Thin hair with small size (*thss*) is a new recessive hair mutation on Chromosome 12

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Mutation (allele) symbol: *thss*

Mutation (allele) name: thin hair with small size

Gene symbol: *thss*

Strain of origin: BALB/cJ-*Cst6*^{ichq}/J

Current strain name: BALB/cJ-*thss*/GrsrJ

Stock #012624 (jaxmice.jax.org)

Phenotype categories: hair, skeletal

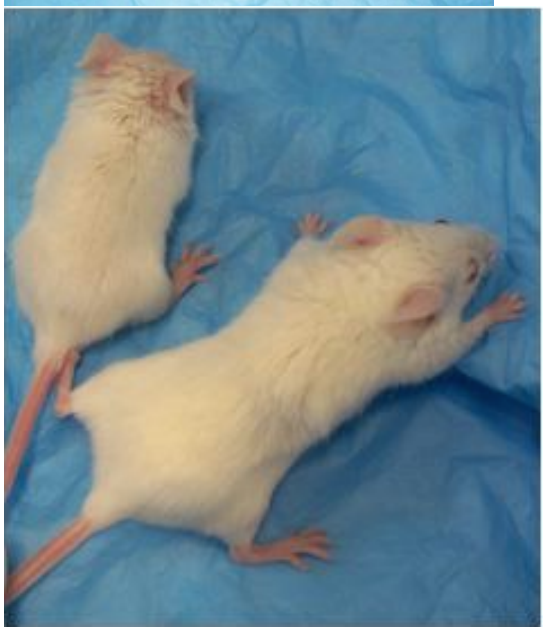
Abstract
We have identified a new mouse mutation affecting hair and body size that has been mapped to Chromosome 12, which we have named thin hair with small size, *thss*.

Origin and Description
Mice carrying the thin hair with small size (*thss*) mutation were discovered in a colony of BALB/cJ-*Cst6*^{ichq}/J mice in the Mouse Mutant Resource at The Jackson Laboratory. Homozygotes were first recognized by their smaller body size compared to their littermates. Their hair never grows in as a normal smooth full coat. This phenotype lasts throughout the lifespan of homozygotes. Both females and males are fertile and live a normal lifespan. As homozygotes age the hair fills in some, but not completely, and the animals begin to appear hunched and thin relative to controls.

Genetic Analysis
Using our standard mapping protocols the *thss* mutation was mapped to Chromosome 12. Using an intercross to CAST/EiJ *thss* was positioned between *D12Mit99* (NCBI 37 position 104.5 Mb) and *D12Nds2* (NCBI 37 position 115.1 Mb). This intercross produced less than the expected 25% of homozygotes in the progeny, suggesting some *in utero* death or incomplete penetrance. The *thss* mutation has a phenotype similar to the known thin hair, *thnh,* mutation but a direct allele test showed that they are not allelic.

Pathology
A routine pathological screen[1] of five homozygotes showed no lesions except in one homozygote in which lymphocytic infiltration was observed in the parathyroid gland. Assessment of brainstem auditory evoked potential in two homozygotes at 5 months of age showed that one of the two had elevated thresholds indicative of hearing loss. Assessment of the eyes of two one-month-old males with an ophthalmoscope did not detect any defect.

2 controls (left) and 4 *thss* homozygotes (right) at 6 days of age



thss homozygote (upper left) and heterozygote (lower right) at 20 days of age

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[1]**Standard Histology Protocol used in the Mouse Mutant Resource:** For fixation of tissues, mice were deeply anesthetized with tribromoethanol (avertin) until they no longer displayed a withdrawal reflex in the hind limbs and then perfused intracardially with Bouin's fixative following a flush of the vasculature with saline solution. After soaking in Bouin's for one week to demineralize bones, tissues were dissected. Six segments of spine with axial muscles and spinal cord in situ, representing cervical, thoracic and lumbar spinal segments, were dissected. The brain was removed and sliced into 6 cross sectional pieces at the levels of olfactory lobes, frontal cortex, striatum, thalamus, midbrain, rostral and caudal medulla with cerebellum. Midsagittal slices of hind leg through the knees were prepared. Slices of basal skull through the pituitary and inner ears were taken. Both eyes, salivary glands and submandibular lymph node, trachea plus thyroid and sometimes parathyroid were removed and cassetted. A longitudinal slice of skin from the back was removed. The thymus, slices of lung, and a longitudinal slice of heart were cassetted. Similarly slices of liver through gall bladder, kidney with adrenal attached, pancreas and spleen were prepared. The stomach was sliced longitudinally to include both squamous and glandular portions. Loops of small intestine from 3 levels and slices of large intestine and cecum were removed, as were slices of urinary bladder. The whole uterus, with ovaries attached, was taken. In males testes were sliced longitudinally. The accessory male organs including seminal vesicles, coagulating gland and prostate were removed en block. Altogether in most cases all tissue fit into a total of 10 cassettes. The cassettes were processed in an automatic tissue processor to dehydrate tissues which were then embedded in paraffin. Six micron sections were cut and stained with hematoxylin and eosin (H&E). Sections of brain and spinal cord in vertebral bones also were stained with luxol fast blue (LFB) for myelin and cresylecht violet (CV) for cellular detail.