

## **Guidelines for the Use of Food or Fluid Restriction**

The University of Texas at Austin  
Institutional Animal Care and Use Committee

*These guidelines have been written to assist faculty, staff, and students in performing vertebrate animal procedures in a humane manner and complying with pertinent regulatory requirements. Under some circumstances deviations from these procedures may be indicated but such variances must be approved in advance by the IACUC.*

This document provides information to be used when planning and performing food or fluid restriction in animals used for research, teaching, or other purposes at the University of Texas at Austin. It is organized into five sections:

- Section A – Background Information
- Section B – Definitions
- Section C – Monitoring Food or Fluid Restricted Animals
- Section D – Body Condition Charts
- Section E – References and Acknowledgements

### **Section A – Background Information**

Depending on the experimental design, some research projects may require the regulation of food and/or water to achieve desired experimental results. The objective when these studies are being planned and executed should be to use the least restriction necessary to achieve the scientific objective while maintaining animal well-being. If food or fluid restriction other than an accepted pre-anesthetic fasting procedure is to be used in an experimental protocol, the method of restriction and scientific justification for its use should be clearly explained in the protocol form submitted for IACUC approval. The procedures that restrict food or fluid must be approved by the IACUC before implementation to ensure the welfare of research animals.

Food or fluid regulation may entail either scheduled access to food and water, so animals can eat/drink as much as they want at regular (but time-limited) intervals; or restricted access, in which the total volume of food or fluid is strictly monitored and controlled. At least minimal quantities of food and fluid must be available to provide for development of young animals and to maintain long-term well-being of all animals.

### **Section B – Definitions**

Fluid restriction: deprivation of water for greater than 12 hours

Food restriction: deprivation of food for more than 24 hours (16 hours for rodents) or restricted feeding that limits the total amount of food consumed for the purpose of reducing the animal's weight to a level lower than that expected for an *ad libitum* fed animal

*Ad libitum*: the amount of food or fluid consumed when the animal has free access at all times

### **Section C – Monitoring Food or Fluid Restricted Animals**

According to the Guide for the Care and Use of Laboratory Animals, page 31,

The development of animal protocols that involve the use of food or fluid regulation requires the evaluation of three factors: the necessary level of regulation, potential adverse consequences of regulation, and methods for assessing the health and well-being of the animals (NRC 2003b)...

The animals should be closely monitored to ensure that food and fluid intake meets their nutritional needs (Toth and Gardiner 2000). Body weights should be recorded at least weekly and more often for animals requiring greater restrictions (NRC 2003b). Written records should be maintained for each animal to document daily food and fluid consumption, hydration status, and any behavioral and clinical changes used as criteria for temporary or permanent removal of an animal from a protocol (Morton 2000; NRC 2003b).

Experimental procedures utilizing food or fluid restriction must include a program for daily monitoring of physiologic and behavioral indices, including criteria for temporary or permanent removal of an animal from the experimental protocol. These definitive physical criteria must be described in the IACUC protocol. Physiologic and behavioral indices that must be monitored on a daily basis include:

- Rapid weight loss
- Poor body condition
- Muscle wasting
- Prominent bones
- Sunken eyes
- Poor hair coat
- Lethargy or other behavioral changes
- Dehydration, which can include the following signs:
  - Decreased urine production
  - Constipation
  - Dry mucous membranes
  - Sunken eyes
  - Crusting around eyes and nose
  - Loss of skin elasticity

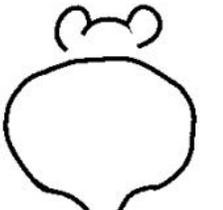
Investigators must monitor food and/ or water consumption each day that food or fluid is restricted and maintain records of individual body weights throughout the restrictive period. Required frequency of body weight monitoring will vary depending on the species with once a week as a minimum. Small animals with high metabolisms such as rats and mice or animals with metabolic disturbances will require monitoring on a more frequent basis. A UT Austin veterinarian should be consulted if the animal's body weight decreases by 15% or more.

Investigators must complete the Animal Resource Center's [Procedures for Nonstandard Feeding or Watering form](#) to communicate restrictions for animals maintained in ARC managed facilities. Restriction specific cage cards are available through the ARC. They must be fixed to the cage(s) and completed daily if the ARC is not to provide food or fluid to the animals.

