PROTECTIVE THE ROLE OF LYCOPENE IN EXPERIMENTAL HEART ISCHEMIA REPERFUSION MODEL

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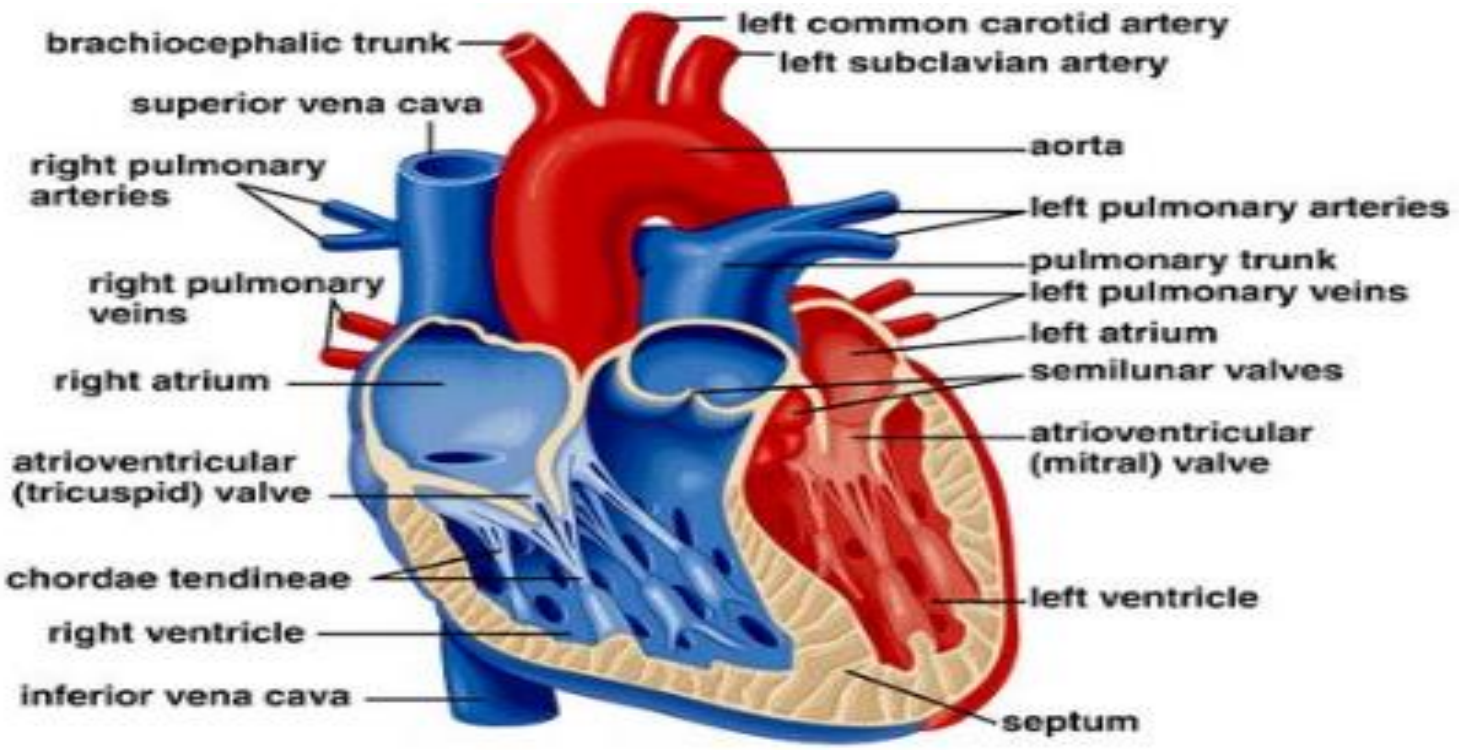
OBJECTIVES



