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Characterization of stem cell systems in skeletal muscle and their contribution of fatty degeneration in skeletal muscle

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Obesity and diabetes are systemic disorders affecting adipose tissues, skeletal muscles, liver, vessels and nervous system. Skeletal muscle is the largest organ in the body and is the primary target of insulin. In various disease conditions such as obesity, muscle wasting disorders and aging, skeletal muscles undergo fatty degeneration and atrophy, which result in insulin resistance. Our group has identified and characterized mesenchymal progenitors, which contribute to fatty degeneration. Mesenchymal progenitors are located in interstitial space in skeletal muscles, positive for platelet-derived growth factor- α , CD90 and CD82, and are distinct from satellite cells. We have established a culture system to separate satellite cells and mesenchymal progenitors by FACS cell sorting both from mouse and human skeletal muscles. Preventing fatty degeneration in skeletal muscle is important for therapeutic strategy not only for muscle wasting disorders but also for obesity and diabetes. We have performed drug repositioning and screened various compounds to identify drugs to prevent ectopic adipocytes in skeletal muscle. We have identified anti-histamine drugs as candidate compounds of inhibitors of fatty degeneration in skeletal muscles. Anti-histamine drugs inhibited adipocyte differentiation of mesenchymal progenitors from human skeletal muscle in culture and suppressed ectopic fat cell formation in tendon rupture model with intramuscular fat deposition. Our results suggest that our strategy is useful to identify promising drug candidates to prevent fatty degeneration of skeletal muscle in various pathological conditions.

Biography

Kunihiro Tsuchida has completed his MD/PhD in 1992 from Kyoto University, School of Medicine and Postdoctoral studies at the Salk Institute for Biological Studies. He is presently a full Professor in Fujita Health University, Institute for Comprehensive Medical Science and also appointed as Adjunct Professor in School of Medicine and School of Health Sciences in Fujita Health University. He has published more than 110 international papers in endocrinology-related and cell biology-related journals.

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