Antihypoxic and cardiotropic properties of humic substances

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Keywords: humic substances, cardioprotectors, antihypoxants

DOI:10.36291/HIT.2021.038

According to statistics, every year an average of about 17 million people on the planet die from pathologies of the cardiovascular system. In view of this, the more increasing preventive measures role is taken, consisting in the use herbal cardioprotective drugs that do not have a systemic toxic effect from prolonged use. The perspective cardioprotective substances also are the humic substances (HS) due to they have high protective properties.

Cardioprotective properties of the 1% aqueous solution HS (by Novoland company, Russia) were tested on 24 rats "Wistar" (n=12, 2 groups) as described in [1, 2]. The animals were divided on 9 groups of 10 animals each for the study of normobaric hypercapnic hypoxia, tissue and hemic hypoxia. Mexidol® was used as a reference drug.

The direct cardiovascular effects were establish for the tested HS. The preventive HS use in the period preceding ischemia-reperfusion was increased the resistance of the isolated myocardium to hypoxia. This fact was confirmed by the repair of its contractility (end-diastolic pressure (EDP) and pressure developed by the left ventricle (LVDP) decreased) (Table 1).

The antihypoxic HS effect at the 500 mg/kg concentration was comparable to that of Mexidol® only at the 1000 mg/kg concentration (Table 2), which indicates about than more 2 times higher efficiency of the tested HS in comparison with Mexidol®.

Table 1 Influence of HS on contractility of the isolated myocardium

Time	LVDP (mmHg) (n = 12)		EDP (mmHg) (n = 12)	
	Control	Test sample HS	Control	Test sample HS
10 min of adaptation	92,75±2,5	93,7±2,1	15±0,1	15±0,1
20 min of perfusion HS	94,6±2,3	**73,6±2,4	14,45±0,2	**12,2±0,28 ^s
Reperfusion, min				
5 min	###8,2±0,8	###9,1±1,7	###76,3±2	**###64±1,9
15 min	###9,6±0,9	**###17,2±2	###75,6±2,3	**###61,2±1,9
30 min	###25,2±2,4	**###29,7±1,2	###68,25±3,9	**###59,8±1,9

*reliability relative to similar values in the control p< 0,05; **p< 0,01;

#reliability relative to baseline values in the group p< 0,05; ##p< 0,01; ###p< 0,001.

Table 2 Influences of HS on the course of hypoxia

Injected substance	Latent time of hypoxia, min		
	Normobaric hypercapnic hypoxia	Tissue hypoxia	Hemic hypoxia
NaCl, 0 mg/kg (control)	20,9±1,1	12,9±0,4	7,4±0,4
Mexidol®, 1000 mg/kg	*24,8±0,9	12,9±0,6	7,2±0,3
HS, 500 mg/kg	*25,8±1,1	13,3±0,4	8,3±0,6

*differences with the "control" group are statistically significant, p<0,05.

References

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