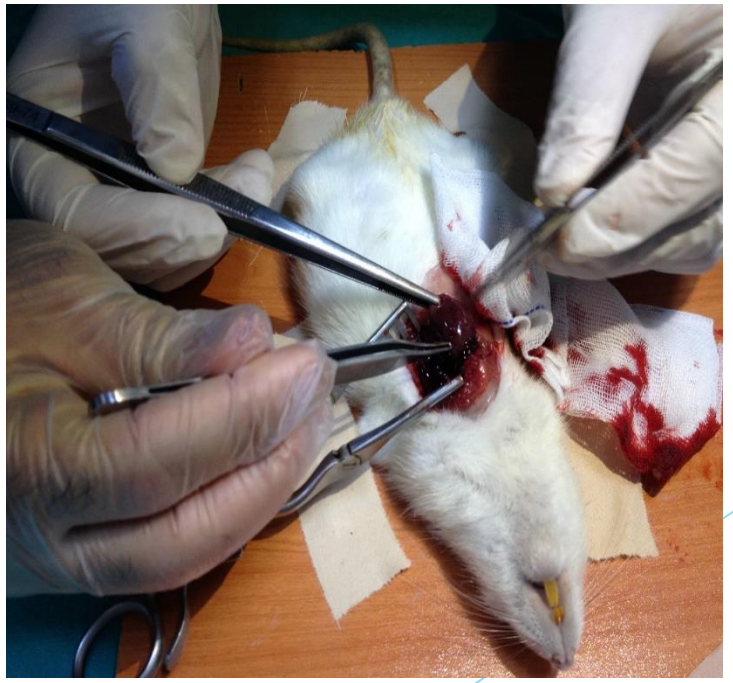
- Ischemia refers to the reduction or cessation of blood flow which results in tissue damage and causes insufficient oxygen and nutrition to the tissues. Oxidative stress due to reperfusion after ischemia causes severe functional and structural damage. Free oxygen radicals are responsible for this damage. Lycopene is a pigment of the carotene family, wich is naturally found in vegatables and fruits.

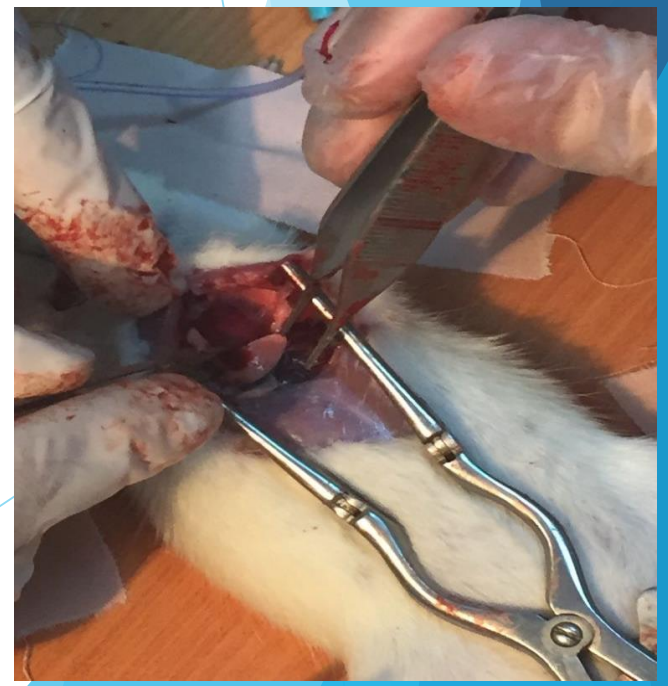
AIM

- To the best of our knowledge, this is the first study, we aimed to investigate the protective role of lycopene in experimental heart ischemia reperfusion (I/R) model.

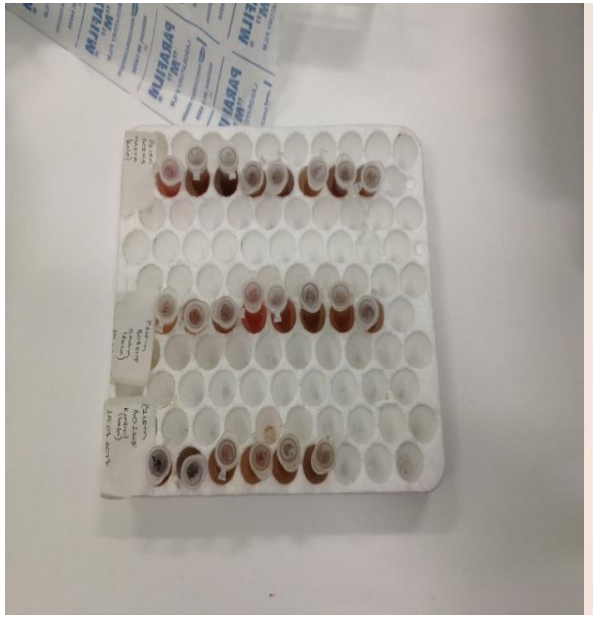
MATERIALS AND METHODS

- Male Wistar rats were randomly allocated into three groups (n = 8, each) as control (I/R group), Sham and Lycopene (therapy group) groups.





