Pain is defined by the I.A.S.P (International Association for Study of Pain) as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Today, most of the “pain reaction” measured in the animal is based on the analysis of threshold values to produce motor reflexes after noxious or non-noxious stimuli. If useful, these tests require animal handling, produce a variable degree of stress and do not allow to obtain information on spontaneous pain expression [1].

To avoid or limit stress in animal, we have used radiotelemetry to measure some key physiological parameters in freely-moving animals recovering from surgery [2]. Transmitters used in the present study (volume: 7cc; weight: 3g) allowed to record changes in the heart rate, respiratory frequency, abdominal temperature and locomotor activity in real time and for the whole duration of the experiments. A surgery is required to implant this type of miniaturized electronic biocaptors in the peritoneal space of the animal and surgery is required to implant this type of miniaturized electronic biocaptors in the peritoneal space of the animal and implantation. Interestingly, only hyperthermia persisted 7-10 days and was unaffected by the ropivacaine treatment, letting us thinking than that is induced by scaring process, and do not reflect pain. This was not the case if the single infiltration of ropivacaine was performed 3 days after the surgery. Indeed, we observed a transient and short-lasting analgesic effect but we did not see any changes in the locomotor impairment, tachycardia or hyperthermia.

In summary, we have been able to monitor simultaneously the pain hypersensitivity resulting from abdominal surgery and some physiological/autonomic parameters. This study was conducted in freely-moving and non-handled animals which limit possible bias due to stress. We have characterized the time-course of mechanical allodynia and the impairment of locomotor and heart rate values during the recovery period of the surgery. Strongly supporting than control of side-effects is crucial for successful surgery and fast-track rehabilitation [5] we show than modifying slightly the surgery protocol by using subcutaneous ropivacaine injections in a short time window (i.e. before or just before awakening of the animal) appears to prevent the immediate and long-lasting allodynia as well as locomotor impairment and tachycardia. The mechanism involved in this phenomenon is currently under investigation.

References