## **Section D – Body Condition Charts**

The following charts should be used when determining body condition of the animals below. Consult with UT Austin veterinarians if you have concerns about the condition of research animals, for example if an animal has a body condition score of two or less.

Body Condition Chart for Laboratory Mice

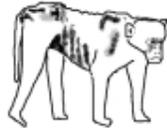
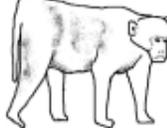
	<p><b>BC 1</b></p> <p>Mouse is emaciated.</p> <ul style="list-style-type: none"><li>◦ <i>Skeletal structure extremely prominent; little or no flesh cover.</i></li><li>◦ <i>Vertebrae distinctly segmented.</i></li></ul>
	<p><b>BC 2</b></p> <p>Mouse is underconditioned.</p> <ul style="list-style-type: none"><li>◦ <i>Segmentation of vertebral column evident.</i></li><li>◦ <i>Dorsal pelvic bones are readily palpable.</i></li></ul>
	<p><b>BC 3</b></p> <p>Mouse is well-conditioned.</p> <ul style="list-style-type: none"><li>◦ <i>Vertebrae and dorsal pelvis not prominent; palpable with slight pressure.</i></li></ul>
	<p><b>BC 4</b></p> <p>Mouse is overconditioned.</p> <ul style="list-style-type: none"><li>◦ <i>Spine is a continuous column.</i></li><li>◦ <i>Vertebrae palpable only with firm pressure.</i></li></ul>
	<p><b>BC 5</b></p> <p>Mouse is obese.</p> <ul style="list-style-type: none"><li>◦ <i>Mouse is smooth and bulky.</i></li><li>◦ <i>Bone structure disappears under flesh and subcutaneous fat.</i></li></ul>

*A "+" or a "-" can be added to the body condition score if additional increments are necessary (i.e. ...2+, 2, 2-...)*

Body Condition Chart for Laboratory Rats

	<p><b>BC 1</b> <b>Rat is emaciated</b></p> <ul style="list-style-type: none"><li>• Segmentation of vertebral column prominent if not visible.</li><li>• Little or no flesh cover over dorsal pelvis. Pins prominent if not visible.</li><li>• Segmentation of caudal vertebrae prominent.</li></ul>
	<p><b>BC 2</b> <b>Rat is under conditioned</b></p> <ul style="list-style-type: none"><li>• Segmentation of vertebral column prominent.</li><li>• Thin flesh cover over dorsal pelvis, little subcutaneous fat. Pins easily palpable.</li><li>• Thin flesh cover over caudal vertebrae, segmentation palpable with slight pressure.</li></ul>
	<p><b>BC 3</b> <b>Rat is well-conditioned</b></p> <ul style="list-style-type: none"><li>• Segmentation of vertebral column easily palpable.</li><li>• Moderate subcutaneous fat store over pelvis. Pins easily palpable with slight pressure.</li><li>• Moderate fat store around tail base, caudal vertebrae may be palpable but not segmented.</li></ul>
	<p><b>BC 4</b> <b>Rat is overconditioned</b></p> <ul style="list-style-type: none"><li>• Segmentation of vertebral column palpable with slight pressure.</li><li>• Thick subcutaneous fat store over dorsal pelvis. Pins of pelvis palpable with firm pressure.</li><li>• Thick fat store over tail base, caudal vertebrae not palpable.</li></ul>
	<p><b>BC 5</b> <b>Rat is obese</b></p> <ul style="list-style-type: none"><li>• Segmentation of vertebral column palpable with firm pressure; may be a continuous column.</li><li>• Thick subcutaneous fat store over dorsal pelvis. Pins of pelvis not palpable with firm pressure.</li><li>• Thick fat store over tail base, caudal vertebrae not palpable.</li></ul>

