

THE EFFECT OF HYDROGEN PEROXIDE ON THE CONTRACTION RESPONSE OF THE SMOOTH MUSCLE IN THE BLADDER OF RATS

Hypothesis / aims of study

Ischemia followed by reperfusion may evoke progression of bladder dysfunction associated with bladder outlet obstruction and overactivity of bladder. Cyclic episodes of ischemia-reperfusion can lead to both direct ischemic damage and the generation of free radicals including reactive oxygen species (ROS). Hydrogen peroxide (HP) is the one of most important free radical among ROS, nevertheless, it's effects on bladder smooth muscle are still unknown. Therefore we examined the direct effects of HP on bladder and pathophysiology.

Study design, materials and methods

The smooth muscle in the bladder of rats was obtained and strips were prepared. The effects of HP were examined using isometric tension recording. To elucidate the mechanism of contraction by hydrogen peroxide, 10 nM Y-27632 (specific Rho kinase inhibitor) and 10 μ M indomethacin (cyclooxygenase inhibitor) were applied. The changes of HP-induced contraction were observed in condition of Ca²⁺ free physiologic solution and 10 μ M vitamin E (an antioxidant) pre-treatment

Results

HP at all concentrations ($3 \times 10^{-6} \sim 3 \times 10^{-2}$ g%) showed the contractile response in dose dependent manner. When the strips were pretreated with Y-27632 or indomethacin, the contractile responses were significantly inhibited. After pretreatment of 10 μ M verapamil or vitamin E, HP induced contraction were decreased significantly. In condition of Ca²⁺ free physiologic solution, the contractile responses by HP were almost disappeared.

Interpretation of results

HP has direct contractile responses of the smooth muscle in the bladder, it is thought that that effect is mediated by the activation of cyclooxygenase pathway, Rho kinase pathway, and increased sensitivity of calcium ion.

Concluding message

Therefore, it is thought that increased ROS including HP may lead to abnormal contraction of bladder smooth muscle in bladder outlet obstruction or overactivity of bladder.

Specify source of funding or grant	non
Is this a clinical trial?	No
What were the subjects in the study?	ANIMAL
Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	Yes
Name of ethics committee	Laboratory animal trial ethical committee of Chung-Ang University