P16 Lumbrokinase and Dilong Cardio Protective Effects against Second-Hand Smoke Induced Apoptotic Signaling in SD Rat Hearts

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Exposure to environmental tobacco smoke has been epidemiologically linked to heart disease among non-smokers. However, the molecular mechanism behind cardiac disease pathogenesis is not well known. This study found that SD rats exposed to tobacco cigarette smoke at a dose of 10 cigarettes for 30 mins twice a day for 1 month exhibited reduced left ventricle to tibia length ratio (mg/mm), increased cadiomyocyte apoptosis as identified by TUNEL assay and wider interstitial space as identified by H&E stain. However, lumbrokinase and Dilong both reverse the effects of SHS. We used Western blotting to demonstrate significantly increased levels of the apoptotic effecter caspase-3 in rat hearts exposed to SHS. Elevated protein levels of Fas, FADD, and promoted apoptotic initiator activated caspase-8, a molecular of the death-receptor-dependent pathway, coupled with increased t-Bid and the apoptotic initiator activated caspase-9 were found. Molecules of the mitochondria-dependent pathway, which is breaking the mitochondrial membrane potential in rats exposed to second-hand smoke (SHS) were also found. These factors are indicative of cardiac apoptosis. However, rat treatment with Lumbrokinase and Dilong inhibit SHS-induced apoptosis. With regard to the regulation of survival pathway, using Western blotting, we found that cardiac pAkt, Bcl2, Bcl-xL protein levels were significantly decreased in rats exposed to SHS. These factors were reversed with treatment with Lumbrokinase or Dilong. We found that the effects of SHS on cardiomyocytes are mediated by the Fas death-receptor-dependent apoptotic pathway, imbalanced the mitochondria membrane potential and decrease survival signaling. However, treatment with both Lumbrokinase and Dilong inhibits the SHS effects. We believe Lumbrokinase or Dilong might prevent the epidemiological incidence of cardiac disease in SHS-exposed non-smokers.

Key Words: cardiac survival signaling, caspases, death-recptor-dependent pathway, mitochondria-dependent pathway, second-hand smoke (SHS), lumbrokinase, Dilong

蚯蚓激酶可以長時間保護對抗SD大鼠心臟二手菸所引起的細胞凋亡訊號

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