

Surgery Model #: FVC-R

Femoral Vein Catheterization (FVC) Care and Use Document for the Rat

Anesthetic: Isoflurane to effect

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

Basic Surgical Procedure Description:

An anesthetized and surgically prepared animal is positioned under a dissecting scope in dorsal recumbency. A 2cm ventral skin incision is made along the crease formed by the abdomen and thigh. Blunt dissection of the adductor muscles is used to visualize the femoral vein. Five to ten millimeters of vessel is mobilized and a sterile FVC is inserted into the vessel and secured in place with suture. Catheter patency is assessed at this time and once patency is established, the catheter is flushed with 200 µL saline and filled with lock solution. A 0.5cm dorsal, midline skin incision is made between the scapulae. The FVC port is tunneled back through the scapular incision. Skin incisions are closed and the catheter port is secured with a stainless steel wound clip. The port protrudes through the center of the clip and the port's anchoring bead should remain under the skin.

Catheter:

Catheter material consists of a single length of sterile polyurethane tubing with a 40 mm intra-vascular tip and 25 mm access port. The access port is sealed with a sterile stainless steel pin. 22 gauge blunted needles are required to enter the port. Fill volume of the catheter is 60ul.

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). Catheters can be flushed by following the sampling procedure below, minus the withdrawal of the whole blood sample.

Dosing/Sampling:

FVC's are utilized primarily for *sterile* test article administration. Administration is achieved by bolus dosing or constant infusion. Rates of infusion should not exceed 1ml per minute. To a lesser extent, femoral vein catheters can be utilized for obtaining blood samples. 200-300 gram rats can tolerate 1000 to 1500µl of total blood withdrawal in a 24 hour period. Sample size and frequency should be minimized to essential time points to maintain the health of the animal.

For test article administration or blood withdraw, gather the following materials: Syringe assemblies (1cc syringe attached to a 22G 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 (70µl); clamp port
- 5.) Attach a second SA, release hemostats and withdraw sample or administer test article (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 65µl 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 the staple around the port.

Notes: 1. During animal manipulations (dosing / weighing), it is important not to place undue stress on the catheter. **2.** Using needles larger than 22 gauge will stretch the port and make sampling difficult. Additionally, sampling by way of needles with bevels or rough edges will damage the port, again making sampling difficult.