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Study the effect of L-Carnitine on Infarct Size in the Ischemic-Reperfused Isolated Rat Hearts

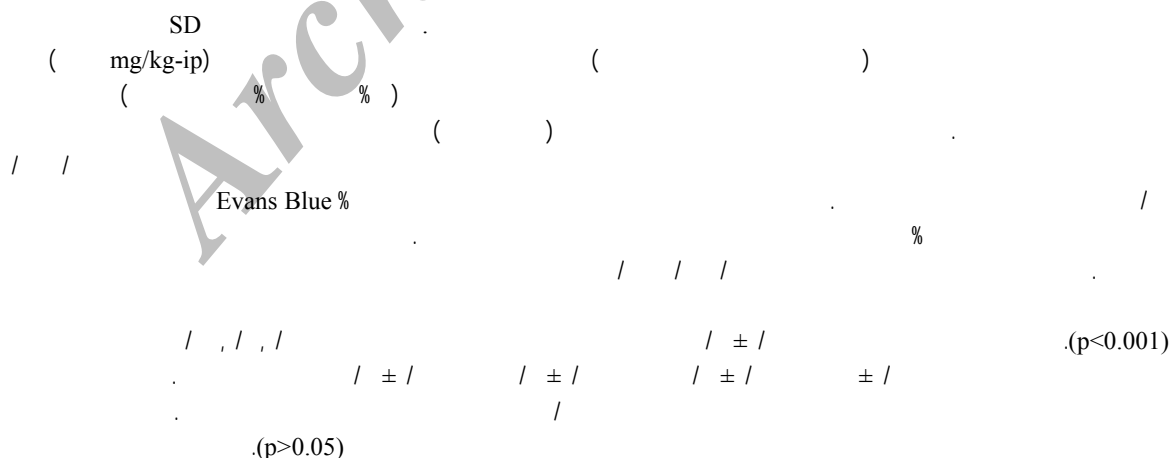
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Abstract: Carnitine is a vital biologic substance for transporting fatty acids into myocytes and facilitates fatty acids β -oxidation for energy production. There are some conflicting findings about its cardioprotective effects such as decreasing the infarct size during ischemia / reperfusion. In this study, the effects of L-Carnitine on infarct size in the ischemic isolated rat hearts were investigated. Male Sprague-Dawley rats (270-330g) were divided into 5 groups randomly and they were anesthetized by sodium pentobarbital (50-60 mg/kg-ip). Heart was removed and quickly mounted on a Langendorff apparatus and perfused by a modified Krebs -Henseleit solution under constant pressure at 37 C °. In control group (n=6), the hearts were perfused only by normal Krebs -Henseleit solution at stabilization, 30 min regional ischemia and 120 min reperfusion, while in the test groups (1-4 groups, n=6 in each group), during ischemia / reperfusion, the hearts were perfused with 0.5, 2.5, 3.75 and 5mM of L-Carnitine - enriched Krebs -Henseleit solution, respectively. At the end of reperfusion, 1% Evans Blue solution was infused to stain the non-ischemic area. Then the heart was cut into slices and incubated by 1% Triphenyltetrazolium chloride (TTZ) solution and fixed by formalin. The area of infarcted tissue and area at risk were determined by computerized planimetry. In control group, the infarct size was $46.29 \pm 3.46\%$, while in the test groups, the addition of L-Carnitine (0.5, 2.5, 3.75 and 5mM) into the Krebs solution during ischemia and reperfusion, reduced infarct size to 27 ± 2.85 , 25.53 ± 5.40 , 19.53 ± 4.88 and $15.68 \pm 2.78 \%$, respectively ($p < 0.001$). The effect was dose-dependent at the doses of 0.5 – 5mM. There was no significant difference between and within test groups using ANOVA one-way test. Considering these results, we conclude that L-carnitine has a protective effect against cardiac ischemic reperfusion injuries and reduces the infarct size.

