similar, however reduced when compare with sham tDCS.

We can conclude that even a single session of tDCS is effective in reducing appetite and food craving. Electrode polarity seems to be the main determinant of the effects of a single tDCS application on food craving as anodal tDCS decreased appetite for sweets while cathodal tDCS inhibited fat consumption. Further investigations are needed to explain mechanisms responsible for these effects.

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Biography

Agata Ziomber has completed her PhD at the age of 30 years from Jagiellonian University and postdoctoral studies from Jagiellonian University Medical College. She is an assistant professor of Department of Pathophysiology in Jagiellonian University Medical College and a medical doctor endocrinologist. She has published articles concerning appetite regulation, obesity, hypertension and overactive bladder. In her research she is focusing on neuromodulation as a method to modulate appetite and change body weight. At the present she is a leader of a project regarding transcranial brain stimulation and energy metabolism.

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