 <b>BROWN</b>	<b>Institutional Animal Care and Use Committee (IACUC): Policy on Food and Fluid Regulation in Rodents</b>	POL # 10.10.11
		Effective Date: 6/2/2017

## 1.0 Policy Purpose

The purpose of this policy is to provide information to research teams, animal caregivers, veterinarians, and IACUC members on how to approach and manage food and fluid [Regulation](#) for rodents in a manner consistent with animal health and welfare standards.

## 2.0 To Whom the Policy Applies

This policy applies to all individuals involved in research using rodents at Brown University under an IACUC-approved animal use protocol, and to the IACUC in its evaluation of the proposed use of food and/or fluid Regulation in animal use protocols.

## 3.0 Policy Statement

Food and/or fluid [Regulation](#) must be approved by the IACUC and justified based on the scientific objectives of the study. The least amount of [Restriction](#) that will achieve the objectives must be used.

Studies that typically require food/fluid Regulation involve

- use of food/fluid consumption to motivate animals to perform novel or learned tasks;
- research of the motivated behaviors and physiologic mediators of hunger and thirst; and
- homeostatic regulation of energy metabolism or food balance.

### 3.1 Guidelines

Food and/or fluid Regulation is not recommended in rodents under eight weeks of age and no rodent can be completely deprived of fluids for more than 24 hours. [Ad libitum](#) values should be used as a baseline for food and/or fluid Regulation. These values may be determined by the laboratory for rodents of the same strain, background, sex, and age group as those used in the study. Published values (see for example, [Appendix I](#)) may be used in lieu of a laboratory determination as long as the published value is for a rodent of the same strain, background, sex, and age group.

[Baseline body weight](#) must be measured before food or water Regulation occurs. Rodents must be acclimated over three days to new Regulation or [Scheduling](#) paradigms. Food and water must be made available concurrently, as rodents typically do not eat without available water. Additionally, scheduled Regulation must make food and/or water available for at least 15 minutes per day.

When using fluid rewards as motivation for task performance, it is imperative that the Principal Investigator (PI) ensure that the daily requirements to maintain a healthy state are met by the sum of earned rewards and supplemental fluid offered. Full-grown animals can be fed 70% of Ad libitum food consumption until they reach 85% of a baseline weight. Upon reaching this point, they must no longer be restricted. Fluid Regulation usually involves a percentage of Ad libitum fluid intake that is permitted outside of the testing sessions, and can vary widely depending on the species and task. Rodents may be placed under chronic water Regulation of as much as 50% of the Ad libitum daily ration imposed over an interval of no more than seven days. Each cage must be marked to indicate that the animal is under food and/or fluid Regulation.

### 3.2 Recordkeeping

Laboratory records must be maintained **daily** (unless otherwise noted) by the research team and contain the following information:

- Protocol number, animal identification number, PI name, laboratory contact person, contact phone number
- Dates of entries
- Baseline body weight(s)
- Indication that water was given and amount
- Indication that food was given and amount
- Weight (minimum of twice weekly)
- Health of animal(s), including hydration status
- Initials of observer/recorder

### 3.3 Endpoints and Treatment

During food Regulation, a rodent may not lose more than 20% of baseline body weight. After 20% weight loss has been achieved, the daily food allowance must be increased to prevent additional weight loss beyond 20%. Regulation is not permitted to resume until the animal weighs at least 80% of its original weight.

Rodents on fluid Regulation must be monitored daily for clinical signs of dehydration, and must be treated as outlined below. Any rodent appearing dehydrated (*e.g.*, displaying listlessness/inactivity, increased “skin tent,” and/or sunken eyes) must have drinkable fluid support provided immediately by supplying a measured volume of fluid. Enough fluid must be provided to allow the animal to freely drink without interruption. In addition, alternative fluid sources (*e.g.*, hydrogel, moistened food, 0.5-2 mL subcutaneous sterile lactated ringers or saline) may be administered.

Laboratory members involved in fluid Regulation must be trained to identify dehydration and be able to give subcutaneous fluids. If a rodent appears dehydrated, listless, or hunched, or shows signs of pain/distress, laboratory personnel must promptly contact the veterinary staff in addition to providing supplemental food/water. Please reference the Body Condition Scoring (BCS) chart in [Appendix II](#) for further guidance on animal appearance as it relates to their

health. Animals undergoing surgical procedures must receive Ad libitum food/water for at least one week prior to and following the surgical procedure.

#### 4.0 Definitions

For the purpose of this policy, the terms below have the following definitions:

**Ad libitum:** when animals are offered access to a continuous supply of food and water and can eat / drink as much and as often as they want.

**Baseline body weight:** the average weight before the restriction period began. Individual baseline fluid requirements under similar conditions (*e.g.*, clinical health, environmental factors, level of physical exercise) vary depending on the species, gender, growth and developmental phase, body weight, social ranking, and individual preferences.

**Regulation:** a deviation from the standard husbandry practices in the amount or availability of food or water. It can include Scheduling and Restriction as defined below. Special diets are not inherently considered regulation.

