

Role of mechanosensing machinery in muscle regeneration

Yuji Hara^{1,2}, Kotaro Hirano¹, Seiji Takabayashi¹, Mari Takeuchi¹, Masaki Tsuchiya¹, Yasuo Mori¹, Masato Umeda¹

¹Grad. Sch. Eng., Kyoto Univ., ²AMED, PRIME

Skeletal muscle has the capacity to regenerate myofibers after muscle injury. Upon a variety of stimuli including mechanical stretch, muscle-resident stem cells called muscle satellite cells (MuSCs) are committed to become myoblasts that can fuse with each other to generate multinucleated myotubes. We previously reported that transbilayer relocation of phosphatidylserine is essential for morphogenesis of myotubes through the function of PIEZO1, a mechanosensitive cation channel that is activated by membrane tension. However, the molecular entity that determines the cell fate of MuSCs remains to be elucidated. In this session, we will present our recent data showing that mechanosensitive ion channels play crucial roles in activation of MuSCs. *In silico* analysis demonstrates that at least three mechanosensitive ion channels including PIEZO1 are strictly expressed in MuSCs. By genetic elimination, we revealed that those mechanosensitive ion channels have distinct roles during myogenesis, suggesting that cell fate of MuSC is largely dependent on mechanosensation through a triad of mechanosensitive ion channels.