Webinar Q&A Responses: Rodent Anesthesia and Surgical Monitoring

Questions and answers from the November 28, 2018 webinar "Rodent Anesthesia and Surgical Monitoring: The Foundation for Great Experiments"

This document includes questions we received and answered during the webinar, as well as those that we did not have time to address.

1. **I do cardiovascular work, will the type of volatile anesthetic I choose influence my results?**

Anesthetic agents can alter several cardiovascular parameters including myocardial contractility, blood pressure, left ventricular systolic and diastolic function. If your experiment is designed to assess hemodynamics, you may wish to consider a different anesthetic agent. Urethane can be combined with alpha-chloralose to preserve autonomic reflexes, however this is not suitable for survival procedures. It is best to discuss anesthetic options with a veterinarian to ensure animal well-being and accurate data.

2. **How important is it to maintain constant physiological temperature?**

In addition to providing the animal with heat, it is important to ensure a constant physiological temperature. Several cardiovascular parameters are altered to compensate for changes in core temperature and may affect data collection. For example, changes in heart rate and blood pressure will influence cardiac output. Further, blood viscosity changes with temperature and can influence pressure-volume loop measurements. Fluctuations in temperature can also influence drug metabolism (including anesthetic agents).

3. **If I want active gas scavenging, do I have to purchase a new anesthesia system?**

Scintica Instrumentation offers an active anesthetic gas scavenging unit that can be configured with existing anesthesia systems. The scavenging unit can be connected to the induction box and nose cone with a 3-way valve and tubing and will actively remove waste gas from the system to a charcoal filter.

4. **What surgical monitoring system was shown during the presentation? What are the features of the system?**

The screenshots were taken from an Indus Rodent Surgical Monitor (the RSM+ available from Scintica Instrumentation). The system consists of a heated surgical platform that wirelessly connects to a display tablet. It enables non-invasive ECG, heart rate, respiration and core temperature monitoring. It may also be configured with optional pulse oximetry and vascular/ventricular pressure catheter modules. The RSM+ allows the user to set alarms indicating when a parameter has exceeded a set range. Data can be stored on the tablet and exported to a computer with the USB connection. Alternatively, the system can be connected to an existing data acquisition system with a BNC connection to enable live data (analog) output and analysis.

5. **What is the best way to provide heats (to rodents) during a surgery?**

There are several options, however some have significant drawbacks. Simple solutions include microwavable pads and electric heating pads available at any pharmacy. These provide a quick and affordable solution, but also lack control. In addition to the risk of overheating the animal, microwave options cool throughout the procedure and will not maintain a stable temperature. Some facilities use a circulating water bath to maintain pad temperature. These systems offer greater control than microwave packs or electric heating pads, however they can be cumbersome and may take additional time to reach the desired temperature. The ideal solution is a monitoring device with a thermostated heating platform, such as the Rodent Surgical Monitor+ (RSM+). This system enables the user to set a desired platform temperature, and the system will maintain this temperature throughout the entire procedure.

6. **What signs do I need to monitor during recovery?**

Rodents display many different signs of pain and distress. It is best to speak with a veterinarian prior to initiating a procedure to ensure staff members are aware of what to look for during recovery. Some of these signs may include: altered gait, hunched posture, reduced appetite and weight loss. It is essential to ensure staff are available to check on animals regularly after a procedure to document any abnormal appearance or behavior and intervene accordingly.

7. **How do I know what concentration of isoflurane to use?**

This will depend on the size and species of animal you are working with. Isoflurane is generally delivered at 5% during the induction phase and reduced to 1-3% for anesthesia maintenance. It is best to speak with your veterinarian prior to initiating procedures to obtain an appropriate protocol.

8. **How can I keep records with a monitoring device?**

When working with the Rodent Surgical Monitor+ (RSM+) the user is able to define the file using experiment title, animal ID, etc. The procedure may be recorded on the tablet (along with screenshots if desired) and exported to a computer with a USB connection.

9. **Is there a maximum limit for temperature settings on the device you featured? How can you make sure the animal is not overheated?**

Please also see question #5. The Rodent Surgical Monitor+ (RSM+) platform has a maximum temperature of 43.5°C.

10. **Using the device you showed in the presentation, is there a way to save the data for analysis?**

Data can be saved on the Rodent Surgical Monitor+ (RSM+) tablet and exported as a .CSV file for later analysis. You can also connect the system to an existing data acquisition system with a BNC connection for live data (analog) output and analysis.

11. **Is there any legislation or are there any institutional guidelines surrounding operator safety when using volatile anesthetics?**

There is no current legislation, and it is only recommended that operators are not exposed to greater than 2ppm over 1 hour. Individual institutions may have their own guidelines and regulations in place, so it is best to confirm prior to initiating any work with volatile anesthetics. While there are no formal guidelines, the effects of short term exposure can be minimized with simple solutions such as incorporating an active gas scavenging system and using a key fill for your vaporizer.