**Restriction:** the provision of rations such that the volume of food or fluid is strictly monitored and controlled. Restricted feeding typically limits the total volume of food or fluid consumed for the purpose of reducing the animal's weight to a level lower than that expected for an Ad libitum fed animal.

**Scheduling:** limiting of the number of times or length of periods during which the animal has access to food or fluid so that the animal consumes a normal portion, but at intervals or durations that differ from standard husbandry practices. This definition only applies if food or fluid is removed for a period of greater than 12 hours. Scheduled feeding should not result in a subnormal body weight.

#### 5.0 Responsibilities

All individuals to whom this policy applies are responsible for becoming familiar with and following this policy. University supervisors are responsible for promoting the understanding of this policy and for taking appropriate steps to help ensure compliance with it.

#### 6.0 Consequences for Violating this Policy

Violation of this policy may be considered a serious event of noncompliance that is reportable to the IACUC, funding and accrediting agencies, as well as other regulatory agencies. Violations of this policy are a serious matter that may adversely affect both the ability to perform animal work and acquire funding sources.

Failure to comply with this and related policies is subject to disciplinary action, up to and including suspension without pay, or termination of employment or association with the University, in accordance with applicable (*e.g.*, staff, faculty, student) disciplinary procedures.

#### 7.0 Related Information

Brown University is a community in which employees are encouraged to share workplace concerns with University leadership. Additionally, [Brown's Ethics and Compliance Reporting System](#) allows anonymous and confidential reporting on matters of concern online or by phone (877-318-9184).

The following information complements and supplements this document. The information is intended to help explain this policy and is not an all-inclusive list of policies, procedures, laws and requirements.

- **Related Policies**

- [N/A](#)

- **Related Procedures**

- [N/A](#)

- **Related Forms:**

- N/A

- **Frequently Asked Questions (FAQs):**

- N/A

- **References:**

- Bachmanov, A.A., G.K. Beauchamp, and M.G. Tordoff. "Voluntary Consumption of NaCl, KCl, CaCl<sub>2</sub> and NH<sub>4</sub>Cl Solutions by 28 Mouse Strains." *Behav Genet* 32.6 (2002): 445-57.
  - Bachmanov, A. A., D.R. Reed, G. K. Beauchamp, and M. G. Tordoff. "Food Intake, Water Intake, and Drinking Spout Side Preference of 28 Mouse Strains." *Behav Genet* 32.6 (2002): 435-43.
  - Bekkevold, C.M., K.L. Robertson, M.K. Reinhard, A.H. Battles, and N.E. Rowland. "Dehydration Parameters and Standards for Laboratory Mice." *JAALAS* 52.3 (2013): 233-39.
  - Hickman, D.L., and M. Swan. "Use of a Body Condition Score Technique to Assess Health Status in a Rat Model of Polycystic Kidney Disease." *JAALAS* 49.2 (2010): 155-59.
  - National Research Council. "Food and Fluid Regulation." *Guide for the Care and Use of Laboratory Animals*. 8th ed. Washington, D.C.: The National Academies Press. (2011): 30-31.
  - Rowland, N.E. "Food or Fluid Restriction in Common Laboratory Animals: Balancing Welfare Considerations with Scientific Inquiry." *Com Med* 57.2 (2007): 149-60.
  - Toth, L.A., and T.W. Gardiner. "Food and Water Restriction Protocols: Physiological and Behavioral Considerations." *Contemp Top Lab Anim Sci* 39.6 (2000): 9-17.
  - Ullman-Culleré, M.H., and C.J. Foltz. "Body Condition Scoring: A Rapid and Accurate Method for Assessing Health Status in Mice." *Laboratory Animal Science* 49.3 (1999): 319-23.
  - Wolfle, Thomas. 50 years of the Institute for Laboratory Animal Research (ILAR)(2003): 324-337

