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High-concentration hydrogen protects mouse heart against ischemia/reperfusion injury through activation of thePI3K/Akt1 pathway

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Abstract

The study investigated the role of Akt1 through the cardioprotection of high-concentration hydrogen (HCH). C57BL/6 mice were randomly divided into the following groups: sham, I/R, I/R + HCH, I/R + HCH + LY294002 (PI3K inhibitor), I/R + HCH + wortmannin (PI3K inhibitor), I/R + LY294002, and I/R + wortmannin. After 45 min of ischemia, HCH (67% H_2 and 33% O_2) was administered to mice during a 90-min reperfusion. To investigate the role of Akt1 in the protective effects of HCH, mice were divided into the following groups: I/R + A-674563 (Akt1 selective inhibitor), I/R + HCH + A-674563, I/R + CCT128930 (Akt2 selective inhibitor), and I/R + HCH + CCT128930. After a 4-h reperfusion, serum biochemistry, histological, western blotting, and immunohistochemical analyses were performed to evaluate the role of the PI3K-Akt1 pathway in the protection of HCH. In vitro, 75% hydrogen was administered to cardiomyocytes during 4 h of reoxygenation after 3-h hypoxia. Several analyses were performed to evaluate the role of the Akt1 in the protective effects of hydrogen. HCH resulted in the phosphorylation of Akt1 but not Akt2, and Akt1 inhibition markedly abolished HCH-induced cardioprotection. Our findings reveal that HCH may exert cardioprotective effects through a PI3K-Akt1-dependent mechanism.

Figures

Figure 1 Flow chart of the study....

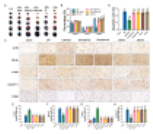

Figure 2 Morphological examination from experiment 1....

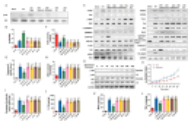

Figure 3 Protective effects of HCH following...

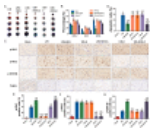

Figure 4 Morphological examination from experiment 2....

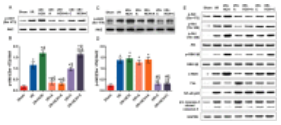

Figure 5 The roles of Akt1 and...

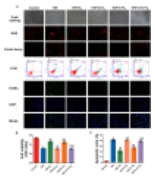

Figure 6 The protective effect of hydrogen...

All figures (8)

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