rev. 3.01e

Technical Note
Micro SMP-200

Recommendations for Subcutaneous Administration

INTRODUCTION

iPRECIO® is a completely implantable, programmable micro-infusion pump system for experimentation in small laboratory animals. The pump has a built-in microprocessor which can be programmed to administer small volumes, in vivo, for extended durations. Additionally, the pump houses a septum designed for percutaneous access, through which filling and exchange of solutions is made possible. The iPRECIO® system's highly precise, in vivo capabilities uses a patented, high accuracy, mechanical pump technology, the "Rotary Finger Method", which was developed by Primetech.

Subcutaneous (SC) infusion is one of the easiest and most common infusion sites. While there is no limitation for SC infusion, the site should be beyond the reach of the animal's limb and mouth. Therefore, this technical note will only describe S.C. infusion at dorsal side. The choice of drug administration site will be dependent on:

- Compound absorption and clearance
- Compatibility of drug uptake with expected effect
- Suitability of the site for the duration of the infusion and the animal's motor activities.

Other important considerations include animal species and size. For S.C. infusion, the same the considerations apply. In addition, it is important that the infusion site is not too close to the pocket for the implantation of the iPRECIO® pump. Otherwise, it is possible that a "solution pool" is formed in the implantation pocket which will cause additional complications.

WARNING：iPRECIO® Micro – Infusion Pump is not intended for human use.

REQUIREMENTS

Perioperative Care

- Antibiotics and the treatments
- Anesthetic agents and the techniques
- Heating Pad
- Surgical glove, mask, cap and gown
- 70% Isopropyl Alcohol
- Disinfectant Soap
- Sterile saline
- Hair remover

Pocket and Tunnel Making

- Surgical scissors and forceps
- Sterile scalpel blade with handle
- Trocar Sleeve Kit

Subcutaneous Pump and Tube Fixation

- 5-0 non-absorbable suture with curved needle

Wound Closing

- Wound clips and wound clip applier
- 3M™ Vetbond™ Tissue Adhesive (supplied by 3M)

METHODS

1. Perioperative Care

Careful attention to sterile techniques and the use of sterile equipment are crucial to successful surgery. Additionally, antibiotics are most effective to administer pre- and post-surgery in order to maximize blood levels during surgery and recovery. Primetech recommends the use of a heating pad to prevent decreased body temperature in the peri- and post-operative animal.

2. Anesthetize the Animal

Anesthesia must be used to ensure a reliable experimental result. General anesthesia should be maintained for around 20 – 30 minutes. Primetech recommends using an anesthetic method that supports prompt post-operative recovery.

3. Site Selection

While there are no limits for S.C. infusion sites within the reach of catheter tip from the iPRECIO® pump pocket, only 3 sites will be described in detail with advantages and disadvantages.

On the neck

Benefits:

- Single incision at one location.
- The tube can be placed without the use of a trocar sleeve kit.
- Less affected by animal size and body motion.

Considerations:

- Infused solution might delay healing of incision when the tube placement too closes to the pocket.

Right superior and inferior limb regions and Left superior limb region

Benefits:

- Separate healing of incision for iPRECIO® pump pocket and infusion site.

Considerations:

- Incision at two locations
- The tube must be tunneled subcutaneously with a trocar sleeve kit.
- Affected by animal size and body motion.

Left inferior limb region

Benefits:

- Separate healing of incision for pocket and infusion site.

Considerations:

- Incision at two locations
- The tube must be tunneled subcutaneously with a trocar sleeve kit.
- Opposite pocket making.
- Affected by animal size and body motion.

4. **Pocket Making ⋯**See Fig.1
    1. Position the animal in sternal recumbency on the heating pad.
    2. Remove the hair from incision site and scrub with disinfectant soap and isopropyl alcohol. A series of three scrubs with both the disinfectant soap and alcohol is recommended.
    3. Using a scalpel blade, make a 4cm midline incision through the skin on the thoracic vertebrae.
    4. Using blunt dissection, create a pouch under the skin from the point of the incision to the caudal area by separating the skin from the underlying tissue with scissors.

    The pocket should be the appropriate size (not too large and not too small) for pump fixation, low-stress implantation for a successful long-term infusion.

5. **Tunnel Making ⋯**See Fig.1
    1. Position the animal in appropriate position on the heating pad.
    2. Remove the hair from incision site and scrub with disinfectant soap and isopropyl alcohol. A series of three scrubs with both the disinfectant soap and alcohol is recommended.
    3. Using a scalpel blade, make a 2cm midline incision through the skin on the S.C. infusion site.
    4. Gently separate the skin from the muscle by blunt dissection with a scissors. Using the metal trocar sleeve kit, tunnel subcutaneously from the dorsal pocket to the S.C. infusion site.

