

***In Vivo* Multiscale and Spatially-Dependent Biomechanics Reveals Differential Strain Transfer Hierarchy in Skeletal Muscle**

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Supplementary movie 1. Axial section view of mouse hind limb imaged using ultrasound. Undeformed (without stimulation) and deformed (with stimulation).

Supplementary movie 2. Coronal section view of mouse hind limb imaged using ultrasound. Undeformed (without stimulation) and deformed (with stimulation).

Supplementary movie 3. Coronal plane view of a part of the tibialis anterior muscle. The white elongated dots are the nuclei. Imaged using optical microscopy (10X). Undeformed (without stimulation) and deformed (with stimulation).

Supplementary movie 4. High magnification (40X) Coronal plane view of a nucleus in the tibialis anterior muscle. Imaged using optical microscopy. Undeformed (without stimulation) and deformed (with stimulation).