The Effect of a New LncRNA 2953 on Muscle Creation

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Long non-coding RNAs (lncRNA) could become a revolutionary treatment for people with muscle ailments if they could be inserted into the muscle stem cells (or myoblasts) to control their proliferation or differentiation. Last year, I studied the ability of certain microRNAs that are induced during differentiation, like miR-206, and found that by themselves they induce differentiation in C2C12 mouse muscle (myoblast) cells. This year, I studied lncRNA 2953. lncRNA 2953 is significantly upregulated during muscle differentiation and so I hypothesized that like miR-206 it will help differentiation. I first defined the structure of lncRNA 2953 by PCR with primers designed from the chromosome sequences on either side of the then known transcript. I expanded the transcript by 1600 b and found that there are several splicing junctions and contains no open reading frames. I then analyzed lncRNA 2953's function by comparing C2C12 cells transfected with si2953 to cells transfected with a negative control siRNA. Quantititative-Reverse-Transcription-PCR for Myosin Heavy Chain, Myogenin, miR-133b, Mef2c, and lncRNA linc-MD1 was used to follow muscle differentiation. In cells induced to differentiate by depriving growth factors (differentiation medium), knockdown of lncRNA 2953 increased the levels of these factors implying that knockdown accelerates differentiation. Immunofluorescence for MHC confirmed an increased cell fusion and MHC levels after 2953 knockdown. Thus, although it is induced during differentiation, my results disprove my original hypothesis that lncRNA 2953 is a promoter of differentiation. Instead they suggest that lncRNA 2953 brakes differentiation induced by growth factor deprivation.