

Video Article

Erratum: Implantation of Radiotelemetry Transmitters Yielding Data on ECG, Heart Rate, Core Body Temperature and Activity in Free-moving Laboratory Mice

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Abstract

Corrections in the Protocol and Discussion sections have been made to: *Implantation of Radiotelemetry Transmitters Yielding Data on ECG, Heart Rate, Core Body Temperature and Activity in Free-moving Laboratory Mice*

Step 1.2 in the Protocol has been updated from:

1.2 Hair clipping at one day prior to surgery

The day prior to implantation, in order to shave the animals for surgery, mice are anesthetized briefly in a small (8x8x8cm) Perspex chamber using sevoflurane (8%) or isoflurane (5%) in pure oxygen (600 mL/min). After loss of the righting reflex, the mouse is taken out of the chamber and the anterior neck and abdominal hair is clipped with the animal lying in dorsal recumbence; anesthesia is maintained for approximately 5 minutes with a nose mask with sevoflurane 3-4% or isoflurane 1.5-3% in pure oxygen at a flow rate of 600 mL/min. After clipping the hair, the animals are allowed to awaken and are then brought back to their home cage.

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After the last health check or directly prior surgery, in order to shave the animals for surgery, mice are anesthetized briefly in a small (8x8x8cm) Perspex chamber using sevoflurane (8%) or isoflurane (5%) in pure oxygen (600 mL/min). Shaving the animals one day before surgery prevents hair stubbles in the operating field. After loss of the righting reflex, the mouse is taken out of the chamber and the anterior neck and abdominal hair is clipped with the animal lying in dorsal recumbence; anesthesia is maintained for approximately 5 minutes with a nose mask with sevoflurane 3-4% or isoflurane 1.5-3% in pure oxygen at a flow rate of 600 mL/min. After clipping the hair, the animals are allowed to awaken and are then brought back to their home cage.

Step 2.3 in the Protocol has been updated from:

2.3 Surgery

The skin of the anterior neck and abdominal region is disinfected with 70% ethanol. A 1- to 1.5-cm-long incision in the skin is made from the lower thorax along the midline to the abdomen. The negative (white/colourless) lead is tunnelled subcutaneously from the thorax to the neck, where a small incision (≤ 0.5 cm) is made in the longitudinal direction. The skin and underlying tissues are prepared to make space for the fixation of the wire loop of the electrode. The wire loop is fixed between the muscles located to the right of the trachea, using two thin silk sutures (PERMA-Handseide, 6-0, Ethicon, Norderstedt, Germany). The wound in the neck is then closed with absorbable sutures (VICRYL 6-0, Ethicon, Norderstedt, Germany) in layers. The abdominal wall is then opened at the linea alba and the body of the telemetric transmitter is placed into the abdominal cavity of the mouse. The wire loop of the positive (red) electrode is sutured to the xiphoid process with silk sutures in such a way that it lies between the liver and the diaphragm in the left upper abdominal region (Figure 2). Then, the muscle layers of the abdominal region are closed with absorbable sutures (VICRYL 6-0, Ethicon, Norderstedt, Germany). Before finally closing the abdominal wall, a mixture of Sulfadoxin and Trimethoprim [(30 mg/kg and 6 mg/kg, respectively; dissolved in 1 mL of saline (0.9%) and at approximately body temperature (38-39°C)] is injected into the abdominal cavity for the purposes of anti-infective prophylaxis and to support fluid homeostasis. Finally, the skin of the abdominal region is restored with staples (Precise, 3 M Health Care, St. Paul, MN, USA).

to:

2.3 Surgery

The skin of the anterior neck and abdominal region is disinfected for 5 minutes with 70% ethanol, chlorhexidine or iodine using a soaked cotton swab. A 1- to 1.5-cm-long incision in the skin is made from the lower thorax along the midline to the abdomen. The negative (white/colourless) lead is tunnelled subcutaneously from the thorax to the neck, where a small incision (≤ 0.5 cm) is made in the longitudinal direction. The skin and underlying tissues are prepared to make space for the fixation of the wire loop of the electrode. The wire loop is fixed between the muscles located to the right of the trachea, using two thin silk sutures (PERMA-Handseide, 6-0, Ethicon, Norderstedt, Germany). The wound in the neck is then closed with absorbable sutures (VICRYL 6-0, Ethicon, Norderstedt, Germany) in layers. The abdominal wall is then opened at the linea alba and the body of the telemetric transmitter is placed into the abdominal cavity of the mouse. The wire loop of the positive (red) electrode is sutured to the xiphoid process with silk sutures in such a way that it lies between the liver and the diaphragm in the left upper abdominal region (Figure 2). Then, the muscle layers of the abdominal region are closed with absorbable sutures (VICRYL 6-0, Ethicon, Norderstedt, Germany). Before finally

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Step 3 in the Protocol has been updated from:

3. Post-operative care

After completion of surgery and anesthesia, 0.1 mg/kg of buprenorphine (Temgesic, Essex Chemie AG, Lucerne, Switzerland) and 5 mg/kg of meloxicam (Metacam, Boehringer Ingelheim, Basel, Switzerland) is administered subcutaneously for pain treatment, and the animals are left on the warm (39°C \pm 1) surface of the work bench to recover for approximately 2h. Together with pain relief (twice daily: buprenorphine, 0.1 mg/kg and meloxicam 5 mg/kg), supportive therapy consisting of 300 μ L glucose (5%) and 300 μ L saline (0.9%) warmed to body temperature, is applied subcutaneously twice daily for 4 days. For further recovery support, it is worthwhile providing the animals with an additional drinking bottle containing 15% glucose solution. During the recovery period of 4–10 days, it is recommended that the animals are kept warm. Therefore, in our case, the mice are housed in a warming cabinet (30°C \pm 1). Monitoring of general condition and body weight, as well as food and water consumption, is performed once daily according to the general condition and health monitoring data sheet (Table 1) for 10 days post-operatively. Humane endpoints, i.e. the sacrifice of an animal to avoid unnecessary suffering and pain if progression of recovery is unsatisfactory, are realised under the following conditions:

- i. *If in poor general condition, i.e. the animal is substantially apathetic (no movement after being touched/pushed) and its body surface feels cold despite warming, the animal should be euthanatized immediately*
- ii. *If, on day 4 after transmitter implantation, the animal shows clear signs of apathy, is extremely aggressive or does not show any food intake, it should be euthanatized immediately.*
- iii. *On day 8 after transmitter implantation, the animal has to display a clear increase in body weight in comparison to the preceding post-operative days. Moreover, it has to consume at least 80% of the pre-operative daily food intake. If one of these conditions is not met, the animal should be euthanatized immediately.*

At 10 days after implantation, the animal is transferred back to the animal room under standard housing conditions. Mice should be housed in compatible groups to allow social interaction and to prevent the adverse effects of long-term individual housing, which can have substantial impacts on the read-out of subsequent experiments^{8,9}. Mice should have a period of at least 4 weeks convalescence after transmitter implantation before the first experiment is conducted and data acquisition begins.

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The 4th paragraph in the Discussion has been updated from:

Aseptic conditions should be maintained during surgery to keep the microbiological burden and the risk of infections low. However, complete sterility cannot be provided because of some specific, sterility conflicting conditions in mice (e.g., cooling effect of extensive hair clipping and disinfection, impracticality of bandages to protect the wounds). Thus, anti-infective prophylaxis is administered during the implantation. Well tailored analgesic

treatment and a clearly defined monitoring plan as well as adequate post-operative care play a crucial role in the satisfactory outcome of the experiment.

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Disclosures

No conflicts of interest declared.