

Standard Operating Procedure

Delivery of Inhalant Anesthetics Using a Bell Jar

The following outlines the proper procedure for delivery of inhalant anesthesia to rats and mice only via the use of a chamber or “bell jar”. A bell jar may be used to deliver inhalant anesthesia for very short term procedures only (e.g. < 30 seconds). If longer duration anesthesia is needed, an alternate method of anesthesia, such as an anesthetic machine with a calibrated vaporizer, should be used.

- This procedure applies to all personnel using bell jars to deliver inhalant anesthesia to rats and mice.
- Materials:
 - a. Fume Hood or Biosafety Cabinet (exhausted to an outside source)
 - b. Open- drop bell jar with mesh platform (see attached picture)
 - c. Cotton balls or gauze squares
 - d. Volatile anesthetic, such as isoflurane
 - e. Recovery cage
- Procedure:
 - a. Bell jar anesthesia contains no provisions for scavenging anesthetic waste gases. Therefore **the bell jar must be used in a fume hood** to protect personnel from inhalation exposure to anesthetic gases.
 - b. In the fume hood, soak cotton balls or gauze squares with liquid anesthetic (Isoflurane). Place cotton balls or gauze in the bell jar.
 - c. Cover the anesthetic-impregnated cotton balls or gauze with a **plastic or wire mesh platform**. This will prevent the rodent from coming into direct contact with the anesthetic agent, which can cause localized discomfort or irritation to the animal’s skin.
 - d. Place the animal in the bell jar and then cover the bell jar with a lid. The bell jar should be large enough for the animal to comfortably move around. Only 1 (one) animal at a time should be placed in the bell jar.
 - e. Using a bell jar to deliver inhalant anesthetics involves no calibrated vaporizer, thus the anesthetic concentration with the jar cannot be controlled and lethal concentration of anesthetics can rapidly accumulate. The animal must be closely monitored at all times while it is in the jar. A deep plane of anesthesia is indicated by lack of a righting reflex when the jar is tipped slightly and a respiratory rate that is reduced by ~ 50% from pre-anesthetic rate (i.e. 80 – 100 breaths/min.). This should take ~ 1 minute for mice and ~ 2 minutes for rats. If at any time the animal has difficulty breathing, (respiration becomes labored, slows, or stops) or poor mucous membrane color (pale or gray membranes), then the animal should immediately be removed from the chamber.
 - f. Visually observe the animal closely for cessation of voluntary movement and recumbency. This will signal the onset of anesthesia.

- g. Remove the animal from the bell jar. Check that animal's mucous membrane color, respirations, and withdrawal reflexes. Apply a noxious stimulus (i.e. toe pinch) before proceeding with the procedure. If the animal responds to the toe pinch return it to the jar. If the animal's mucous membrane color and respirations are normal and its withdrawal reflexes are absent, then you may begin your procedure.
- h. When using a bell jar to deliver anesthesia there is no way to maintain anesthesia once the animal has been removed from the bell jar, thus this method only provides anesthesia for very short-term procedures, such as orbital bleeding, tail snipping, or subcutaneous tumor implantation.
- i. When the procedure is done, place the animal in a recovery cage, administer any required post-operative analgesics, and monitor the animal until it is fully awake. All post-operative monitoring and supportive care and observations of the animals should be written and recorded on the animal's cage card or in a separate post-operative monitoring log.



Classic glass bell or desiccation jar with tight fitting lid. All jars or chambers should have bottom screens, which separate the anesthetic soaked media (cotton balls or gauze) from the animal in order to prevent contact with the irritating anesthetic agent. Adequate scavenging must be used to prevent unintentional exposure of humans and animals to waste anesthetic gases.