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Role of organic cation transporter 3 (OCT3) in adipogenesis and novel OCT3 isoforms with internalized subcellular localization

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Organic cation transporter 3 (OCT3) mediates the uptake of the neurotransmitters epinephrine, norepinephrine and histamine and the neuromodulators agmatine, Cyclo (His-Pro) and salsolinol. It also plays a role in the therapeutic action of anti-diabetic drug metformin. Recent studies have identified OCT3 as a strong susceptibility gene for coronary artery disease (CAD) and prostate cancer. OCT3 exhibits a broader tissue distribution and is found relatively high-expressed in prostate, skeletal muscle, liver, adipose, yet the roles of OCT3 in adipose are largely unknown. Here, we used the pre-adipocyte 3T3-L1 to study the role of OCT3 in adipogenesis. We found that overexpression of mouse oct3 enhanced 3T3-L1 adipocyte differentiation, as evidenced by increased lipid accumulation by oil red o staining and elevated mRNA levels of both CCAAT/enhancer binding protein- α (C/EBP α), peroxisome proliferator-activated receptor- γ (PPAR γ) and adipocyte fatty acid-binding protein (aP2). We also uncovered two novel isoforms of human SLC22A3 gene during cloning of OCT3 from human tissues and cell lines, which lack of exon 6 and exon 6, 7 respectively. Transportation capacity of MPP⁺ by those truncated OCT3 isoforms were significantly decreased compared with that of transfected full-length OCT3 HEK293 cells. GFP-tagged OCT3 novel isoforms revealed that truncated OCT3 retained in cytoplasm while full-length OCT3 is detected on cell plasma membrane.

Biography

Ligong Chen has completed his PhD from University of California at Berkeley and Postdoctoral studies from UCSF School of Medicine and Pharmacy. He is the Principal Investigator in Pharmacology and Toxicology of Tsinghua University School of Medicine, a premier University in China. He has published more than 20 papers in reputed journals including Nature Genetics, PNAS and JBC et al. He is an expert in transporter physiology and pharmacology. His lab is working on various transporters' role in human diseases, using metabolomics, genomics and proteomics as major tools.

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