6. **Tube Fixation ⋯**See Fig.2
    1. Place the tube on the muscle.
    2. Gently suture the tube to the muscle.

7. **Pump Fixation ⋯**See Fig.3
    1. Place in the pump into the pocket.
    2. Suture the pump through the muscle layer.

    Over tightening of the sutures may induce tissue necrosis and laceration due to compression.

8. **Wound Closing**
    1. Close all skin incisions using would clips or 5-0 absorbable or non-absorbable suture.
    2. Use one drop of Vetbond™ in between wound clips, and press edges of skin together to seal wound.

    Proper pocket closing will help in wound healing and help to prevent infection.

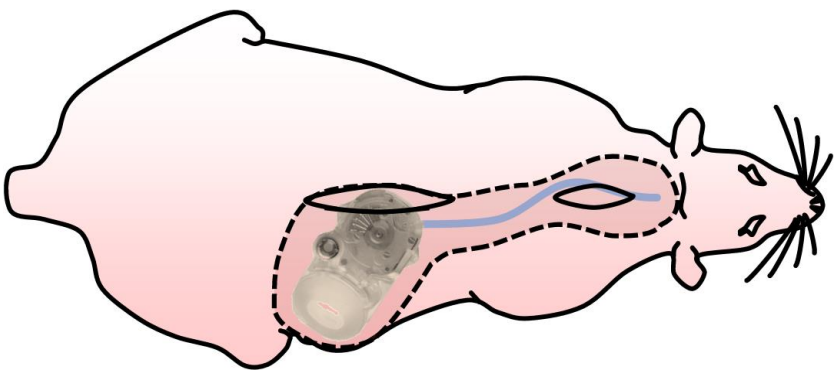

Fig. 1 Pocket and Tunnel for subcutaneous infusion on the neck

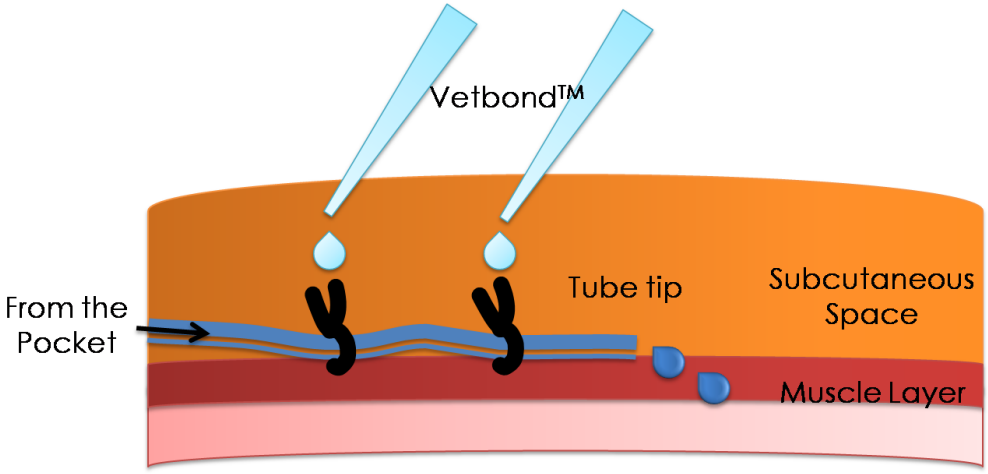

Fig. 2 Tube Fixation

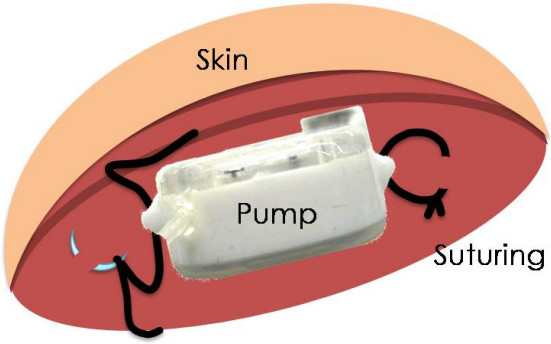

Fig. 3 Subcutaneous Pump Fixation: View from the back of the pump with septum port on right handside.

REFERENCES

Rat Jugular Vein and Carotid Artery Catheterization for Acute Survival Studies, A Practical Guide. Angela Heiser, Foreword by John H. K. Liu. Springer