

FOLLOW UP OF HUMAN MYOGENIC CELLS FROM DONORS AGED 2- 82 YEARS

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We investigated whether the lifelong turnover of the organotypic muscle stem cells, the satellite cells, might lead to their exhaustion in aged people. Human myogenic cells derived from donors aged 2-82 years (n=12) were implanted into soleus muscles of immunincompetent mice.

In addition, we studied myogenic cells from biopsies of 3 children suffering from Duchenne muscular dystrophy (DMD), a disease in which satellite cells are proposed to suffer premature ageing due to continuous demand for muscle regeneration.

Seven to 12 weeks after implantation, grafted cells were quantified by structural features (muscle fibres expressing human protein and human nuclei/myonuclei) and by the amount of human DNA extracted from these muscles.

When considering highly pure myogenic cell preparations, we observed an inverse relation between the donors' age and the proliferative capacity in vitro as well as in vivo with about 2 divisions of each satellite cell per 10 years of life. Myogenic cells from the oldest donors still grew human muscle tissue, indicating a residual proliferative capacity even in aged donors in spite of a continual loss of growth capacity of satellite cells in the living muscle.

On the other hand, cell preparations with initially low or decreasing myogenicity during expansion in vitro showed completely different growth characteristics, e.g. increased proliferative capacity, longer telomeres and lower myogenicity of the tissue formed upon implantation.

We suggest a "Desmin Factor" (DF) to predict myogenicity of the human tissue formed in vivo from the growth characteristics during expansion in vitro. This may serve as a prognostic tool for transplantation efficacy in human trials.

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