

Surgery Model #: CAC-R

Carotid Artery Catheterization (CAC) 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 cervical skin incision is made left of the midline with its caudal terminus at the level of the clavicle. Tissue is separated by means of blunt dissection to visualize the left carotid artery. After mobilizing and securing 0.5cm of vessel with suture, a catheter is inserted into the artery and advanced so that the internalized tip is located at the level of the aortic arch. The catheter is then secured in place. Catheter patency is assessed at this time and once patency is established, the catheter is flushed with 200 μ L saline and filled with lock solution. A 0.5cm-midline skin incision is made between the scapulae. The CAC 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 sterile polyethylene (PE) tubing with a silicone rubber intra-vascular tip. The access port consists of a 25mm length of PE50 tubing (0.023" ID) that is sealed with a sterile stainless steel pin. 23 gauge blunted needles are required to access the port. Fill volume of the catheter is 25 μ L. Upon customer request, catheter material may be made of a single piece of polyurethane.

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.

Blood Pressure Monitoring & Sampling:

CAC are reliable for obtaining blood samples and blood pressure readings. Sample size and frequency should be minimized to essential time points to maintain the health of the animal. Pilot studies are always encouraged to be sure our CAC preparation performs up to user expectations. For blood withdraw, gather the following materials: Syringe assemblies (1cc syringe attached to 23G blunted needle), sterile saline and sterile lock 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 hemostats and withdraw sample (syringe may contain anticoagulant); clamp port
- 6.) Release hemostats and slowly flush catheter with sterile saline ~200 μ L (or greater to match blood withdraw); clamp port
- 7.) Add 30 μ L 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 and repeat 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 manipulation, it is important not to place undo stress on the catheter. **2.** Using needles larger than 23 gauge will stretch the port and decrease the longevity of the preparation. Additionally, accessing the port by way of needles with bevels or rough edges will damage the port, again making sampling / use difficult.