

Role of a magnesium ion-permeable cation channel TRPM7 in skeletal muscle regeneration

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Transient Receptor Potential Melastatin 7 (TRPM7) is an ubiquitously expressed cation channel that possesses unique features such as high permeability to magnesium ion, and the presence of a kinase-domain in its C-terminus. TRPM7 is known to be involved in a variety of cellular, physiological, and pathological processes including cell proliferation, embryonic development, and oxidative stress-induced cytotoxicity; however, it is still obscure whether TRPM7 plays a role in skeletal muscle. Here we show that TRPM7 plays a role in regeneration of myofibers after muscle injury. *In silico* analysis demonstrates that TRPM7 is predominantly expressed in muscle stem cells called muscle satellite cells (MuSCs) but not in mature myofibers. A conditional deletion of *Trpm7* led to impaired myofibers regeneration after cardiotoxin-induced myofiber injury, probably due to a proliferation defect in MuSCs. Thus, our results indicate that TRPM7 is crucial for maintenance of muscle homeostasis by regulating the fate decision of MuSCs.