

	Laboratory Animal Resources Center	<p style="text-align: center;"><b>Tumor Burden Guidelines for Rodents</b></p>	<p style="text-align: center;">Date: Created 4/01/2012, IACUC reviewed 9/13/2017</p> <p style="text-align: center;">1 of 2</p>
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These guidelines provide tumor burden limitations for rats and mice. These parameters were established to prevent pain or distress in animals as a result of spontaneous or experimentally-induced tumors. Adherence to these guidelines maximizes study data acquisition.

#### Tumor Implantation and Growth

- a. Subcutaneous: The tumor(s) should be located in a site or sites that will not interfere with normal body functions such as ambulation, eating, drinking, defecation or urination. Subcutaneous tumors located on the back or in the flank are considered to cause the least distress. If multiple sites are used, no more than four tumors should be implanted in one animal.
- b. *De novo* and metastatic tumor models: As the behavior of these tumor models cannot be predicted the Principal Investigator (PI) must outline possible or suspected adverse effects and describe the implementation of humane endpoints.
- c. Tumors induced in body cavities (cranium, orbit, abdomen, or thorax) will have specific growth limitations that must be described in the Animal Care and Use Protocol (ACUP). Intramuscular tumor growth is discouraged as it causes pain to the animal.

#### Tumor Size

- a. To help avoid measurement discrepancies, calipers should be used to measure tumors. In addition for consistency, only one or two observers from the lab should perform routine tumor measurements on a given study group.
- b. The tumor size limit is 17- 20mm (1.7 - 2.0cm) at the largest diameter in an adult mouse and 34 - 40 mm (3.4 - 4.0cm) in adult rats. Larger tumors must be specifically justified in the ACUP. If multiple subcutaneous tumors are implanted, smaller maximum tumor sizes must be described in the ACUP.
- c. Animal health concerns may be evident before the tumor reaches the maximum size limit. Limitations may include mobility restrictions, inability to access food and water, pain or discomfort due to pressure on internal organs or sensitive regions of the body or ulceration. *The AV should be contacted or the animal euthanized if an animal displays these signs, even if the maximum tumor size has not been reached.*

#### Monitoring

Mice and rats with developing tumors must be observed *no less than* three times weekly (evenly spread throughout the week) until a palpable tumor nodule is present (5-7.5mm in diameter). At this point daily monitoring is required for the duration of the study (this includes weekends and holidays). If tumor growth is rapid, twice daily monitoring may be necessary. Deviations from this monitoring schedule must be discussed with the Attending Veterinarian (AV) prior to the start of the study and justified in the ACUP.

If tumors are not palpable due to location, a monitoring schedule should be established based on pilot studies or existing knowledge. Pilot studies can be used to familiarize the PI with possible adverse effects and to define the critical growth timeline. Features to consider include tumor site, growth rate, invasion, distension, ulceration, metastasis, and cachexia.

#### Humane Endpoints

The overall well-being of the animal takes priority over precise tumor measurements in decisions regarding euthanasia or other interventions. The animals must be monitored closely for any severe impairment of physiological or neurological function. The AV must be contacted or the animal euthanized when any of the following signs appear.

- Tumor  $\geq 2.0$ cm or 20mm in diameter in mice or  $\geq 4.0$ cm or 40mm in diameter rats
- Dehydration, emaciation
- Depressed or restless/aggressive activity
- Labored respiration/cyanosis
- Neurological signs
- Abdominal distension
- Rough hair coat and/or hunched posture
- Restricted mobility
- Changes in feces/urine and/or perianal soiling, diarrhea
- Eye/nose discharge
- Hypothermia
- Ulcerated tumor
- Body Condition Scoring of  $\leq 2$  [<http://research.oregonstate.edu/larc>, Guidelines]