C/Tia1 mice carry the knock-in allele, Smn1 (also known as allele C), a hybrid allele consisting of two tandem mouse Smn1/human SMN2 genes and the Tia1 knock-out allele. Female mice develop tail shortening and necrosis. Males exhibit impaired reproductive organ development. This mutant mouse strain may be useful in studies of modifiers of a mild mouse model of SMA.

Donating Investigator
Ravindra Singh, Iowa State University
The Smn (survival motor neuron) genes (Smn1 in mouse; SMN1 and the nearly identical SMN2 in humans) are found in a 500 kb inverted duplication on human chromosome 5q13. Loss of Smn1 due to exon 7 skipping is associated with spinal muscular atrophy (SMA). Mice carrying allele C (Smn1<sup>tm5(Smn1/SMN2)Mrph</sup>) develop a mild form of SMA that does not effect lifespan. Tia1 (cytotoxic granule-associated RNA binding protein 1) encodes a member of the RNA binding family that regulates SMN exon 7 splicing.

In C<sup>+/+</sup>/Tia1<sup>−/−</sup> mice, the knock-in allele, allele C, a hybrid allele consisting of two tandem mouse Smn1/human SMN2 genes, is combined with the Tia1 knock-out allele, double homozygous females develop earlier tail loss with the addition of the Tia1 allele, but develop tail necrosis similar to the C<sup>+/+</sup> mice. Reproductive organ development is impaired in double homozygote males. Specifically, testes mass is reduced, degeneration of seminiferous tubules is increased, sperm count is reduced, and spermatogenesis is impaired as compared to C<sup>+/+</sup> males. Mice homozygous for the Tia1 allele and heterozygous for the Smn1 allele (C<sup>+</sup>/Tia1<sup>−/+</sup>) are viable and fertile. This mutant mouse strain may be useful in studies of modifiers of a mild mouse model of SMA.
Genotyping Protocols

Standard PCR: Smn1
Standard PCR: Smn1 Alternate
Standard PCR: Smn1
Probe: Tia1 Probe
Genotyping resources and troubleshooting

Breeding Considerations

When maintaining a live colony, mice homozygous for Tia1 and heterozygous for Smn1 (allele C) may be bred. Mice homozygous for both alleles exhibit reduced fertility, specifically male reproductive organ development is impaired in males homozygous for allele C.

Additional Breeding and Husbandry Support

Mating System
See "Breeding Considerations"
Homozygous for Tia1<tm1Andp>
Heterozygous for Smn1<tm5(Smn1/SMN2)Mrph>
x Homozygous for Tia1<tm1Andp>
Wild-type for Smn1<tm5(Smn1/SMN2)Mrph>
and reciprocal

Citation
When using the C<sup>+</sup>/Tia<sup>−</sup>; SmnC/C/Tia<sup>−</sup> mouse strain in a publication, please cite the originating article(s) and include MMRRC stock #65937 in your Materials and Methods section.

Animal Health Reports
Facility Barrier Level Descriptions

Production of mice from cryopreserved embryos or sperm occurs in a maximum barrier room, G200
THE JACKSON LABORATORY’S GENOTYPE PROMISE

The Jackson Laboratory has rigorous genetic quality control and mutant gene genotyping programs to ensure the genetic background of JAX® Mice strains as well as the genotypes of strains with identified molecular mutations. JAX® Mice strains are only made available to researchers after meeting our standards. However, the phenotype of each strain may not be fully characterized and/or captured in the strain data sheets. **Therefore, we cannot guarantee a strain's phenotype will meet all expectations.** To ensure that JAX® Mice will meet the needs of individual research projects or when requesting a strain that is new to your research, we suggest ordering and performing tests on a small number of mice to determine suitability for your particular project. We do not guarantee **breeding performance** and therefore suggest that investigators order more than one breeding pair to avoid delays in their research.

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