

Characterization and adipogenic differentiation of myogenic satellite cells isolated from Korean black goat

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To investigate the hypothesis that muscle and adipose tissues are mesodermal in origin we isolated semitendinosus muscle from prepubertal Korean black goat and proliferated to study the differentiation of characterized myogenic satellite cells to adipogenic lineage. Isolated myogenic satellite cells from semitendinosus muscles were characterized for its stemness with CD44, CD34, Vimentin, CD13 and CD 106 surface markers using flow cyclometry. The entire experiments were grouped into four as A: Control (without treatment); B: TZD; C: TZD + L.A; D: TZD + Retinoic acid. Cells proliferated and differentiated further without any treatment did not leave the myogenic lineage at any given point of differentiation. However, upon exposure of myogenic satellite cells with adipogenic induction medium comprising of insulin, acetic acid, ascorbic acid, pantothenic acid, isobutyl methoxanthane, biotin and dexamethasone when proliferated cells reached confluence >95%. Induction mixture during 48 hours in culture initiated considerable production of lipid droplets. Subsequently, induced cells when treated with TZD (10 uM), TZD (10 uM) +LA (100 uM) and TZD (10 uM) + RA (1 uM) prompted the process of diffusion of lipids through cellular membrane by endocytosis. Treatments were given to cells until d 8. Cells were harvested on d 0, 4 and 8 and subsequently analysed. Cells in control group demonstrated the formation of myofibers which was prominently seen in H&E staining and expressed myogenic specific genes such as MyoD, MHC and SMA. On the contrary, Oil red O staining was seen in all the treatment groups with relative variation in the intensity and elution index. Moreover, upregulation in adipose specific genetic markers such as PPAR γ , AdipoQ and LPL confirmed in all treatments. Conclusively, TZD+LA appeared to produce adipogenesis with statistically significance when compared to other treatment groups.

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