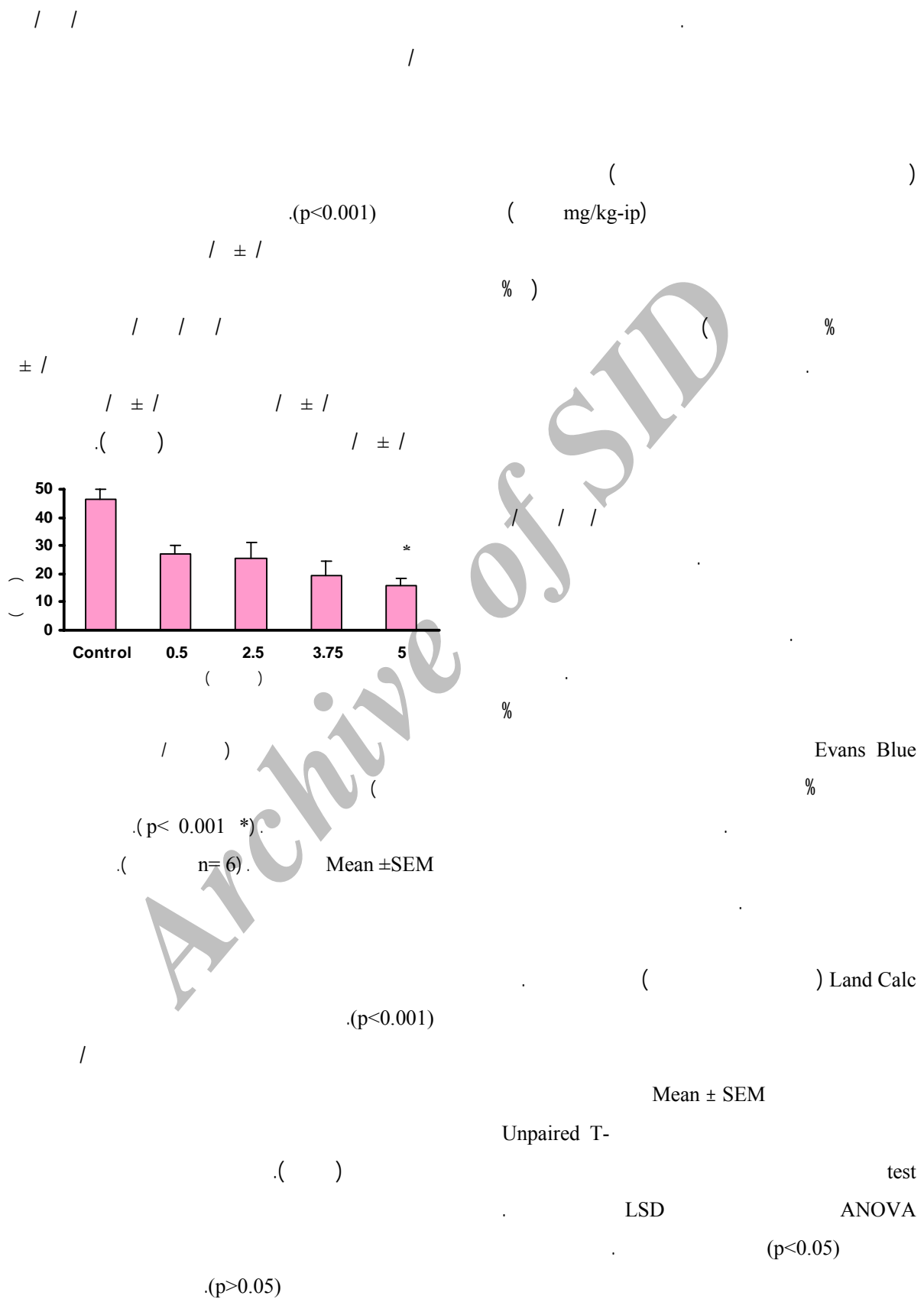
Key words: L-Carnitine, Infarct size, Isolated heart, Rat

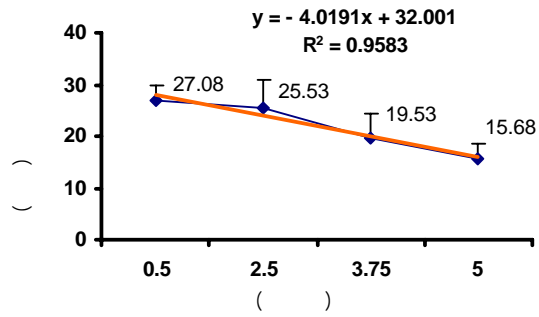


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Acyl-Carnitine, Acyl-CoA beta-hydroxy fatty
(acid intermediates)

n= 6) . Mean ±SEM

Yamada

(Risk Zone)

Cui
(Global Ischemia)

Acetyl-CoA CoA-SH

(p<0.001)

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