



# miRNA-146a induces vascular smooth muscle cell apoptosis in a rat model of coronary heart disease via NF- $\kappa$ B pathway

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**ABSTRACT.** The aim of this study was to investigate the role of miRNA-146a in modulating the function of vascular smooth muscle cells in a rat model of coronary heart disease. Vascular smooth muscle cells were isolated and cultured from the rat coronary heart disease model and normal rats (controls). miRNA-146a levels were measured in vascular smooth muscle cells obtained from rats with coronary heart disease and control rats. The proliferation, growth, apoptosis, and activation of the NF- $\kappa$ B pathway in the vascular smooth muscle cells were detected using the MTT assay and flow cytometry, respectively. The role of the NF- $\kappa$ B pathway in modulating the apoptosis of vascular smooth muscle cells was investigated by measuring the reactivity of the cells to an NF- $\kappa$ B pathway inhibitor (TPCA-1). Vascular smooth muscle cells from the disease model exhibited higher levels of miRNA-146a than that by the normal controls ( $P = 0.0024$ ). The vascular smooth muscle cells obtained from rats with

coronary heart disease showed decreased proliferation and growth and increased apoptosis. miRNA-146a overexpression elevated the rate of cell apoptosis. The NF- $\kappa$ B pathway was activated in vascular smooth muscle cells obtained from rats with coronary heart disease. Inhibition of the NF- $\kappa$ B pathway significantly decreased the rate of vascular smooth muscle cell apoptosis in coronary heart disease rats ( $P = 0.0038$ ). In conclusion, miRNA-146a was found to induce vascular smooth muscle cell apoptosis in rats with coronary heart disease via the activation of the NF- $\kappa$ B signal pathway.

**Key words:** miRNA-146a; NF- $\kappa$ B signal pathway; Cell apoptosis; Coronary heart disease rat model; Vascular smooth muscle cells