Background:

Animal studies may occasionally require the regulation of food or fluid intake to achieve a specific experimental goal, for example, studies of homeostatic regulation of energy metabolism or fluid balance, studies of the motivated behaviors and physiological mediators of hunger or thirst, and studies that regulate food or fluid consumption to motivate animals to perform novel or learned tasks. However, any use of food or fluid restriction to achieve a scientific objective must comply with regulatory standards:

The *Guide for the Care and Use of Laboratory Animals*, 8th Edition (2011), states:

"Animals should be fed palatable, uncontaminated diets that meet their nutritional and behavioral needs at least daily, or according to their particular requirements, unless the protocol in which they are being used requires otherwise. Subcommittees of the National Research Council Committee on Animal Nutrition have prepared comprehensive reports of the nutrient requirements of laboratory animals (NRC 1977, 1982, 1993, 1994, 1995a, 1998b, 2000, 2001, 2003a, 2006b,c, 2007); these publications consider issues of quality assurance, freedom from chemical or microbial contaminants and natural toxicants in feedstuffs, bioavailability of nutrients in feeds, and palatability."

"Animals should have access to potable, uncontaminated drinking water according to their particular requirements."

“The development of animal protocols that involve the use of food or water 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...”

“The animals should be closely monitored to ensure that food and fluid intake meets their nutritional needs... 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. In the case of conditioned-response research protocols, use of highly preferred food or fluid as positive reinforcement, instead of restriction, is recommended."

The USDA Animal Welfare Act [9 CFR, Subchapter A, Part 2, Section 2.38 (f)(ii)] states:
“Deprivation of food or water shall not be used to train, work, or otherwise handle animals; Provided however: That the short-term withholding of food or water from animals, when specified in an IACUC-approved activity that includes a description of monitoring procedures, is allowed by these regulations.”

Definitions:

- Regulation is defined as offering rodents special diets (i.e., something other than ad libitum standard rodent chow and drinking water) for experimental reasons.
- Restriction is defined as offering less than ad libitum access to food or water, and less than the normal daily intake of food or water for the species.
- Deprivation is defined as withholding food or water for greater than 24 hours.

IACUC Expectations:

To receive IACUC approval for food or water regulation, restriction, or deprivation, investigators must address the following subjects in their IACUC protocol application:

1. A scientific justification for the food/water regulation, deprivation, and/or restriction.

2. A description of how the food and/or water regulation, restriction or deprivation will be accomplished, including due consideration for:
   - Assurance that a palatable, uncontaminated diet that meets the nutritional requirements of the animals is being offered.
   - The least restriction possible to achieve the scientific objectives will be used.
   - The use of highly palatable or preferred food or fluid as a positive reinforcement will be used instead of restriction, if possible.

3. A description of the monitoring procedures that will be used to assess the health and well-being of the animals and prevent them from becoming dehydrated and/or malnourished, including provisions for:
   - The routine weighing of all animals, which should be not less than once weekly.
   - Establishing target weights or growth rates that are species-, age-, sex-, and strain-specific. However, target weights or growth rates need not be derived from comparisons to animals with ad libitum access to food, since in most cases ad libitum access is not optimal for long-term health. A sensible target growth rate for adult (between 20 and 113 weeks of age) Sprague Dawley rats on food restrictions might be 2 g/wk in males, and 1 g/wk in females. The criteria (preferably objective and well-defined) for the temporary or permanent removal of animals from deprivation and/or restriction conditions.

References:

