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Bone marrow transplantation as mode of stem cells therapy of mdx mice muscle dystrophy

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Mdx mice are experimental model of cureless human monogenic disease Duchenne Muscular Dystrophy (DMD). Hopefulness for cure is connected with use of stem cells therapy particular but not exclusively. Analysis of multiple experimental results shows what intramuscularly transplantation of different types of cells of different origins with stem cells properties can't transform mutant striated muscles fibers (SMF) into wild type SMF. It's explained by the loss of stemness by transplanted cell. As a rule cultured cells lines do not contain stem cells with pluripotent properties, which are capable for self maintenance. It was concluded that only replacement of mutant bone marrow by wild type bone marrow cells can convert mutant SMF into SMF of wild type. Unfortunately X-ray irradiation of mdx mice with lethal dose for mdx mice 11, 7 or 5 Gy with next transplantation of wild C57BL/6 mice bone marrow cells did not increase SMF dystrophin synthesis. The absence of dystrophin synthesis is consequence of suppression of dystrophin gene expression by transplanted nuclear in the mdx mice SMF myoplasm. There was a stable growth of dystrophin synthesis after nonlethal X-ray irradiation 3 Gy. The part of dystrophin positive SMF of M. quadriceps increased from 1% up to 4% (2 months), 12% (4 months) and 27%(6months) after irradiation. Growth of dystrophin synthesis is accompanied by decrease of level of SMF death and by increase of part of SMF without central nuclear up to 22%. Size and structure of nerve muscle junctions (NMJs) of M. quadriceps and of diaphragm SMF were partly reconstructed at 4 months and fully at 6 months after change of bone marrow. Reparation of NMJs structure is accompanied by recovery of membrane resting potential more expressed in the end-plate region. Work was funded by contract # 02.740.11.0094 of Russian MES and by Grant RFBR # 10 04 00970a.

Biography

Prof. Viacheslav M. Mikhailov has completed his Ph.D at the age of 31 years from Mechnikoff Medical University (St.Petersburg) and postdoctoral studies from Institute of Cytology RAS at the same city. He is the head of Group of Cell Population Genetics of Dep. of Intracellular Signaling and Transport Institute of Cytology RAS. He has published more than 70 papers in reputed journals.