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## UC Davis - Temperature and activity by Telemetry

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**Protocol status:** Working

**We use this protocol and it's working**

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**Keywords:** Temperature and activity by Telemetry, comprehensive assessment of circadian pattern, circadian pattern, core body temperature in multiple intervention, core body temperature, activity by telemetry summary, genetic mouse model, temperature, telemetry summary, physiol genomic, mouse model, telemeter, activity measure, single mouse

## Abstract

### Summary

Utilizing the TA-F10 (DSI) telemeter we can simultaneously collect temperature and activity measures in a single mouse. This can provide a comprehensive assessment of circadian patterns, activity levels, and core body temperature in multiple interventions (drug, altered fed access, etc.) or genetic mouse models. The following protocol describes the implantation and measurement parameters and intervals.

**Modified from:** Butz et al. *Physiol Genomics*. 2001 Mar 8;5(2):89-97.



## Materials

### MATERIALS

- ✕ Isoflurane
- ✕ sterile cotton swabs
- ✕ 9mm AutoClips (wound clips) **Braintree Scientific Catalog #205016**
- ✕ MikRon 9mm AutoClip Applicator **Braintree Scientific Catalog #ACS APL**
- ✕ silk ligatures **Braintree Scientific**
- ✕ Vannas spring micro-scissors **Fine Science Tools Catalog #15610-08**
- ✕ cannulation forceps **Fine Science Tools Catalog #00608-11**
- ✕ blunt dissecting **Fine Science Tools Catalog #14018-14**
- ✕ veterinary adhesive
- ✕ Buprenex (buprenorphine hydrochloride)
- ✕ Dataquest ART data acquisition system **Data Scientific International**
- ✕ TA-F10 telemeter **Data Scientific International Catalog #TA-F10**

## Troubleshooting

## Safety warnings

### **WARNING**

*All blood components and biological materials should be handled as potentially hazardous. Follow universal precautions established by CDC when handling and disposing of infectious agents.*

- 1 Mice are anesthetized with isoflurane (2.5%) and the flank/back was shaved and disinfected.
- 2 Implantation of transmitter subcutaneously along the right flank.
  - a. Through the same ventral neck incision, a subcutaneous pouch is formed for placement of the transmitter body along the animal's right flank.
  - b. Using a pair of blunt dissecting scissors (Fine Science Tools, catalog no. 14018-14), the skin is gently dissected free from underlying tissue starting at the right neck region and proceeding posteriorly to form a "pocket" along the right flank. It is important that the pocket be made sufficiently large to house the transmitter without unduly stretching the skin, because pressure necrosis could result.
  - c. Using a 1mL syringe with warmed saline, insert tip of syringe into the pocket for lubrication prior to inserting the transmitter.
  - d. The transmitter is slipped under the skin and down into the pocket along the flank as close to the right hindlimb as possible.
  - e. A small drop of veterinary adhesive is placed on the catheter in the right neck region to further secure the device.
  - f. The neck incision is closed using 1 or 2 wound clips and further sealed with tissue adhesive.
  - g. Mice are kept warm on a heating pad and monitored closely until fully recovered from anesthesia.
- 3 Implantation of transmitter on the back. Alternatively, the transmitter body can be installed on the back at the midscapular region.
  - a. The upper back is shaved, and a horizontal incision was made.
  - b. The transmitter is placed in the opening and sutured to both the muscle and the skin (with the suture loop around the probe) via the suture rib on the probe as described.
  - c. A separate ventral neck incision is then made, the catheter is tunneled subcutaneously to the neck, and the catheterization procedure is carried out as described.
  - d. Mice are observed postoperatively as above.
- 4 Buprenex (buprenorphine hydrochloride) 0.1 mg/kg will be administered subcutaneously at the termination of surgery to maintain analgesia.

- 5 Following full recovery from anesthesia, mice are returned to their home cages (placed atop telemetry receivers), where they continued to be monitored daily throughout the study for general condition, body weight, food and water intake, state of surgical wound healing, and any signs of morbidity.
  - a. Radiotelemeters are magnetically activated immediately upon return to the home cage, and temperature and locomotor activity are recorded continuously.
- 6 Radiotelemetry data are collected continuously (sampling every 5 min for 10-s intervals) and stored using the Dataquest ART data acquisition system (Data Sciences International).
  - a. MAP and HR data collected from the first 12 consecutive days following surgery were plotted as mean values over each hour.