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Severe runting in a laboratory mouse (*Mus musculus*)

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We discovered a runted 10-week-old juvenile male mouse in our animal research facility at the Children's Cancer Research Institute in San Antonio, TX. For breeding purposes, we classified the mouse as a mixed strain consisting of 50% C57BL6 and 50% SVJ129. As with all animals kept in our animal research facility, the mouse was fed autoclaved mouse diet (LM-485 Mouse/Rat Sterilizable Diet, Harlan Teklad Laboratory Animal Diets & Bedding, Madison, WI) and drank demineralized and acidified water (pH 2.5–3.0). The mouse and its littermates were exposed to a 14:10-hour light/dark cycle and housed in individually ventilated cages (Micro-VENT Mouse, Allentown, Inc., Allentown, NJ).

Upon physical examination, the mouse was bright, alert, and responsive. It measured 65 mm from the tip of the nose to the base of the tail and weighed 14.9 g. In comparison, its littermate siblings measured an average of 97.5 mm and weighed an average of 29.5 g, placing the runted mouse below the fifth percentile for both size and bodyweight. There were no other abnormalities detected.

Our laboratory animal facility houses mice that we use in conditional genetic

studies specifically designed to model human alveolar rhabdomyosarcoma, an aggressive soft tissue sarcoma of children. Because runting is an undesired morphological trait of specific tumor-prone transgenic mice in our colony, we genotyped the mouse by polymerase chain reaction (PCR) using a tail sample¹. PCR results for a modified version of the *Pax3* allele indicated that the runted mouse carried no transgenes associated with phenotypic runting.

We decided to keep the mouse as a teaching case under an approved IACUC protocol. The juvenile runted mouse was housed in a separate cage for a period of one month to allow for catch-up growth, and was then subject again to a thorough physical examination. In addition to the runting, this time a single abnormality was noted—a large protruding mandibular incisor encroached upon the tip of the animal's nose and an aberrant upper incisor grew inwardly, but could not be fully assessed (Fig. 1). As this animal was not vital to ongoing laboratory experiments, we chose to euthanize the mouse and examine the dental abnormality.



FIGURE 1 | A runted 14-week-old mouse (C57BL6 × SVJ129 strain) with a protruding mandibular incisor.

Assuming that genotype did not have a direct influence on this phenotype, what do you think was the cause of runting in this mouse?

What's your diagnosis?

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