

## Surgical Note

### Minimizing Postoperative Complications in Mice

#### Intraperitoneal (IP) Device Placement

Intraperitoneal rather than subcutaneous device placement can reduce post-operative complications in mice. **Note: for IP placement, mice must be 25 grams or greater in size.** The complications that may arise with this device placement are typically easier to manage and are not as detrimental to the animal.

#### Complications and Treatment:

- Mild to Moderate Paraphimosis (male mice)
  - Moisten with warm sterile saline
  - Replace penis within prepuce
  - Liberally apply Artificial Tear Ointment (Covetrus) to the prepuce
  
- Proteinaceous Penis Plugs (male mice)
  - Most likely to occur in first 3 days of post-operative period, but may occur up to 7 days post-op
  - Palpate the prepuce to check for presence of proteinaceous penis plugs as they are sometimes contained within the prepuce
    - Moisten the prepuce with warm sterile saline to loosen the plug
    - Gently pull on the plug to remove it from the penis
  - Note if the animal's body or extremities feel cool to the touch
    - Proteinaceous plugs can cause a decrease in activity due to discomfort
      - If cool, place animal's home cage half on a heating pad set to low to aid in animal's self-regulation of temperature.
  - Check hydration by tenting the skin
    - If dehydrated, administer 3cc warm sterile saline SQ for hydration

\*Monitor for and address these issues daily.

## Subcutaneous (SQ) Device Placement

Subcutaneous device placement can allow for the implantation of mice smaller than 25g but can result in more serious post-operative complications.

### Reducing Complications Resulting from Subcutaneous Device Placement:

- During surgical preparation:
  - Clip the fur over the right flank where the device will be after implantation
    - Take care not to nick the skin when clipping
    - This allows for the skin condition to be more easily monitored post-operatively
  - Prophylactically apply 1% Silver Sulfadiazine Cream (SSD) to the clipped area of skin on the animal's flank
    - This allows time for the cream to soak into the skin during surgery prior to the animal waking up from anesthesia
- During Surgery:
  - When making the subcutaneous pocket for device placement:
    - Always place the device on the animal's right side
    - Use a Crile hemostat rather than Lexar baby scissors to make the pocket
      - <https://www.finescience.com/en-US/Products/Forceps-Hemostats/Hemostats/Crile-Hemostats> (see picture below)
    - Have the handle rings parallel to the table when starting the pocket so that there is enough space cleared for the device to make it past the forelimb
      - Stay superficial so as not to puncture the jugular during this process
    - Once the pocket has been made to pass the forelimb, change the orientation of the Crile hemostats so that the handle rings are perpendicular to the table
      - This will help keep the pocket on the flank of the animal and not on the ventral surface
    - Make the pocket very large to reduce pressure placed on the skin from the device – a good representation of size approximation is to create a pocket and ensure that a 3cc syringe can slide in comfortably



**Complications and Treatment:**

- Dryness, thinning, redness, and/or irritation to the skin over the device pocket
  - Liberally apply 1% Silver Sulfadiazine Cream (SSD) to the irritated skin
  - Continue to observe carefully for changes and re-apply SSD daily until issue is resolved
  
- Adherence of device to skin over the device pocket – will likely accompany one or multiple of the previously mentioned symptoms
  - Anesthetize the animal if necessary
  - Place gauze soaked in warm sterile saline over adhered area to moisten and loosen skin
    - Full moistening may take several minutes; the skin should appear hydrated and fuller
  - Gently massage the area until skin is free from device
  - Carefully inspect for any openings in the skin
  - Liberally apply 1% Silver Sulfadiazine Cream (SSD) to the irritated skin
  
- If the skin opens while freeing the device while the animal is anesthetized, you can repair the opening
  - Clean area with a combination of saline and chlorhexidine scrub
  - Thoroughly lavage the opening in the skin
  - Remove any thin or necrosed tissue

- Place 2 to 3 sutures in a horizontal mattress pattern or another tension-relieving suture pattern to close the skin
  - Male mice typically tolerate this well
  - In our experience, female mice tend to be more likely to remove sutures which necessitates euthanasia
    - Consider placing intradermal sutures in female mice
  - Apply a thin line of a flexible tissue adhesive, such as Gluture, along the wound closure

If skin was found open in the animal's cage, euthanasia is recommended due to high risk of infection.

\*Monitor for and address these issues daily.