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   2020Y012

2. Title
   Effects of Smoking and Passive Smoking on Locomotive Syndrome and Establishment of the Preventive Methods

3. Period
   2020-2022

4. Summary
   Sarcopenia is an age-related skeletal muscle disorder characterized by the progressive loss of muscle mass and function, resulting in physical disability and mortality. Oxidative tissue damages in skeletal muscles have been implicated as one of key causative factors in the multiple mechanisms of sarcopenia. Tobacco smoke and the aerosols yielded by heated tobacco devices contains many toxic chemicals including highly unstable free radicals, reactive oxygen species, and carbonyl compounds including acrolein. Here, we investigated the muscular injury induced by cigarette smoke extract (CSE) and heated tobacco products (HTPs) using murine myoblast C2C12 cells as an *in-vitro* model. The exposure of either CSE, HTPs, or acrolein decreased the cell viability in C2C12 myoblasts. Moreover, the distribution change of actin filaments was found in the cells exposed to CSE, HTPs, or acrolein, accompanied with the deactivation of the ROCK2/LIM kinase-1/cofilin signaling pathway. The differentiation to myotube and the expression of myogenic marker protein were suppressed as well. These defects were partially restored by treatment with either *N*-acetylcysteine, ethanol-extracted Brazilian green propolis, or a natural carotenoid, crocetin. Our findings indicate that daily intakes of foods with antioxidant effects may contribute to the maintenance of skeletal muscle homeostasis by the protection from environmental oxidants in cigarette smoke.