ESSENTIAL AMINO ACID LEUCINE AND PROTEASOME INHIBITOR MG132 ATTENUATE CIGARETTE SMOKE INDUCED CATABOLISM IN C2 MYOTUBES

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Exposure to cigarette smoke (CS) and cigarette smoking have been shown to promote catabolism of skeletal muscle. Previous studies and recent findings from our laboratory have demonstrated the involvement of the ubiquitin proteasome system and the muscle-specific E3 ubiquitin ligases MAFbx/atrogin-1 and MuRF1 in CS induced skeletal muscle catabolism. Essential amino acid leucine is a known anti catabolic agent that improves skeletal muscle metabolism in various atrophic conditions. To examine the protective effect of leucine and proteasome inhibition in CS induced muscle catabolism, C2 myotubes, from an *in vitro* skeletal muscle cell line, were exposed to CS in the presence or absence of leucine and proteasome inhibitor, MG132. Diameter of myotubes, levels of the main contractile proteins – myosin heavy chain and actin, expression of MAFbx/atrogin-1 and MuRF1 were studied by microscopy, Western blotting and qPCR. Leucine pretreatment prevented CS induced reduction in diameter of myotubes and degradation of myosin heavy chain by suppressing the up-regulation of MAFbx/atrogin-1 and MuRF1. MG132 also attenuated CS induced decrease in diameter of myotubes and degradation of myosin heavy chain. Our findings demonstrate that supplementation with the essential amino acid leucine and inhibition of the proteasome may protect skeletal muscle from CS induced catabolism.