Gavage in Rodents

Restraint-
- Restrain the rodent in an *upright* position using standard restraint technique
- Extend the head and neck
- Keep the nose, head and spine aligned so that the esophagus is straight
- DO NOT allow the rodent to tip back as you perform the gavage

Measure
- Measure the distance from the mouth to the last rib (stomach) against the needle
- This is how far you must insert the needle to ensure that you are not in the lungs
- You must do this **EVERY TIME** because your rodent will grow!!

Procedure
- Insert the bulb into the corner of the mouth
- Reposition the needle toward the center and run the bulb along the roof of the mouth
- Gently push the head and nose back (upright) using the needle as a lever (this straightens esophagus)
- DON'T bend your restraining hand back-- keep it upright!
- Slowly feed the needle down the esophagus the premeasured distance
- If resistance is felt: **DO NOT FORCE THE NEEDLE ANY FURTHER!!**
- Extend the head and nose further back and advance the needle
- If necessary, pull the bulb to the front of the mouth (but not out) and try again

Volume does not exceed 10ml/kg body weight (0.1ml/10 grams)
Needle size:
- 20-24 g mice
- 16-20 g rats
Subcutaneous injection in rodents (scruff of the neck)

- Restrain your rodent by its scruff in your nondominant hand while holding it on the table
- Tent the scruff
- Hold the syringe in your dominant hand (with your thumb, the bevel and the measurement lines up)
- Insert the needle into the skin tent, parallel to the head and pointing caudally (towards the tail)
- **Aspirate gently** to ensure that you are not in a blood vessel
- Inject the entire solution with as little movement as possible
- Withdraw the needle and discard into sharps container

Mice: 21-27 g needle, ½-3/4 inch long, volume average 10 ml/kg

Rats: 21-23 g needle, 1 inch, volume average 5 ml/kg (skin is not as loose)
Intramuscular Injection in Mouse and Rats

- Have your partner grasp the rodent by its scruff and hold upright and hold the foot of the leg not being injected
- Apply slight tension on the foot of the leg to be injected
- Palpate the muscle mass (located on the dorsal—i.e. back of the thigh—thigh area midway between the back of the knee and the base of the tail)
- Hold the syringe in your dominant hand with your thumb, the bevel and measurement lines facing up
- Insert the needle into the muscle mass at a 90 degree angle
- The needle should go into the muscle to half the thickness of the muscle (be careful not to come out the other side!!)
- **Aspirate gently** to ensure that you are not in a blood vessel
- Inject the entire solution with as little movement as possible, withdraw needle

Mice: Avoided in the mouse due to small muscle mass. If use, 27-30 g needle, ½ inch and do not exceed 0.05 ml total volume
Rats: 21-23 g needle, ½ inch, do not exceed 0.1 ml total volume
Intraperitoneal Injection of Rats and Mice

- Restrain the rodent by the scruff in your nondominant hand
- Position with the head angled toward the floor (allows intestines to move towards the animal’s head)
- Maintain this position throughout the procedure
- Hold the syringe in your dominant hand (thumb, bevel & measurement lines up)
- Insert the needle into the abdomen between the midline and leg at a 45 degree angle: **REMEMBER TO KEEP HEAD TILTED DOWN!!**
- Insert the needle at least half of its length (mice) or to the hub (rats)
- Aspirate gently to ensure that you are not in a blood vessel, urinary bladder or intestines
- If you aspirate blood, bile, urine or other fluid, withdraw and apply pressure (change needle before re-injecting)
- Inject the entire solution with as little movement as possible
- Remove the needle

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**Mice:** 25-27 g, 1 inch needle, volume limit 10-20ml/kg

**Rats:** 23-25 g, ½ to 1 inch needle, volume limit 10ml/kg
Intravenous Injection (Tail) in Mice and Rats

- Place the cage of rodents to be bled on a heating pad or under heat lamp—must watch to prevent overheating. For rats, the tail can be placed in warm water.
- Place rodent in restrainer
- Swab tail with alcohol
- Needle placement should be no closer to the body than half the length of the tail.
- With tail under tension, insert needle into skin approximately parallel with the vein.
- Insure proper placement by inserting needle at least 2-3 mm into lumen of vein.
- Administer article in a slow fluid motion to avoid rupture of the vessel
- Remove needle and place gauze on site to stop any bleeding
- If unsuccessful, and move proximal (towards the base of the tail) and try again.

Mice: 27-30 g, ½ inch needle, 5ml/kg but do not exceed more than 0.5 ml total volume

Rats: 23-27 g, ½ inch needle, 5ml/kg but do not exceed more than 4 ml
Retro orbital Injection in Mice:

- **Anesthetize mouse**
- Place the mouse against absorbent paper on the table surface
- Using the index finger, gently retract the fur above the eye and stabilize the head
- Using a 1 cc syringe and a 27 or 30g needle, with the bevel facing outward insert the needle at a 45° angle into the inside corner (medial) of the eye
- Carefully introduce the tip of the needle to penetrate the retro-orbital sinus. Make sure the needle is approximately mid-sinus (not against bone
- Inject slowly. It is imperative that the material to be injected contains no clumped material (e.g., always filter cell suspension prior to injection).
- After injection, the needle should be carefully removed, keeping the bevel outward to protect the mouse’s eye from being scratched.
- For multiple injections, at least 2 days should elapse between injections. Eyes should be alternated for subsequent injections, with a maximum of 2 injections per eye per mouse.

Mice: 27-30 g, ½ inch needle, 5ml/kg but do not exceed more than 0.5 ml total volume
Intradermal Injection of Mice and Rats

- Intradermal injection MUST be done UNDER ANESTHESIA!
- TINY volumes
- 25-30 g needle, volume not to exceed 0.1 cc rats, 0.05 cc mice
- Clip hair on injection area and prep with alcohol swab.
- Insert needle between layers of skin on the back at about 20 degree angle.
- Aspirate syringe to insure proper placement.
- Administer article slowly to avoid tissue trauma. Successful injection results in a small circular skin welt.
- Remove needle

References:

- http://www.medaille.edu/vmacer/120_lab_rodentlab2.htm
- http://www.siu.edu/~iacuc/ROD_RX.HTML
- http://www.jhu.edu/animalcare/training2.html
- http://vpr.utsa.edu/files/larc/MouseBiomethodology.pdf