p38 in muscle differentiation

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The adult muscle has stem cells called satellite cells. Those cells are quiescent in a normal situation and they get activated after injury. The most important function of satellite cells is to allow post-natal muscle growth and regeneration. After an injury satellite cells become active and they can be called activated satellite cells or myoblasts. Myoblasts proliferate and they either activate the myogenic program to differentiate into myotubes or they return to be quiescent replenishing the satellite cell pool. p38 is a well known kinase that is able to activate the myogenic program in satellite cells. The study of how p38 can activate myogenesis might be very important to find a cure for several muscle diseases. We wanted to determine when p38 is activated in satellite cells, where the active form localizes and if it forms foci. With the immunofluorescence we saw that p38 is active and forms nuclear foci upon differentiation stimuli, such as cell-to-cell contact and serum withdrawal. We confirmed the presence of active p38 only upon differentiation stimuli through the Western Blot analyses. The activation of p38 and the formation of p38 nuclear foci seemed to be an early event, indeed, it occurs before the expression of MyHC, a late marker of regeneration. p38 is able to activate and repress genes by epigenetic mechanisms and its ability to form foci may suggest that it performs its role in a localized part of the nucleus. It would be interesting to perform more experiments analyzing this aspect with the goal to find new pharmacological targets for the cure of important diseases, such as rhabdomyosarcoma and muscle dystrophies.

Awards Won: