Washington State University  
Institutional Animal Care and Use Committee

Standard Operating Procedure #10  
Title: Oral Gavage in Mice and Rats

I. Introduction

Oral gavage (dosing) is used when a specific volume of an agent needs to be administered orally. Whenever possible, alternatives such as purchasing custom-made chow containing the experimental agent or dosing with a water bottle should be considered. Gavage may only be performed by trained personnel.

II. Oral Gavage:

A. Supplies needed: see size chart and image of gavage needles below

The choice of whether to use a rigid or flexible gavage needle or to use a straight or curved gavage needle is according to operator preference and the needs of the study. Gavage needles are available in disposable plastic or re-usable stainless steel. All gavage needles have a ball or pear-shaped smooth rounded tip to prevent injury to the esophagus and other tissues. Gavage needles may be also called feeding needles or feeding tubes.

### Mouse Gavage Needle Sizes

<table>
<thead>
<tr>
<th>Weight range (g)</th>
<th>Gauge</th>
<th>Length (inches)</th>
<th>Ball Diameter (mm)</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>to 14 gms</td>
<td>24</td>
<td>1</td>
<td>1 1/4 mm</td>
<td>Straight, Curved</td>
</tr>
<tr>
<td>15-20 gms</td>
<td>22</td>
<td>1&quot;, 1 1/2&quot;</td>
<td>1 1/4 mm</td>
<td>Straight, Curved</td>
</tr>
<tr>
<td>20-25 gms</td>
<td>20</td>
<td>1&quot;, 1 1/2&quot;,2&quot;</td>
<td>2 1/4 mm</td>
<td>Straight, Curved</td>
</tr>
<tr>
<td>25-30 gms</td>
<td>18</td>
<td>1&quot;, 1 1/2&quot;,2&quot;</td>
<td>2 1/4 mm</td>
<td>Straight, Curved</td>
</tr>
<tr>
<td>30-35 gms</td>
<td>18</td>
<td>2&quot;, 3&quot;</td>
<td>2 1/4 mm</td>
<td>Straight, Curved</td>
</tr>
</tbody>
</table>

### Rat Gavage Needle Sizes

<table>
<thead>
<tr>
<th>Weight (g) of rat</th>
<th>Gauge</th>
<th>Length (in)</th>
<th>Ball Diameter (mm)</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-75</td>
<td>20</td>
<td>1-1.5</td>
<td>2.25</td>
<td>Straight/Curved</td>
</tr>
<tr>
<td>75-100</td>
<td>18</td>
<td>1-1.5</td>
<td>2.25</td>
<td>Curved</td>
</tr>
<tr>
<td>100-200</td>
<td>18</td>
<td>2-3</td>
<td>2.25</td>
<td>Curved</td>
</tr>
<tr>
<td>200-300</td>
<td>16</td>
<td>3-4</td>
<td>3</td>
<td>Curved</td>
</tr>
</tbody>
</table>
1. **Mouse**: 18-20 gauge gavage needle about 1 to 1.5 inches in length with a rounded tip. If gavage is performed on young mice a smaller tube is used. (see chart)

   **Rat**: 16-20 gauge gavage needles about 2-3 inches in length (see chart)

2. Permanent marker

3. Scale

![Assorted sizes and types of gavage needles. Note that the end of the gavage needle is blunted with a round or tear-drop shaped tip to prevent esophageal trauma during insertion.]

### B. Procedure

1. Weigh the animal and determine the appropriate gavage needle size and maximum dosage volume. The maximum dosing volume is 10 ml/kg of animal. The maximum amount that can be given is less for pregnant animals. Dosing may be repeated up to 3 times within a 24 hour period—if additional dosing is necessary this must be justified in the protocol.

2. Check the length of the gavage needle by measuring from the tip of the animal's nose to the xyphoid process (bottom of the sternum). Mark the needle shaft level with the nose and do not pass the needle into the animal past that point to avoid perforation the stomach. See image 1 below for measuring technique.

3. Restrain the animal
   a. **Mouse**: scruff the mouse, grasping the skin over the shoulders with the thumb and middle fingers. Grasp the skin over the shoulders so that the fore legs are extended out to the side, keeping the front feet from pushing the gavage tube away.
   b. **Rat**: hold the rat near the thoracic region and support the lower body. A small towel can be used to wrap around the rat's body. Do not squeeze the thorax tightly and restrict respiration.

4. Hold the animal's head in place by gently extending the head back—this extension of the head creates a straight line through the neck and esophagus.

5. Place the gavage needle in the mouth. The needle is then gently advanced along the upper palate until the esophagus is reached. The tube should pass easily into the esophagus. The animal may
swallow as the tube is passed. Pass the needle smoothly in one motion. Note: If there is any resistance, **DO NOT FORCE** the needle. Pull the needle out and try again.

6. Once proper placement is verified, the material can be slowly administered by a syringe attached to the end of the needle. Do not rotate the needle because the tip may rupture the esophagus. After dosing, gently remove the needle following the same angle as insertion. See image 2 below.

7. Return the animal to the cage and monitor for 5-10 minutes, looking for signs of labored breathing or distress. Monitor animals again between 12-24 hours after dosing.

III. **Potential adverse effects to be considered:** Perforation of the esophagus or stomach with the gavage needle or respiratory distress associated with administration of fluid into the lungs.

IV. **References**

2. Laboratory Animal Technician Training Manual (2012); American Association for Laboratory Animal Science at [www.aalas.org](http://www.aalas.org)

Reviewed and Approved by WSU IACUC 7.30.2014