## 8.0 Policy Owner and Contact(s)

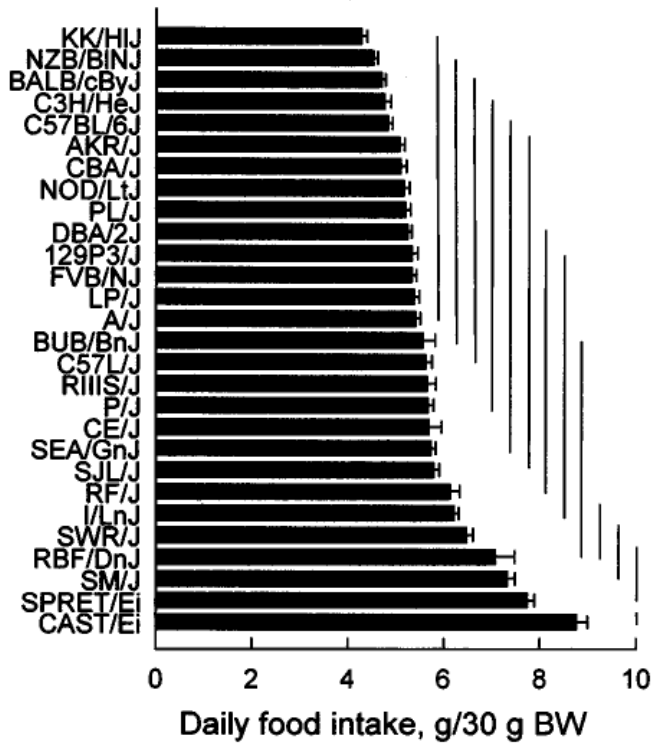
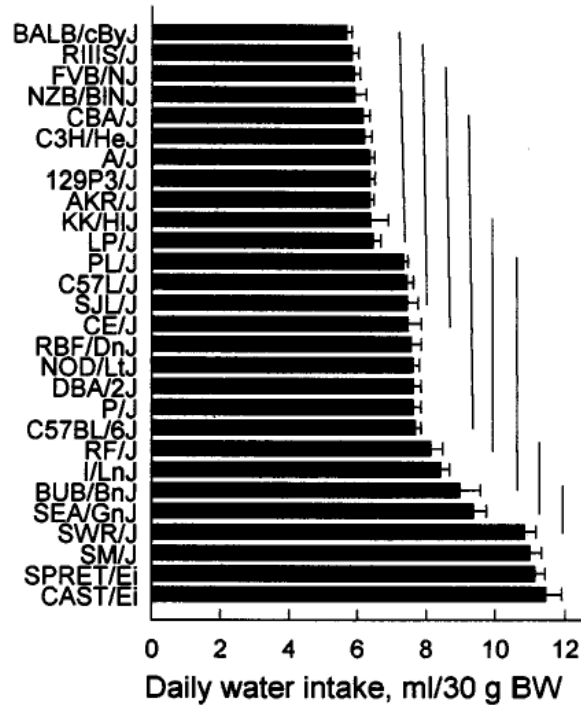
- **Policy Owners:** Vice President for Research
- **Policy Approved by:** Vice President for Research

- **Subject Matter Contact:** Brown University Animal Research Protection Program.
  - Telephone: 401-863-3050
  - Email: IACUC@Brown.edu

## 9.0 Policy History


- **Policy Effective Date:** June 2, 2017
- **Policy Last Reviewed:** May 1, 2020
- **Policy Update/Review Summary:** N/A

Appendix I. Published Graphs of Water and Food Intake of 28 Common Mice Strains




Bachmanov, A.A., G.K. Beauchamp, and M.G. Tordoff. "Voluntary Consumption of NaCl, KCl, CaCl<sub>2</sub> and NH<sub>4</sub>Cl Solutions by 28 Mouse Strains." *Behav Genet* 32.6 (2002): 445-57.


Appendix II: Body Condition Scoring in Mice and Rats




**BC 1**  
**Mouse is emaciated.**  
 • *Skeletal structure extremely prominent; little or no flesh cover.*  
 • *Vertebrae distinctly segmented.*




**BC 2**  
**Mouse is underconditioned.**  
 • *Segmentation of vertebral column evident.*  
 • *Dorsal pelvic bones are readily palpable.*



**BC 3**  
**Mouse is well-conditioned.**  
 • *Vertebrae and dorsal pelvis not prominent; palpable with slight pressure.*




**BC 4**  
**Mouse is overconditioned.**  
 • *Spine is a continuous column.*  
 • *Vertebrae palpable only with firm pressure.*




**BC 5**  
**Mouse is obese.**  
 • *Mouse is smooth and bulky.*  
 • *Bone structure disappears under flesh and subcutaneous fat.*


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




**BC 1**  
**Rat is emaciated**  
 • Segmentation of vertebral column prominent if not visible.  
 • Little or no flesh cover over dorsal pelvis. Pins prominent if not visible.  
 • Segmentation of caudal vertebrae prominent.




**BC 2**  
**Rat is under conditioned**  
 • Segmentation of vertebral column prominent.  
 • Thin flesh cover over dorsal pelvis, little subcutaneous fat. Pins easily palpable.  
 • Thin flesh cover over caudal vertebrae, segmentation palpable with slight pressure.



**BC 3**  
**Rat is well-conditioned**  
 • Segmentation of vertebral column easily palpable.  
 • Moderate subcutaneous fat store over pelvis. Pins easily palpable with slight pressure.  
 • Moderate fat store around tail base, caudal vertebrae may be palpable but not segmented.



**BC 4**  
**Rat is overconditioned**  
 • Segmentation of vertebral column palpable with slight pressure.  
 • Thick subcutaneous fat store over dorsal pelvis. Pins of pelvis palpable with firm pressure.  
 • Thick fat store over tail base, caudal vertebrae not palpable.



**BC 5**  
**Rat is obese**  
 • Segmentation of vertebral column palpable with firm pressure; may be a continuous column.  
 • Thick subcutaneous fat store over dorsal pelvis. Pins of pelvis not palpable with firm pressure.  
 • Thick fat store over tail base, caudal vertebrae not palpable.