1-A-01 Relationships between amount of satellite cells and muscle properties in rats
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Purpose: Satellite cells (SCs) are muscle stem cells capable of increasing myonuclear numbers according to muscle fiber development. To investigate determination factors for amount of SCs, histochemical, biochemical and EMG activity were determined in 15 muscles in the rat muscles.

Methods: Fifteen muscles were taken from 3 wistar male rats (400-500g), and then fiber type composition, number of SCs/muscle fiber and metabolic properties (SDH / PFK enzyme activities) were determined by immunohistochemical and biochemical analysis. Relative expressions of rat Pax7 mRNA (REP7) in each muscle were measured by real time RT-PCR systems (Applied Biosystems). Furthermore, in another 7 rats (500-600g) integrate EMG activities in the each muscle were determined by non-line automatic recording system (3ch) for 3days (DSI and Library systems).

Results: Diaphragm and soleus muscles had obviously high %Type I fibers (24% and 81%), REP7 (3.7 and 9.2) and metabolic properties (0.34 and 0.21), as compared to other 13 muscles [mean value (SD) of %Type I fibers = 7.5(6.0), REP7=1.4(0.4) and metabolic properties= 0.07(0.02)]. A weak significant relationship was found between number of SCs and REP7 (r=0.57; p<0.05). High integrated EMG activities were also found in diaphragm (7.5) and soleus (5.0) muscles, as compared to other 13 muscles (2.3). Although the integrate EMG for 24hr was not strongly correlated to REP7 (r=0.6; p<0.05), there were highly correlated relationships among %type I fibers, metabolic properties and REP7 (r=0.86~0.94; p<0.01).

Conclusion: These findings indicated that satellite cell proliferation could be influenced directly by turnover rate of muscle contractile protein and metabolic properties.

Key words: Muscle fiber type, Pax7, SDH/PFK, EMG

1-A-02 Proliferation and differentiation capacity of myogenic cells derived from human skeletal muscle: Effects of age, gender and the region of localized muscle.
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Purpose: The proliferation and differentiation potential of human skeletal muscle-derived myogenic cells were investigated in the in vitro cell culture in relation to the age, gender and the regions of localizing muscles.

Methods: Muscle samples (3-15g) were obtained from soleus, gastrocnemius, tibialis anterior, and rectus abdominis muscles from 17 to 79-year-old male and female subjects as the clinical research approved by our faculty. Mononucleated cells were extracted by enzymatic digestion, then sorted as (1) CD34+/45/29, (2) CD34+/45/29, (3) CD34+/45/29, and (4) CD34+/45/29 cells by flowcytometry (FACS). The most appropriate culture condition was determined using several cytokines and FACS. Cell doubling-times and myogenic differentiation capacity in vitro was examined by myotube-formation analysis, immunocytochemistry and RT-PCR.

Results and Discussion: Myogenic differentiation was detected in the three cell fractions as (1), (2) and (3), and it was strongest in fraction (3). This result indicated that three kinds of myogenic cells were present in the human skeletal muscle. Interestingly, these capacities were not affected by age, gender and the region of localizing muscles. This means that basic cellular capacities of human myogenic cells were wholly maintaining without any reference to age, gender and the localizing muscles in the appropriate culture condition. Therefore, generally observed ageing dependent decrease in muscle cell functions on human may be largely depending on in vivo cell niche.

Key Words: MyoD, Pax7, bFGF, EGF, IGF-1.