The Relationship between AMPK and HO-1 Expression Induced by Alpha-Lipoic Acid in Rat Aortic Smooth Muscle Cells

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Heme oxygenase (HO) breakdown of heme and produce biliverdin and carbon monoxide (CO), followed by reduced sensitivity of tissues to oxidative stress. In recently studies showed that induced heme oxygenase-1 (HO-1) expression as a therapeutic agent in multiple forms of cardiovascular diseases and hypertension. Alpha-lipoic acid (ALA) is a natural antioxidant that scavenges reactive oxygen species (ROS) and regenerates or recycles endogenous antioxidants. In our lab recently researches found that ALA induced HO-1 expression and increase the AMP-activated protein kinase (AMPK) acitivity in rat aortic smooth muscle cells (A10 cells). But the relationship between AMPK and HO-1 was unknowed. The aim of this study was to inverstigate whether the role of AMPK in HO-1 induction and determined the relationship of basic leucine zipper transcription factor 1 (Bach-1) and Nuclear factor-erythroid 2-related factor 2 (Nrf2) expression in A10 cells by alpha-lipoic acid. The results showed that HO-1 expression occurred maximally at 30 μM and peaked at 6hrs in A10 cells. Meanwhile, phosphorylated-AMPK (p-AMPK) expression maximally at 30 μM, too. On the contrary, the expression of p-AMPK and HO-1 induced by ALA were all abolished in present of compound C (AMPK inhibitor). Results indicated that AMPK may play an important role in the regulation of HO-1 expression by ALA in A10 cells.