Body Condition Chart for Laboratory Primates

		Ambulating	Right Lateral Viewed from Back
<b>1</b>	<b>EMACIATED</b> – Very prominent hip bones (easily palpable and likely visible), prominent facial bones, spinous processes and ribs. Minimal to no muscle mass is palpable over ileum or ischium. Anus may be recessed between ischial callosities. Body is very angular, no subcutaneous fat layer to smooth out prominences.		
<b>1.5</b>	<b>VERY THIN</b> – Hips, spinous processes, and ribs are prominent. Facial bones may be prominent. There is very little muscle present over the hips and back. Anus may be recessed between ischial callosities. Body is angular, no subcutaneous fat to smooth out prominences		
<b>2</b>	<b>THIN</b> – Very minimal fat reserves, prominent hip bones and spinous processes. Hips, spinous processes and ribs are easily palpable with only a small amount of muscle mass over hips and lumbar region.		
<b>2.5</b>	<b>LEAN</b> – Overlying muscle gives hips and spine a more firm feel. Hip bones and spinous processes are readily palpable, but not prominent. Body is less angular because there is a thin layer of subcutaneous fat.		
<b>3</b>	<b>OPTIMUM</b> – Hip bones, ribs and spinous processes are palpable with gentle pressure but generally not visible. Well developed muscle mass and subcutaneous fat layer gives spine and hips smooth but firm feel. No abdominal, axillary or inguinal fat pads.		
<b>3.5</b>	<b>SLIGHTLY OVERWEIGHT</b> – Hip bones and spinous processes palpable with firm pressure but are not visible. Bony prominences smooth. Rib contours are smooth and only palpable with firm pressure. Small abdominal fat pad may be present.		
<b>4</b>	<b>HEAVY</b> – Bony contours are smooth and less well defined. Hip bones, spinous processes and ribs may be difficult to palpate due to more abundant subcutaneous fat layer. May have fat deposits starting to accumulate in the axillary, inguinal or abdominal areas.		
<b>4.5</b>	<b>OBESE</b> – This animal will often have prominent fat pads in the inguinal, axillary or abdominal region. Abdomen will be pendulous when animal sitting or ambulating. Hip bones and spinous processes difficult to palpate. Bony contours smooth and poorly defined.		
<b>5</b>	<b>GROSSLY OBESE</b> – Obvious, large fat deposits in the abdominal, inguinal and axillary regions. Abdominal palpation is very difficult due to large amount of mesenteric fat. Pronounced fat deposits may alter posture/ambulation. Hip bones, rib contours and spinous processes only palpable with deep palpation.		

## Section E – References and Acknowledgements

Clingerman KJ, Summers L. 2005. Development of a body condition scoring system for nonhuman primates using *Macaca mulatta* as a model. *Lab Anim (NY)* 34:31–36

Hickman, Debra L. and Melissa P. Swan. “Use of a body condition score technique to assess health status in a rat model of polycystic kidney disease.” *Journal of the American Association for Laboratory Animal Science : JAALAS* 49 2 (2010): 155-9.

National Research Council. *Guide for the Care and Use of Laboratory Animals: Eighth Edition.* Washington, DC: The National Academies Press; 2011.

Ullman-Cullere, MH and CJ Foltz. Body condition scoring: A rapid and accurate method for assessing health status in mice. *Laboratory Animal Science* 1999, 49(3):319-323

United States Department of Agriculture. *Animal Welfare Act and Animal Welfare Regulations.* Washington, DC: APHIS; 2017.

This guideline contains information adapted from

- Emory University Institutional Animal Care and Use Committee, “Food and/or Fluid Restriction” found at: [http://www.iacuc.emory.edu/documents/352\\_Food\\_and\\_or\\_Fluid\\_Regulation.pdf](http://www.iacuc.emory.edu/documents/352_Food_and_or_Fluid_Regulation.pdf)
- Marquette University Institutional Animal Care and Use Committee, “Guidelines and Policy on Food or Fluid Restriction” found at: <https://www.marquette.edu/orc/animal-care-use/documents/Food.Fluid.Restriction.2012.pdf>
- Penn State Animal Resource Program, “Food & Fluid Restriction” found at: <https://www.research.psu.edu/arp/experimental-guidelines/food-fluid-restriction.html>
- University of California, Davis Office of Research, “Humane Endpoints for Laboratory Animals” found at: <https://research.ucdavis.edu/policiescompliance/animal-care-use/iacuc/humane-endpoints-for-laboratory-animals/>
- University of California, Irvine Office of Research, “Guidance Regarding Food or Water Restriction” found at: <https://www.research.uci.edu/compliance/animalcare-use/research-policies-and-guidance/food-fluid-restriction.html>