

23R0064

Optional Column E Explanation Form

This form is intended as an aid to completing the Column E explanation. It is not an official form and its use is voluntary. Names, addresses, protocols, veterinary care programs, and the like, are not required as part of an explanation. A Column E explanation must be written so as to be understood by lay persons as well as scientists.

1. Registration Number: 23-R-0064
2. Number 250 of animals used in this study.
3. Species (common name) Mesocricetus auratus of animals used in this study.
4. Explain the procedure producing pain and/or distress.
Hamsters undergo a 48 hour period of fasting.
No analgesics or anesthetics are administered.

5. Provide scientific justification why pain and/or distress could not be relieved. State methods or means used to determine that pain and/or distress relief would interfere with test results. (For Federally mandated testing, see question 6 below)

See attached sheet.

"Exemption from Feeding Standard"

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6. What, if any, federal regulations require this procedure? Cite the agency, the Code of Federal Regulations (CFR) title number and the specific section number (e.g., APHIS, 9 CFR 113.102):

Agency _____ CFR _____

23R0064

EXEMPTION FROM FEEDING STANDARD

Explanation of the procedures for which anesthetics will not be given.

Since we are studying the nutritional and energetic signals that control reproduction, in some of our experiments, animals are food restricted or fasted. During fasting or food restriction, no anesthesia or analgesics are given because the animals are not in pain or distress. However, despite the fact that the animals are not in pain or distress, we have been asked to fill in the number of animals that are food restricted or fasted in the space labeled "E" on Interagency Report Control NO. 01800-DOA-AN.

In our experiments, hamsters are food restricted or fasted to the extent that estrous cycles are interrupted but are not restricted further. When animals are fasted or food restricted, effects on fertility and ovulation occur long before any other adverse health consequences (Merry and Holehan, 1979; Merson and Kirkpatrick, 1981, Bronson, 1989). This is because animals have a sensory system designed to detect internal energy availability (Schneider, 1992). The sensory detectors of fuel availability send signals to parts of the brain that control fertility and ovulation as well as those areas that control hunger, food intake and caloric homeostasis. My experiments are designed to study the mechanisms that underlie this link between energy and fertility. Thus, in most experiments, hamsters are fasted to a degree that induces infertility and anestrus, but not to a degree that causes health problems. This is possible because fertility is affected prior to any effect on general health. All of the available information on the effects of food deprivation in Syrian hamsters comes from work in my own laboratory or in the laboratories of Drs. George N. Wade and Lawrence P. Morin. For example, Dr. Morin (Morin, 1975; 1986) found that a 48 hour fast, but not a 24 or 36 hour fast, on days 1 and 2 of the estrous cycle induced anestrus, but this fast had no other health effects. NOTE: Hamsters have a 4-day estrous cycle with ovulation and estrous behavior occurring on Day 4. One important piece of evidence demonstrating that a 48 h of fast is not harmful to Syrian hamsters is that when the 48 hour fast occurs on Days 2 and 3, Days 3 and 4, or on Days 4 and 1 or the cycle, there is no effect on estrous cyclicity (the hamsters showed normal ovulation rates and vigorous sex behavior). Ovulation and estrous behavior are inhibited only when the fast occurs on Days 1 and 2 of the estrous cycle, but not on any other days. Morin also found that normal estrous behavior could be easily reinstated in the 48 hour fasted hamsters by giving an injection of estradiol. Furthermore, the effects on estrous cyclicity are rapidly reversed when the hamsters are returned to ad lib feeding. I subsequently demonstrated that the same 48 hour fast had no effect on estrous cyclicity or health in previously fattened hamsters (Schneider and Wade, 1989, Schneider and Wade, 1990). Thus, a 48 hour fast has no effect on estrous cyclicity whatsoever when the hamsters have a high body fat content. In general, the fatter the hamster, the longer the period of food restriction necessary to induce anestrus. As long as the hamsters have