**Supplement 1. Primary cultured MPCs.** (A) The muoD expression (a marker of myogenesis MPCs) was assessed in the first of third passaged cells by immunohistology. A positive myoD was determined as a red spot localized in the nuclei. (B) α-smooth muscle actin (a marker of myofibroblast was assessed by immunohistology in third passaged of MPCs. The positive α-smooth muscle actin was stained red color.

**Supplement 2. Additional change of microRNA in aging Muscle.**
Supplement 3. **Ki67 was decreased in aged mice muscle vs young's.** The Ki67 expression, a marker of proliferation, was assessed by western blotting in muscle lysates from young and old mice. Results in the bar graph compare the densities of protein bands in aged muscle expressed as percentage change from levels in young mice. All band densities were normalized to the density of GAPDH (Bars: mean ± s.e.; n=4; *p<0.05 vs young).

Supplement 4. **miR29 changed cell shape in MPCs.** MPCs supplied miR-29 exogenously led to flat cells resembling a fried egg, which indicated cell senescence.

Supplement 5. **miR29 increases cellular arrest in MPCs.** The protein levels of B-myb, p53, p16\(^{INKA}\), RB, and GAPDH were measured in MPCs treated with either control or Ad-miR-29. Two bands of the RB protein were detected. The lower band in hypophosphorylated RB (pRB; MW 112kDa). The bar graph shows the density of each 48 hour protein band expressed as a fold change from control levels (control set to 1 and indicated by horizontal line in the graph). All band densities were normalized using the density of GAPDH (Bars: mean ± s.e.; n=9; *p<0.05 vs. Ad-ctrl).

Supplement 6. **The mechanism of miR29-induced senescence.** With aging, the miR-29 promoter is activated by Wnt-3a. miR-29 then reduces levels of IGF-1, p85 and B-myb by directly binding to the 3'-UTR of each mRNA. Reduced levels of IGF-1, p85 and B-myb increase the level of cell arrest proteins (p53, p16 and RB). The increase in cell cycle arrest proteins block progression through the cell cycle and inhibit cell proliferation and induce cellular senescence.