University of Vermont
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DEATH AS AN ENDPOINT - DEFINITIONS, POLICIES AND GUIDELINES

DEFINITIONS:

Death as an endpoint refers to projects in which the animals' induced death is required as a measured data point. It does not refer to projects in which the animals will be euthanized for tissue collection or project termination.

Moribund is defined as "in a dying state". Animals are considered to be moribund if they evidence unconsciousness or show no response to external stimuli such as a human hand introduced to the cage.**POLICIES AND GUIDELINES**

The *routine* use of death as an endpoint is discouraged. Researchers should always consider alternative endpoints and use those alternatives when the research objectives allow. Examples of alternative endpoints are listed in Table 1 below. Investigators must perform euthanasia on all moribund experimental animals unless there is scientific justification that euthanasia would invalidate experimental data collection. All "death as an endpoint" protocols without relief of pain or distress are identified as USDA Pain Level E.

If euthanizing a moribund animal would invalidate the study, the scientific justification for using death as an endpoint must be provided in writing as part of the animal care protocol and must be approved by the University of Vermont Institutional Animal Care and Use Committee (IACUC). Investigators who receive approval from the IACUC to use death as an experimental endpoint must also agree to the following:

1. Written records of all monitoring sessions, indicating the time of the observations, the person observing the animals, and any observations such as the number of animals evidencing clinically abnormal behavior and the number of animals found dead, must be maintained and made available to the Office of Animal Care Management and the IACUC.

2. Animals must be monitored at a minimum of twice daily and any animals evidencing clinically abnormal behavior must be removed from group housing situations and housed individually with easy access to food and water.

3. Use the minimum number of animals necessary to achieve statistical significance as estimated by a sample size calculation and to use alternative endpoints other than death whenever possible.

TABLE 1. Montgomery's endpoint criteria for the euthanasia of moribund animals (Taken from: Montgomery, C.A., Jr. Oncological and toxicological research: Alleviation and control of pain and distress in laboratory animals. *Cancer Bulletin;* **42**(4):230-237, 1990).

- Rapid weight loss (15-20% in less than a week).
- Extended period of weight loss (progressing to emaciated state).
- Spreading area of alopecia caused by disease.
- Rough hair coat, hunched posture, distended abdomen, or lethargy, especially if debilitating or prolonged (3 days).
- Diarrhea, especially if debilitating or prolonged (3 days).
- Coughing, rales, wheezing, and nasal discharge.
- Distinct icterus and/or anemia.

- Rapid growth of mass or masses or clinical signs of neoplasia.
- Central nervous system signs such as head tilt, tremors, spasticity, seizures, circling, or paralysis or paresis, especially if associated with anorexia.
- Frank bleeding from any orifice.
- Markedly discolored urine, polyuria, or anuria.
- Persistent self-induced trauma.
- Lesions interfering with eating or drinking.
- Clinical signs of suspected infectious disease requiring necropsy for diagnosis.
- Other clinical signs judged by experienced technical staff to be indicative of moribund condition.