

Institutional Animal Care and Use Committee (IACUC) Directive 5.0: Food and Fluid Regulation in Non-Human Primates (NHPs) (NHPs)

1.0 Directive Purpose

The purpose of this directive is to instruct research teams, animal caregivers, veterinarians, and the Institutional Animal Care and Use Committee (IACUC) members on how to approach and manage food and fluid regulation in a manner consistent with maintaining animal health and welfare, while not compromising the integrity of data collection when working with NHPs.

2.0 To Whom the Directive Applies

This directive applies to all individuals involved in research using Non-Human Primates (NHPs) under an IACUC-approved animal use protocol.

3.0 Directive Statement

The Brown University IACUC recognizes that fluid and food regulation may serve as powerful and useful methods to modulate motivation. All food and/or fluid regulation must be approved by the IACUC and justified based on the scientific objectives of the study. In all cases, the least amount of restriction that will achieve scientific objectives must be used.

3.1 Food Regulation

The individual animal's optimum food ration for growth, development, and weight maintenance must be assessed prior to initiating food restriction to develop a baseline pattern. Food regulation must be customized to the individual animal. The daily ration for each animal must be based on consumption, body condition, rate of gain, and life stage. Prior to the implementation of food regulation, Baseline Body Weight, and body condition score (BCS) must be determined by the research team (See section 7.3 for BCS Form). Whenever possible, food regulation must be introduced gradually through a systematic limitation of intake over several days or weeks.

No less than 85% of the animal's determined daily ration should be fed. Regulation below 85% must be justified in the animal use protocol and approved by the IACUC, and involve regular monitoring by the veterinary staff. The number of feedings must be twice daily, given at least six hours apart. A minimum of 25% of the daily food ration must be given in the morning prior to testing. If an animal does not completely consume the restricted ration, the current ration cannot be lessened or made more restrictive and the animal must be closely monitored for signs of illness and/or behavioral changes.

3.1.1 Monitoring Requirements

Food consumption, body weight, and body condition must be evaluated periodically and at intervals appropriate to the life stage. Young developing animals require

more frequent monitoring (*e.g.*, 2-3x weekly) than older mature animals who are performing stably (*e.g.*, once weekly). On days that animals are not tested, they must receive a full food ration divided into two equal meals.

The following parameters must be monitored and documented:

- The amount of food provided and the amount of food consumed at each meal by each animal. This must be monitored by the research team.
- The animal's body weight must be measured a minimum of once per week by the research team. Body weight must be measured at approximately the same time each day, and obtained consistently relative to training (*e.g.*, taken directly before training each day, as opposed to taken directly before training one day, and then taken several hours before training on a subsequent day).
- Body condition must be evaluated and scored at each physical examination by the Center for Animal Resources and Education (CARE) .
- Ethograms must be completed by CARE on a regular basis if behavioral abnormalities are noted.
- Clinical chemistry profiles (serum chemistry and complete blood count and differential) must be reviewed by CARE every 12 months, or more frequently if clinical abnormalities are detected.

3.1.2 Endpoints

Not all animals will perform well with food regulation as a behavioral motivator. Any animal must be temporarily removed from food regulation if:

- it has lost more than 15% of his/her projected Optimal Body Weight;
- it has an unsatisfactory body condition score (BCS) (<4/9); or
- it has significant abnormal behaviors that have not improved with intervention, or has abnormal laboratory data.

Food regulation may resume when improvements in body weight or behavior have been made and with approval from a veterinarian.

Animals must be permanently removed from food regulation if they continue to have significant problems in any of the areas identified above after being returned to food regulation following temporary removal more than twice.

3.1.3 Record Keeping

Food regulation records of animals must be maintained to include the following:

- The proposed individual full ration of food;
- The degree of regulation from full ration;
- The length of time for the regulation and results of monitoring parameters, such as body weight, BCS, behavioral assessments, and laboratory data;
- The individual animal's preferred positive food reinforcements; and
- The results of behavioral training.

Records must be available for review by the IACUC, veterinarians, animal caretakers, and for Post-Approval Monitoring (PAM) activities.



3.2 Fluid Regulation

Prior to initially placing an animal on fluid regulation, the animal must be given a complete physical examination by a veterinarian. Whenever possible, fluid regulation must be introduced gradually through a systematic limitation of intake over several days. Animals must not be offered less than 20 ml/kg/day of fluid. This is an estimate of fluid loss related to daily biological processes (*e.g.*, respiration, urination, defecation, etc.) for NHPs. Each animal must be provided with the opportunity to earn fluids to satiety during each work period. Animals failing to consume their calculated daily minimum fluid intake must be provided with supplemental fluids after the training session to ensure the minimum daily fluid intake level and hydration needs have been met.

