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## Mechanical sensitivity in response to probiotics in behaving obese mice

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**Background and Aims:** Pain thresholds or responsiveness to painful stimuli has been demonstrated to be affected by body conditions such as obesity. Generally, a lower pain threshold has been demonstrated in obesity both in animals and humans. Among the endogenous factors influencing the obesity, intestinal microbiota has also been suggested to influence the pain sensitivity. However, the effect of oral probiotics on pain has not been studied systematically. This study examined the effect of oral probiotic (*Lactobacillus Rhamnusius*) on mechanical sensitivity in behaving diet-induced obese (DIO) mice.

**Methods:** Six-week old male C57BL/6NTac mice were fed with a high fat diet (week 1-4) to produce DIO mice. The DIO mice were then randomly assigned to 2 groups treated with a single daily dose ( $1 \times 10^9$  CFU) of *L. Rhamnusius* (test group) or physiological saline (control group) for 4 weeks (weeks 5-8). Sensitivity to mechanical stimulation (hind-paw withdrawal), was assessed by the electronic Von Frey every two weeks throughout the study period.

**Results:** The DIO mice in the test group did not significantly gain weight after the start of probiotic administration while the control group maintained the weight rising trend leading to a significant weight difference on week 5 which remained up to week 6. The test group showed a trend of lower pain sensitivity (i.e. higher pain threshold) to mechanical stimulation compared to the control group after two weeks of receiving the probiotic treatment ( $12.96 \pm 0.822$  g and  $9.57 \pm 0.822$  g, respectively,  $P > 0.05$ ). After 4 weeks of probiotic administration, a significant difference was observed between the two groups ( $16.05 \pm 0.88$  g in test group and  $7.97 \pm 0.88$  g in control group;  $P < 0.01$ ).

**Conclusions:** The results of this study demonstrated lower mechanical pain sensitivity in probiotic-treated obese mice. The protective effect of probiotics on nociception circuits could be associated with the weight reduction or anti-inflammatory properties of the probiotics. Translation of this result in humans can potentially suggest a novel therapeutic strategy in pain management of obese individuals.

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