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(Article begins on next page)

## MEASUREMENT OF PLASMA CYTOKINES IN A RAT IN VIVO MODEL TO EVALUATE HONEY-BASED MEMBRANE EFFECTS IN ABDOMINAL SURGERY

*Cristina Vercelli (1), Gessica Giusto (1), Rosangela Odore (1), Giulia Gardini (1), Andrea Audisio (2), Marco Gandini (1)*

(1) Department of Veterinary Science of Turin, Italy. (2) Veterinary practitioner.

Peritoneal adhesion following abdominal surgery is a major concern for human and veterinary patients. This could be considered an exceeding effect on healing process leading to attaching of adjacent organs with complications like bowel obstruction, infertility for female, pelvic pain, anastomotic leakage and mortality [1]. Interleukin (IL) -1beta and IL-6 [2] are involved in acute-phase response and their levels have been monitored in peritoneal fluid to predict intrabdominal after surgical procedures [3]. Several strategies are nowadays under investigation to prevent adhesions, and one of them is the use of honey-based membranes to be applied directly at surgical sites [4]. The aim of the present study was to evaluate the plasma levels of the mentioned cytokines in Sprague Dawley rats undergoing laparotomy, after a cecal abrasion induced scraping the surface of caecum. The study was ethically approved, according to Italian and European laws. At the moment of the surgery, rats were randomly divided into two groups: controls (N=22) and treated (N=29) with the honey-based membranes. Blood was collected from the caudal vein using K-EDTA tubes, prior the procedure and after 6, 24, 72 hours, 7 and 14 days. Aliquots of plasma were evaluated with ELISA commercial kits and data were analyzed using Graph pad (Prism) software, using Kruskal Wallis and Dunn's post-test ( $p < 0.05$ ). Controls showed stable levels of IL-6 till 14 days after surgery, when a significant decrease was highlighted. Treated rats demonstrated a decreasing of IL-6 levels from the day of the surgery till day 14. The comparison between the two groups did not show any significant difference, except at day 14. The measurement of IL-1 beta in control groups shown constant levels till day 14, when a significant increase was highlighted. Treated group had stable levels, without any significant difference. The comparison between the groups was similar to that of IL-6. The absence of significant differences between the two groups could be due to the high individual variability. As it has been demonstrated that interleukin levels increase after laparotomy, the data suggest that the honey-based membranes have a moderate anti-inflammatory activity and it is possible to appreciate a trend of decreasing levels of interleukins in treated group. At the end of the observation period, rats were euthanized and samples of adhesions, where present, were submitted to histology. Correlation between interleukin plasma levels and histological score of adhesion are under investigation.

[1]Bae et al. Evaluation of the potential anti-adhesion effect of the PVA/gelatin membrane, *Journal of Biomedical Materials Research Part B*. 102:840-9, 2014. [2]Yamamoto et al. Peritoneal cytokines as early markers of peritonitis following surgery for colorectal carcinoma: a prospective study, *Cytokine*. 53:239-42, 2011. [3]Rijcken et al. Growth factor and gastrointestinal anastomotic healing, *Journal of Surgical Research*. 187:202-10, 2014. [4]Giusto et al. A pectin-honey hydrogel prevents postoperative intraperitoneal adhesions in a rat model. *BMC Veterinary Research*. 13:55, 2017.