I. **Purpose:** The Brown University IACUC recognizes that there are times when food and/or fluid regulation in rodents is necessary for research. These scenarios are typically (1) studies that use food/fluid consumption to motivate animals to perform novel or learned tasks, (2) studies of the motivated behaviors and physiologic mediators of hunger and thirst, and (3) homeostatic regulation of energy metabolism or food balance. This policy has been developed to provide information to research teams, animal caregivers, veterinarians, and IACUC members on how to approach and manage food and fluid regulation in a manner consistent with animal health and welfare, while not compromising data collection.

II. **Definitions:**

- **Ad libitum** – 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.

- **Regulation** is 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** is 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** of access to food or fluid limits the number of times or a 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 is not expected to result in a subnormal body weight.
III. **Guidelines:**

1. 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.
2. 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.
3. *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 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.
4. Baseline body weight must be measured before food or water regulation occurs.
5. Rodents should be acclimated over 3 days to new regulation/scheduling paradigms.
6. Consideration should be made to allow food and water to be available concurrently, as rodents typically do not eat without available water. Additionally, scheduled regulation should make food and/or water available for at least 15 minutes a day.
7. When using fluid rewards as motivation for task performance, it is imperative for the investigator to ensure that the daily requirements to maintain a healthy state are met by the sum of earned rewards and supplemental fluid offered.
8. 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 should no longer be heavily restricted.
9. 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, if it is imposed over an interval of up to 7 days.
10. Each cage must be marked to indicate that the animal is under food or fluid regulation.

IV. **Monitoring:**

Laboratory records should contain the following information:

1. General information (i.e. protocol number, animal identification number, principal investigator, contact person, contact phone number)
2. Date (daily documentation is necessary)
3. Baseline weight
4. Indication that water was given and how much (daily)
5. Indication that food was given and how much (daily)
6. Weight (minimum of twice weekly)
7. Health (including hydration status)
8. Initials of observer/recorder

V. **Endpoints:**

1. For 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 should be increased to prevent additional weight loss beyond 20%. Regulation cannot be attempted again until the animal weighs at least 80% of its original weight.

*Brown University Institutional Animal Care and Use Committee*

*POLICY on Food and Fluid Regulation in Rodents*

*Page 2 of 5*
2. Rodents on fluid regulation must be monitored daily for clinical signs of dehydration, and should be treated as outlined below.
   a. 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 should be provided to allow the animal to freely drink without interruption.
   b. In addition, alternative fluid sources (e.g., hydrogel, moistened food, 0.5-2 mL subcutaneous sterile lactated ringers or saline) must be administered.
   c. Lab members involved in fluid regulation must be trained to be able to identify dehydration and be comfortable giving subcutaneous fluids.
3. If a rodent appears dehydrated, listless, hunched, or showing signs of pain/distress, contact the veterinary staff in addition to providing supplemental food/water.
4. Animals undergoing surgical procedures must receive ad libitum food/water at least one week prior to and following the surgical procedure.

For additional information, see page 4 of this policy for published graphs of water and food intake of 28 common mice strains. See page 5 of this policy for a guide to body conditioning scoring in mice and rats.

VI. References:
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-, 3-...)

**BC 1 (Rat)**
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)**
Rat is underconditioned
- 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)**
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)**
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)**
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.