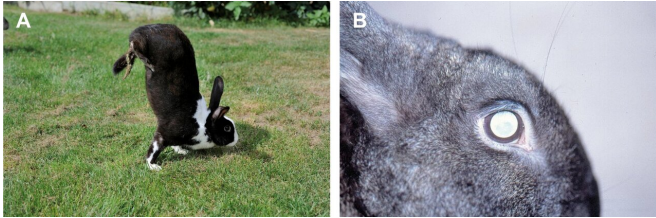


# Gene required for jumping identified in rabbits

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The sauteur d'alfort strain and associated phenotypes. (A) Typical posture of a sauteur rabbit (sam/sam) adopted when jumping (i.e., moving faster or across longer distances). Hindlegs are lifted from the ground, the body is held vertically, and locomotion is achieved through the alternate use of the forelegs. (B) Ocular malformations observed both in sam/sam and +/sam individuals include bilateral papillary colobomas, reduction in pupillary reflexes, bilateral cataracts with lesions in various components of the eye, glaucoma, and/or entropion and ectropion. Taken by (A) R. Cavignaux; (B) S. Boucher. Credit: Carneiro M et al., 2021, PLOS Genetics

Rabbits and other hopping animals require a functional RORB gene to move around by jumping, according to a new study by Miguel Carneiro of the Universidade do Porto and Leif Andersson of Uppsala University published March 25th in *PLOS Genetics*.

Rabbits, hares, kangaroos and some [rodent species](#) all travel by jumping, but this type of movement is not well understood on a molecular and genetic level. In the new paper, researchers investigated jumping-related [genes](#) using an unusual breed of domesticated rabbit called the sauteur d'Alfort. Instead of hopping, it has a strange gait where it lifts its back legs and walks on its front paws. By breeding sauteur d'Alfort rabbits with another breed and comparing the offspring's genomes and jumping abilities, the researchers identified the cause of this developmental defect. They identified a specific mutation in the RAR

related orphan receptor B (RORB) gene. Typically, the RORB protein is found in many regions of the [rabbit nervous system](#), but the mutation leads to a sharp decrease in the number of neurons in the [spinal cord](#) that produce RORB. This change is responsible for the sauteur d'Alfort's weird walk.

The new study demonstrates that a functional RORB gene is necessary for rabbits and likely other hopping animals to perform their characteristic jumping gait. The findings build on previous studies in mice, showing that animals that lack the RORB gene had a duck-like walk. Additionally, this work advances our understanding of the different ways that animals with backbones move.

"This study provides a rare example of an abnormal gait behavior mapped to a single base change and the first description of a gene required for saltatorial locomotion," the authors conclude. "It further demonstrates the importance of the RORB protein for the normal wiring of the spinal cord, consistent with previous studies in mouse."

**More information:** Carneiro M, Vieillard J, Andrade P, Boucher S, Afonso S, Blanco-Aguilar JA, et al. (2021) A loss-of-function mutation in RORB disrupts saltatorial locomotion in rabbits. *PLoS Genet* 17(3): e1009429. [doi.org/10.1371/journal.pgen.1009429](https://doi.org/10.1371/journal.pgen.1009429)

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