

# Emory IACUC Tumor Burden Scoring Guidelines

**Purpose:** To establish guidelines that will allow Emory University laboratory and Emory animal care staff to objectively evaluate the health and welfare of animals carrying spontaneous or experimentally-induced tumors and determine when euthanasia might be warranted to alleviate pain and distress associated with these tumors. The recommendations presented in this document are intended to augment, not supersede, guidelines presented in other documents such as the Emory University *IACUC Endpoints Guidelines*. **These Tumor Burden Scoring Guidelines were accepted as a Standard Operating Procedure of the Emory IACUC by vote on July 18, 2007.**

**General:** In using animal models for the study of cancer, it is typically necessary that the animals utilized experience tumor growth and possibly metastatic disease. These processes can ultimately be very debilitating for the animal. In order to maximize study data acquisition and minimize animal pain and distress, the general health and welfare of test subjects needs to be continually and comprehensively assessed and documented as tumors and associated disease progress. With these health assessments, Emory veterinarian personnel in conjunction with laboratory personnel can determine when euthanasia is appropriate for the animal. In the absence of responsible laboratory personnel, euthanasia will be performed at the discretion of an Emory veterinarian.

When assessing the health of animals utilized in studies of cancer, the following clinical presentations warrant special attention as they indicate diminished health status that may result from increasing tumor burden and metastasis:

1. Weight loss and decreasing body condition
2. Severe diarrhea
3. Progressive dermatitis
4. Rough hair coat, hunched posture, lethargy, and recumbency
5. Respiratory-associated symptoms such as labored breathing, coughing, and nasal discharge
6. Icterus/Jaundice
7. Hemorrhage from any orifice
8. Neurological signs such as circling or ataxia
9. Self-trauma
10. Difficulty with ambulation due to tumor that might interfere with food and water acquisition
11. Ulceration and necrosis of visible tumors

**Scoring System:** To supplement the general criteria presented above, the following is a system that can be used to objectively establish a cumulative health score for an animal. The animals should be evaluated in each of the 3 areas presented and a total score determined. ***NOTE that all animals should have bodyweights recorded at the initiation of any study involving tumor growth and metastatic disease. Nomograms can be used for calculating normal mouse body weight for animals treated neonatally or as juveniles.*** Recommended actions for a range of scores are also provided.

1. **General Appearance and Body Condition (See Appendix 1 for Guidance)**
  - a. Normal with BCS of 3; Score=0
  - b. Poor hair coat, decreased activity with normal posture and mobility; Score=2
  - c. BCS of 2 with poor hair coat, decreased activity, or hunched posture; Score=3
  - d. BCS of 1 with poor hair coat and severe lethargy; Score=6
  - e. Moribund and/or severe cachexia; Score=19
2. **Tumor size and degree of necrosis or ulceration**
  - a. Tumor  $\leq$  7mm in any dimension; Score=0
  - b. Tumor  $\leq$  7mm in any dimension with minor ulceration; Score=4
  - c. Tumor 7-17 mm in any dimension; Score=9
  - d. Tumor  $\geq$  18 mm in any dimension, or abdominal distention; Score=12
3. **Bodyweight Change (in case of growing animals - % deviation from normal growth patterns)**
  - a. No change from pre-tumor weight; Score=0
  - b. Weight loss of 5-10%, or gain of 5%; Score=9
  - c. Weight loss of 10-15%, or gain of 6-9%; Score=12
  - d. Weight loss of  $>$  15%, or gain of  $>$  10%; Score=15
  - e. Weight loss of  $>$ 25%; Score=18

<b>Cumulative Score</b>	<b>Recommended Action</b>
<b>0-7</b>	Routine monitoring adequate.
<b>8-13</b>	Routine monitoring adequate. Consider initiation of supportive therapy such as fluid administration and creating easy access to food.
<b>14-17</b>	Communication between animal care personnel and lab personnel to determine action plan. Euthanasia is likely warranted and should be considered.
<b><math>&gt;</math>17</b>	Communication between animal care personnel and lab personnel to determine action plan. Euthanasia is warranted and will be performed either by lab or veterinarian personnel.

**Appendix 1**  
**Body Condition Scoring (BCS) Guide Taken from M. Ullman-Cullere**  
**Laboratory Animal Science, 1999.**



**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, 2-...)