

Role of nitric oxide in diaphragmatic muscle contraction under different frequencies of direct and indirect stimulation

Thesis

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Summary

This study aims to examine the role of nitric oxide in diaphragmatic muscle contraction under different frequencies of direct and indirect stimulation and modulation of this effect by hemoglobin (NO scavenger).

Rat diaphragm preparation was used to study these effects, by measuring the contractile properties, maximal twich force (ΔY), contraction time (Δx) and half relaxation time ($1/2 Rt$).

The groups included (a) low frequency group exposed to low frequency electric stimulation (0.5 hz) and (b) high frequency group exposed to high frequency electric stimulation (100 hz) and both groups were stimulated directly and indirectly.

There were significant differences in contractile properties of different groups.

Results of this study reported that NO significantly decreased (ΔY), (ΔX) and increased ($1/2 Rt$) when the rat diaphragm preparation was stimulated directly at either low (0.5 Hz) or high (100 Hz) frequencies, however when rat diaphragm preparation was stimulated indirectly at low (0.5 Hz) or high (100 Hz) frequencies, a significant increase in (ΔY), (ΔX) and decrease in ($1/2 Rt$) were recorded.

Results were confirmed by the fact that with addition of bovine hemoglobin (as NO scavenger) to the bath

containing L-arginine (as NO donor), it completely reversed the NO effects , returning back all recorded parameters to their initial values throughout the experimental protocol .