EFFECTS OF INTRAPERITONEAL INJECTIONS OF CIGARETTE SMOKE EXTRACT ON ISOLATED SKELETAL MUSCLE CONTRACTILITY

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Introduction and objectives: Chronic tobacco smokers show exercise intolerance and decreased muscle force, mass and fatigue resistance. Muscle dysfunction may be due to hypoxia, systemic inflammation, or the noxious compounds of the cigarette smoke (CS), thereby affecting muscle cells. However, the direct effects of CS on muscle function, bypassing the lung injury, are not known. The aim was to investigate the chronic effects of intraperitoneal injections of a cigarette smoke extract (CSE) in mice on isolated muscle contractility and fatigue resistance. Materials and Methods: Ten male mice (C57/BL6), 12 weeks old, were injected (i.p.) with CSE 100% (CSE group, n=4) or buffer (PBS, control group, n=6) weekly for 3 weeks, and anesthetized/euthanized 5 weeks after the last injection. CSE 100% was prepared by bubbling the smoke of five cigarettes in 10 mL of PBS, pH 7.4. Isolated extensor digitorum longus (EDL) and soleus muscles were dissected and electrically stimulated. Muscle contractility and fatigue resistance were evaluated and tension development was normalized to the muscles’ cross-sectional area. Results and conclusions: Muscles from the control vs. CSE groups were not different in either maximal tension, twitch tension, or the midpoint of the force-frequency relationship in either EDL or soleus. Time to fatigue (time necessary to decrease initial tension by 70%) was not different in control vs. CSE groups in soleus (483±48 vs. 398±79 sec, respectively), but showed a trend to lower values in the CSE group vs. control in EDL muscle (196±9 vs. 227±10 sec, respectively, p=0.06). Thus chronic CSE treatment by i.p. injections in mice did not affect contractility, but may affect fatigability in fast-twitch muscles. The data suggest that CS-induced muscle dysfunction is not due solely to the direct action of the compounds present in CS. Acknowledgements: CNPq, CAPES, FAPERJ. Key Words: Muscle force, fatigue, smoke condensate.