3.2.1 Monitoring Requirements

Fluid regulation may result in a decreased appetite for dry diets; therefore, to the extent possible, fluids must be given during meal times to encourage consumption of more food and minimize body weight loss. Animals must be returned to higher fluid balances at least 48 hours prior to undergoing a surgical procedure. Increased fluids must also be provided for at least one week post-operatively depending on the analgesics, antibiotics, or anti-inflammatory agents used to treat the animal.

The following parameters must be monitored and documented:

- When on fluid regulation, regardless of whether actively working or not, the animal's body weight must be obtained at least once per week by the research team. The weight must be obtained at approximately the same time each day.
- A physical examination by a veterinarian with attention to the animal's body condition and assessment of clinical chemistry profiles (serum chemistry, osmolality, and complete blood count and differential) must be performed at least every 12 months or more frequently if clinically indicated.
- Each animal must be observed daily during periods of fluid regulation by the research team and/or CARE. Special emphasis should be placed on food intake, consistency of stool, amount of urine (*e.g.*, normal, no urine output) and behavior.
- Animals manifesting signs of dehydration, such as drinking urine, anorexia, scant or no urine output, scant hard feces, lethargy, incoordination, dry mucous membranes and corneas, reduced skin turgor, or other changes in behavior (*e.g.*, poor study performance) must be reported immediately to the veterinarian.

3.2.2 Endpoints

If an animal loses 10% or more of Optimal Body Weight while on fluid regulation, a veterinarian must assess the animal's body condition and physical well-being. If an animal's weight remains below 85% of Optimal Body Weight for 24 hours despite intervention, the animal must be given ad libitum access to water until its weight has increased to greater than 90% of baseline or Optimal Body Weight.

Animals must be given unrestricted access to fluid if there is >15% body weight loss from baseline, the BCS is <4/9, significant abnormal behaviors have developed, or clinical chemistry parameters are significantly out of normal range. The animal may be returned to study with approval from a veterinarian when improvements in body weight, BCS, and/or behavior have been made. Animals may be permanently removed from a fluid regulation study by a veterinarian (or the research team) if they continue to have significant clinical concerns that fail to respond to veterinary intervention.

3.2.3 Record Keeping

Fluid regulation records must be maintained as follows:

- Veterinary assessment of an animal's well-being prior to study must be maintained by CARE.
- The total daily consumption of fluid before and after regulation, inclusive of supplemental fluid sources and any high-water content food provided. The water content from the fruits and other sources (*e.g.*, jello) must be recorded if they count toward the minimum daily water consumption. These records will be maintained by the research team and/or CARE.
- The duration of the regulation and results of routine monitoring parameters, such as body weight, BCS, behavioral assessments, quality/quantity of urine and fecal material, appearance of visible mucous membranes and corneas, skin turgor and laboratory data will be maintained by the research team and/or CARE.
- Body weight must be logged by the research team a minimum of once each week while an animal is on fluid regulation.
- The results of behavioral training and testing must be recorded by the research team.

Records (*e.g.*, animal medical records, fluid logs, behavior assessments, etc.) must be available for review by the IACUC, veterinarians, and animal caregivers, and for PAM activities.

4.0 Definitions

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

Ad Libitum: is defined as 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: is 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, etc.) vary depending on the species, gender, growth and developmental phase, body weight, social ranking, and individual preferences.

Optimal Body Weight: is the weight of an animal with a body condition score of 4 – 6 out of 9.



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 in this policy. 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: is 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.

5.0 Responsibilities

All individuals to whom this document applies are responsible for becoming familiar with and following it. Animal research program stakeholders (IACUC, CARE, ARC) are responsible for promoting the understanding of this document and for taking appropriate steps to help ensure adherence to it.

6.0 Consequences for Violating this Directive

Violation of this directive 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 are a serious matter that may adversely affect both the ability to perform animal work and acquire funding sources.

7.0 Related Information

Brown University is a community in which employees are encouraged to share workplace concerns with University leadership. Additionally, Brown's Anonymous Reporting Hotline 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 directive and is not an all-inclusive list of policies, procedures, laws and requirements.

7.1 Related Policies/Guidelines/SOPs/Directives: N/A

7.2 Related Procedures: N/A

7.3 Related Forms:

- [Macaque Body Condition Scoring](#)

7.4 Frequently Asked Questions (FAQs): N/A

7.5 Other Related Information: References

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- *Guidelines for Diet Control in Animal Studies*, National Institutes of Health (NIH).
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- Willems, RA. 2009. Regulatory issues regarding the use of food and water restriction in laboratory animals. *Lab Animal* 38(10).

8.0 Document Owner and Contact

8.0 Owner: IACUC

8.1 Approved by: IACUC

8.2 Subject Matter Contact: Brown University Animal Research Compliance

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9.0 History

9.1 Effective Date: 5/5/2017

9.2 Last Reviewed: November 4, 2022

9.3 Update/Review Summary: This document is not new. It is being converted to a directive and was reviewed during the 11/4/2022 convened IACUC Meeting

- Converted to UC template 4/3/2020

