

Telemetry ECG (Mouse) 遙測心電圖分析(小鼠)

1. Purpose

1.1 To evaluate the potential side effects of drugs in cardiac function is vital for any new drug development projects, and this requires a suitable *in vivo* assay platform to measure the heart rate (HR) and electrocardiogram (ECG) in conscious freely moving animals. Moreover, telemetric electrocardiogram recording system in mice is so vital to understanding the mechanisms behind the cardiac dysfunction. This powerful system is able to record the changes of electrical activity that arise from heart muscle depolarization over a period of time during each heartbeat. Basically, telemetric ECG requires a special microsurgery of ECG Implantable telemeters and more importantly, it can be performed in conscious mice without the need for restraint or anesthesia. ECG recording includes the heart rate, RR interval, P duration, PR interval, ST interval and QT interval and etc. Nonetheless, ECG telemetry is thus to provide us a valuable tool for detection of critical information on cardiac electrophysiology in ambulatory animal models such as the mouse.

2. Safety Requirements

2.1 General laboratory procedures should be followed, which include: no eating, no chewing gum, no drinking, and no applying of cosmetics in the work area. Laboratory coats and gloves must be worn at all times in the work area, unless the protocol specifically describes the appropriate attire for the procedure.

3. Notes

3.1 After an ECG Implantable telemeters surgery, drug testing is prohibited during this period of time and each animal must be kept in an individual cage for at least 10 days to ensure a full recovery. During the stage of recovery, the health condition of animals will be monitored each day before commencing any drug testing.

3.2 The majority of mouse cardiovascular studies are age/sex/strain-dependent. Therefore, it is important to retain these parameters comparable throughout a single experiment.

3.3 Environmental factors such as room temperature, humidity, ventilation, noise intensity and light intensity must be sustained at levels appropriate for mice in order to avoid the change in of mouse anxiety. It is also vital that the mice should be kept in a uniform environment conditions before and after testing to elude anomalous results being acquired.

4. Quality Control

4.1 To avoid any source of electrical interference that would contribute to the disturbance of any ECG traces, each cage must be enclosed with specially made copper shield before commencing any drug test.

4.2 To avoid any unnecessary mouse anxiety, no one should be allowed in the experimental room throughout the mouse ECG recording.

5. Equipment

5.1 ECG telemetry system uses PhysioTel and PhysioTel HD telemetry platform which consists of hardware such as PhysioTel® Receivers and Matrix 2.0 (MX2).

The former provides a reliable data transmitted via telemetry, while the latter is set to establish a communication between the PhysioTel and PhysioTel HD implants and the acquisition computer.

- 5.2 As for the data acquisition, DSI's Ponemah v5.20 software is used in order to collect, accurately analyze, and quickly summarize study data.
- 5.3 The mouse ECG activity can be detected via a model of TA-F10 DSI's implantable telemetry devices. This small device is designed for monitoring and collecting ECG data from conscious, freely moving mice without the need for restraint or anesthesia.

6. Supplies

- 6.1 Ethanol 70%
- 6.2 Tissues
- 6.3 Isoflurane
- 6.4 Tape
- 6.5 Mask
- 6.6 Gloves
- 6.7 Heat Pad
- 6.8 Absorbent cotton ball
- 6.9 Suture Needle

7. Procedures

- 7.1 Turn on the computer, and start the DSI's Ponemah v5.20 software system.
- 7.2 Place the animal on the PhysioTel® Receivers and enclosed them with copper shield cage.
- 7.3 Click on "START" icon and record the ECG activity throughout the experiment.
- 7.4 Then click "STOP" icon to terminate recording and all data will be automatically saved.
- 7.5 Remove the mouse from the receiver.
- 7.6 Export the ECG data and analyze them on DSI's Ponemah physiology platform version 6.12 software.