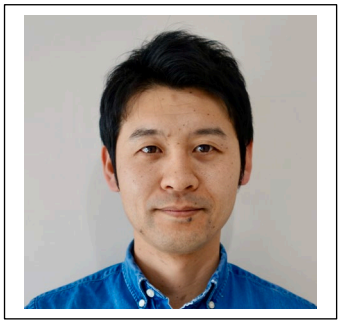
Research field: Regenerative Medicine



Principal Investigator: Ryo Fujita
E-mail address: fujiryo@md.tsukuba.ac.jp
URL: https://tmrc.md.tsukuba.ac.jp/laboratory/regenerative-medicine

Major Scientific Interests of the Group

Our group investigates how skeletal muscle mass, fiber type, and regenerative capacity are regulated at the molecular level. We study the functions of muscle stem cells and the mechanisms that determine muscle fiber type composition and growth, and how these processes are altered in aging and muscular dystrophy. Through these studies, we aim to develop new strategies to maintain or restore muscle health, contributing to the prevention and treatment of sarcopenia and muscle diseases.

Projects for Regular Students in Doctoral or Master's Programs

1) We aim to uncover how muscle stem cells are maintained and regulated by their niche and cellular heterogeneity, providing new insights into muscle regeneration and the development of stem cell–based therapies.
2) We aim to elucidate the molecular mechanisms that control skeletal muscle mass and fiber-type specification. In particular, we focus on the role of large Maf transcription factors in determining fast-twitch fiber identity and on how genetic variation influences muscle properties, adaptation, and disease susceptibility.

Study Programs for Short Stay Students (one week – one semester)

1) Short-stay students can acquire fundamental skills in skeletal muscle research, such as muscle fiber typing and satellite cell isolation.

Selected Publications

1) Sadaki S, Tsuji R, Hayashi T, Watanabe M, Iwai R, Wenchao G, Semenova E, Sultanov R, Zhelankin A, Generozov E, Ahmetov I, Sakakibara I, Ojima K, Sakurai H, Muratani M, Kudo T, Takahashi S, and **Fujita R***. ***Corresponding author.** "Large Maf Transcription Factors Reawaken Evolutionarily Dormant Fast-Glycolytic Type IIb Myofibers in Human Skeletal Muscle," *Skeletal Muscle*, Vol. 15, 2025.
2) Hayashi T, Sadaki S, Tsuji R, Okada R, Fuseya S, Kanai M, Nakamura A, Okamura Y, Muratani M, Wenchao G, Sugasawa T, Mizuno S, Warabi E, Kudo T, Takahashi S, **Fujita R***. ***Corresponding author.** "Dual-Specificity Phosphatases 13 and 27 as Key Switches in Muscle Stem Cell Transition from Proliferation to Differentiation," *Stem Cells*, 42(9): 830-847, 2024.
3) **Fujita R*,** Mizuno S, Sadahiro T, Hayashi T, Sugasawa T, Sugiyama F, Ono Y, Takahashi S, Ieda M. ***Corresponding author.** "Generation of a MyoD Knock-In Reporter Mouse Line to Study Muscle Stem Cell Dynamics and Heterogeneity," *iScience*, 26(5): 106592, 2023.
4) Sadaki S, **Fujita R***, Hayashi T, Nakamura A, Okamura Y, Fuseya S, Hamada M, Warabi E, Kuno A, Ishii A, Muratani M, Okada R, Shiba D, Kudo T, Takeda S, Takahashi S*. ***Corresponding author.** "Large Maf Transcription Factor Family Is a Major Regulator of Fast Type IIb Myofiber Determination," *Cell Reports*, 42(4): 112289, 2023.
5) Sénéchal C[#], **Fujita R**[#], Jamet S, Maiga A, Dort J, Orfi Z, Dumont NA, Bouvier M, Crist C. [#]***Co-first author.*** "The Adhesion G Protein-Coupled Receptor Gpr116 Is Essential to Maintain the Skeletal Muscle Stem Cell Pool," *Cell Reports*, 41(7): 111645, 2022.
6) Baker N, Wade S, Triolo M, Girgis J, Chwastek D, Larrigan S, Feige P, **Fujita R**, Crist C, Rudnicki MA, Burelle Y, Khacho M. "The Mitochondrial Protein OPA1 Regulates the Quiescent State of Adult Muscle Stem Cells," *Cell Stem Cell*, 29(9): 1315-1332.e9, 2022.
7) **Fujita R**, Jamet S, Lean G, Cheng HCM, Hébert S, Kleinman C, Crist C. "Satellite Cell Expansion Is Mediated by P-eIF2α Dependent Tacc3 Translation," Development, 148(2): dev194480, 2021.