

Surgery Model #: PVC-R Portal Vein Catheterization Care and Use Document for Rats

Anesthesia: Isoflurane to effect

Analgesic: Buprenorphine (SQ): Rat Dose 0.05 mg/kg

Basic Surgical Procedure Description:

An anesthetized animal is surgically prepared and draped. A 2.5-cm ventral midline skin and abdominal muscle wall incision is made with a cranial terminus near the xiphoid process. The cecum is exteriorized and abdominal organs are covered and moistened with sterile gauze and saline. Using a dissecting scope, the ileocolic vein is observed and isolated with silk ligatures. A small incision is made in the portal vein and the catheter is inserted to the vicinity of the junction with the lineal vein. Catheter patency is determined at this time and once patency is established, the catheter is flushed with 200µL saline and filled with lock solution. The catheter is exteriorized through a hole in the abdominal wall to a point between the shoulder blades. Abdominal musculature is closed with absorbable suture, while the abdominal skin incision and sub scapular exteriorization site is closed with stainless steel wound clips. The port protrudes through the center of the clip and the port's anchoring bead should remain under the skin.

Catheters:

Portal vein catheter consists of a length of sterile silicone rubber with a 25mm PE 50 access port and 30-35mm polyurethane tippet. Fill volume of the catheter is 60µl. 23 gauge; blunted needles are required to access the port. The catheter may also be made of polyurethane upon customer request.

Lock Solution:

Heparinized Glycerol (500 IU/ml): 10.0 mL stock heparin (1000 IU/mL) + 10.0 mL 99% Glycerol solution (Sigma).

Quality Control:

Patency is verified by the ability to withdraw a blood sample within 24 hours of shipment and is guaranteed upon animal receipt. To maintain animals over longer periods of time, catheters need to be flushed twice a week (once every 3-4 days). Flush catheters by following the sampling procedure below, minus the withdrawal of the whole blood sample.

Sampling:

Blood sample size can vary, but recommendations are in the range of 100-200µl. Sample size and frequency should be minimized to essential time points to maintain the health of the animal. For blood withdrawal, gather the following materials: Syringe assemblies (1cc syringe attached to a 23G blunted needle), sterile saline and sterile fill solution.

1.) Place animal in a restrainer (small open topped boxes the size of a pipette container work well)

Important: Always clamp the port with rubberized or smooth hemostats to prevent unintended blood flow and port damage when changing syringes and flushing the catheter

2.) Clamp port and remove the pin from the catheter and set aside

3.) Insert an empty syringe assembly (SA) into the port and release hemostats

4.) Gently withdraw fill solution and blood; clamp port

5.) Attach a second SA, release clamps and withdraw sample (syringe may contain anticoagulant); clamp port

6.) Release hemostats and slowly flush catheter with sterile saline ~200µl (or greater to match blood withdrawal); clamp port

7.) Add 60µl of sterile lock solution, clamp port and replace pin

If blood fails to flow in step 4, remove the empty SA and replace with a SA containing sterile saline and gently flush the catheter. Continue as outlined above.

Housing:

Individually house animals to prevent cage mates from chewing on one another's catheters.

Staple Removal:

Staples should be removed 7-10 days post-operatively; do not remove staple around the catheter port.

Notes: 1. During animal manipulation (dosing / weighing), it is important not to place undue stress on the catheter. **2.** Using needles larger than 23 gauge will stretch the port and make sampling difficult. Additionally, sampling by means of needles with bevels or rough edges will damage the port, again making sampling difficult.