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**BH3-ONLY PROTEIN BIM IS INVOLVED IN MYOCARDIAL INJURY INDUCED BY CO-STRESS OF ISCHEMIA AND COLD IN RATS**

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**Objectives** To determine the effects of co-exposure to ischemia and cold stress on cardiac injury and whether Bim is involved in this situation.

**Methods** Myocardial ischemia model was established by permanent ligation of left coronary artery. Sprague-Dawley rats were randomly divided to four groups (n=12): sham+normal temperature (S group); sham+cold stress (SC group);

myocardial ischemia+normal temperature (I group); myocardial ischemia+cold stress (IC group). At the condition of 26°C, SC and IC groups were kept in a 4°C artificial chamber for 8 h (8:00–16:00) for 4 consecutive days. Cardiac function was assessed by echocardiography; pathological changes were analysed by HE staining; myocardial infarct size was determined by TTC staining; myocardial apoptosis was detected by TUNEL assay; Bim, caspase-3 expression in myocardium were determined by western blot.

**Results** It was demonstrated that, compared with single myocardial ischemia, co-exposure of myocardial ischemia and cold stress could create significant abnormalities in both appearance and pathology of cardiac muscle; compared to group I, apoptosis of myocardium and infarct size were increased markedly in IC group ( $(27.47 \pm 0.47)\%$  vs  $(19.02 \pm 0.30)\%$ ,  $(47.33 \pm 2.73)\%$  vs  $(35.69 \pm 1.50)\%$ ,  $p < 0.01$ ); LVEDd and LVEDs in group IC were much greater than in group I ( $(7.59 \pm 0.48)$  mm vs  $(6.30 \pm 0.34)$  mm,  $(4.76 \pm 0.42)$  mm vs  $(3.90 \pm 0.23)$  mm,  $p < 0.01$ ), whereas LVEF of group IC ( $(60.20 \pm 3.52)\%$  vs  $(74.40 \pm 1.58)\%$ ,  $p < 0.01$ ) was significantly lower. Higher expression of Bim and caspase-3 protein in group I and IC than in group S ( $p < 0.01$ ), and these two proteins were significantly higher in group IC than group I ( $p < 0.01$ ).

**Conclusion** Co-exposure to myocardial ischemia and cold stress aggravates the cardiac injury and increases the expression of pro-apoptosis protein Bim which may play a detrimental role in this situation.