

Solitary foot mass on a Sprague-Dawley rat

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An animal technician noticed that a 30-month-old, male Sprague-Dawley rat had a growth on its left hind foot (**Fig. 1a**). He reported the rat to the veterinary services department of the Colorado State University Laboratory Animal Resources program for an examination. The rat was singly housed in static micro-isolator caging with a 12-h:12-h light:dark cycle and had *ad libitum* access to water and rodent chow (Harlan Teklad 8640, Madison, WI). Serologic evaluation of two dirty-bedding sentinel rats caged in the same room gave negative results for serum antibodies of common rat pathogens (rat coronavirus, parvovirus, Kilham's rat virus, rat theilovirus, Sendai virus, pneumonia virus of mice, *Mycoplasma pulmonis*, lymphocytic choriomeningitis virus and reovirus type 3).

We examined the rat and noted a 5-mm-diameter round mass on the plantar surface of the left hind limb. The mass was firm and grayish-red in color and had visible blood vessels coursing across its surface (**Fig. 1b**). The rat was in good body condition and showed no evidence of trauma on its body; palpation of the mass did not appear to cause any pain. The mass did not impede walking or seem to trouble the rat. We found no other abnormalities during our clinical examination.

We took a blood sample for a complete blood count and small animal biochemistry analysis. Blood was collected using a 22-gauge needle with syringe via standard tail vein venipuncture technique and immediately placed into EDTA and serum tubes for hematology and serum chemistry analysis. Blood and serum were processed and analyzed within 2 h at the Colorado State University School

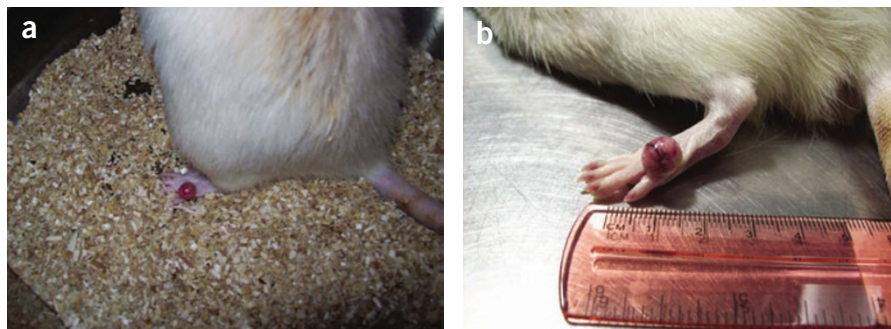


FIGURE 1 | Growth on the left hind foot of a 30-month-old, male Sprague-Dawley rat. (a) As reported by animal care staff. (b) At necropsy. The mass is 5 mm in diameter and has blood vessels coursing across its surface.

of Veterinary Medicine Clinical Pathology laboratory. The samples were evaluated using an automated hematology analyzer (Bayer Advia 120, Bayer Inc., Pittsburgh, PA). Chemistry samples were evaluated using a Hitachi 917 automated analyzer (Roche Inc., Basel, Switzerland). Both instruments are validated to analyze clinical samples from Sprague-Dawley rats. Hematology and biochemistry results were within normal ranges^{1,2}. Microscopic examination of blood smears showed rare lymphocytes with azurophilic granules, rare giant platelets, few acanthocytes, few keratocytes, moderate echinocytosis and slight polychromasia.

The next day, we took a fine-needle aspiration sample of the mass for cytologic examination. After staining the smear with Wright-Giemsa stain, we observed low to mild cellularity of a homogenous mononuclear cell population against a background laden with erythrocytes, platelet clumps and scattered leukocytes (**Fig. 2a**). The mononuclear cells were moderately sized and contained one moderately sized,

round to oval nucleus that was uniform in appearance. These cells possessed a stippled nuclear chromatin pattern; rare binucleated cells were observed (**Fig. 2b**). We saw moderate amounts of moderately basophilic, often vacuolated cytoplasm; anisokaryosis was minimal and anisocytosis was mild. A few rare cells possessed a high degree of anisokaryosis, having multiple, variably sized nuclei. The background contained moderate numbers of free, ruptured nuclei and amorphous, basophilic cellular debris. There were no cytological signs of infection or inflammation.

After cytologic examination and blood analysis, we used the rat for 2 weeks in non-stressful and non-painful teaching demonstrations to students. Then we euthanized the rat by carbon dioxide asphyxiation and carried out a complete necropsy. The mass had not changed in size or appearance during the 2 weeks before euthanasia. On necropsy, we did not observe any other gross lesions.

Samples of the mass and all other tissues (heart, lung, spleen, liver, kidney,

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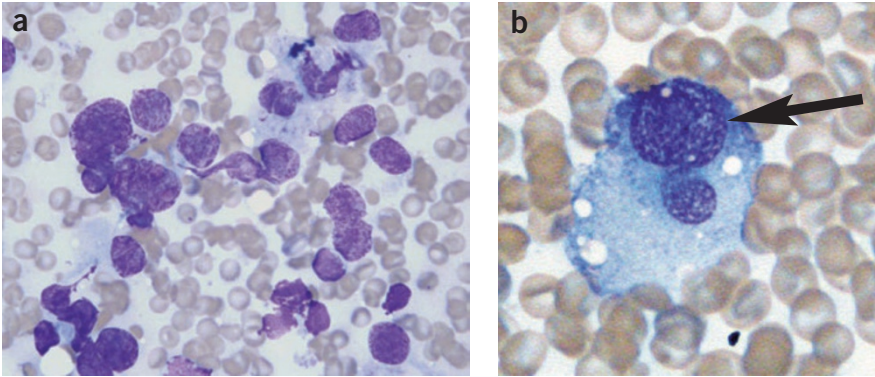


FIGURE 2 | Fine-needle aspirate smear of the mass in **Figure 1** stained with Wright-Giemsa stain. 100× objective magnification. **(a)** There is a homogeneous mononuclear cell population against the erythrocyte background, with a mixture of intact and ruptured mononuclear cells. **(b)** A binucleate cell with nuclei of different sizes. The nucleolus is prominent in the larger nucleus (arrow).

skin, adrenals, testes, bladder, lymph nodes and brain) were preserved in 10% buffered formalin. An acidic solution

with 12% hydrochloric acid was used to decalcify the foot with the skin mass. The tissues were then embedded in

paraffin and routinely stained with hematoxylin and eosin.

Microscopic examination of stained sections of the foot lesion showed an unencapsulated, well-demarcated, subcutaneous mass composed of sheets of round cells admixed with moderate amounts of collagenous stroma. Histologic sections of all other tissues we examined appeared normal.

Given the rat's age and clinical examination, do you think the foot mass is neoplastic? Do the clinical pathology data, cytology and brief histological description support a diagnosis of neoplasia? What type of neoplasm do you suspect?

What's your diagnosis?