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ICAM-1 expression by skeletal muscle cells augments stages of myogenesis

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We previously reported that intercellular adhesion molecule-1 (ICAM-1), an important protein of the inflammatory response, was expressed by satellite cells and myofibers of hypertrophying muscles. As skeletal muscle cell expression of ICAM-1 contributed to the formation of regenerating fibers, as well as hypertrophy to mechanical overload, we speculate that ICAM-1 expression by skeletal muscle cells facilitates myogenesis. Therefore, the purpose of the current study was to establish phenotypic alterations associated with skeletal muscle cell expression of ICAM-1. Through stable transfection of C2C12 myoblasts with an ICAM-1 plasmid, we found ICAM-1 expression augmented stages of myogenesis in which myotubes are forming, adding nuclei, aligning, synthesizing proteins, and hypertrophying. As the cytoplasmic domain of ICAM-1 is capable of activating several intracellular signaling pathways, we selectively inhibited the function of the cytoplasmic domain with a cell permeable peptide to reveal underlying mechanisms involved in ICAM-1 mediated myogenesis. Here, we showed that the ICAM-1 cytoplasmic domain contributed to enhanced rates of protein synthesis via increased Akt/p70s6k signaling. Hence, our findings extend knowledge of the immunobiology of skeletal muscle cells by revealing a novel mechanism through which the inflammatory response facilitates myogenesis.

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