- One group received lycopene (50 mg/kg/day as intraperitoneally) for both single dose before surgery (I/R+lycopene group), while the other was treated intraperitoneally with 0.09 % saline as group (0.3 mL/day) (sham group). However, nothing was given to the I/R group.
- Then; after the venture and surgical procedure applied to the all rats groups, 10 minutes ischemia and 10 minutes reperfusion of the heart was created. At the end of this experimental, activities of catalase (CAT), superoxide dismutase (SOD) and the levels of malondialdehyde (MDA) as oxidative stress biomarkers were measured as spectrophotometric and, also the levels of nitrotyrosine (3-NTx) and nitric oxide (NO) as nitrosative stress biomarkers were measured by ELISA in heart tissues homogenates.



MEASUREMENT OF OXIDATIVE / NITROSATIVE STRESS BIOMARKERS

- Catalase (CAT): Beutler method
- Superoxide Dismutase (SOD): Fridovich method
- Malondialdehyde (MDA): Ohkawa method

} Spectrophotometric Method

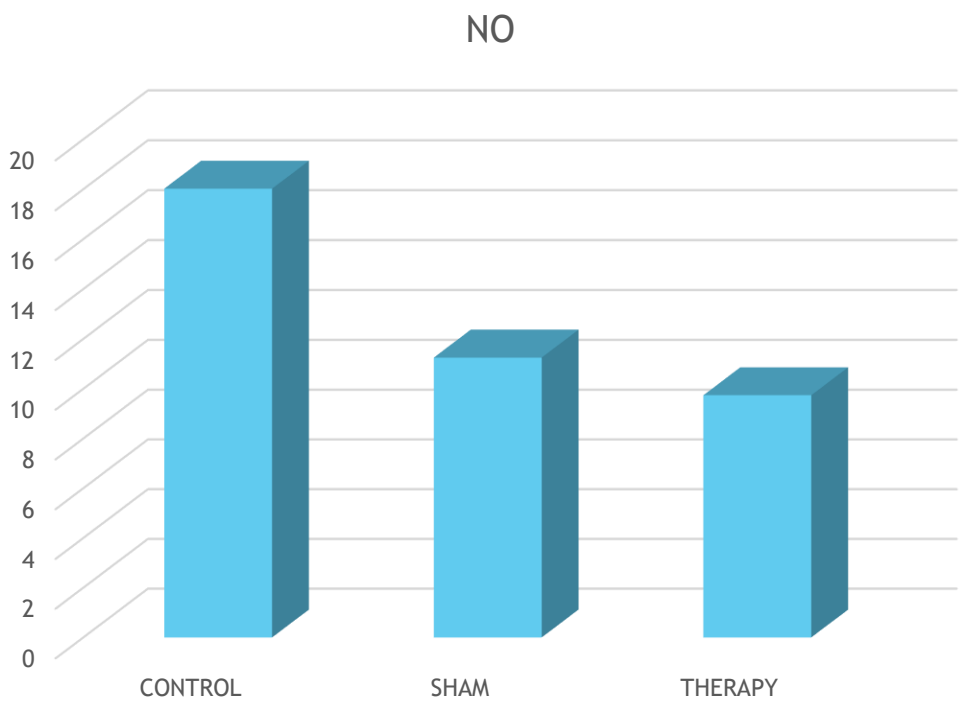
- Nitric Oxide (NO)
- Nitrotyrosine (3-NTx)

} ELISA Method

RESULTS

	Control	Sham	Therapy
CAT (U/mg protein)	4,37±1,82[a]	5,18±2,20**	7,13±2,17*
SOD (U/mg protein)	3,95±1,05 [a]	5,83±2,47**	7,51±3,15*
MDA (nmol/mg protein)	0,52±0,13 [a]	0,39±0,10	0,12±0,09*
NO (µmol/mg protein)	18,02±7,05 [a]	11,25±2,08	9,74±3,19*
3-NT (nmol/L)	6,03±2,18 [a]	4,01±1,64**	3,65±1,02*

Table 1. Oxidative / Nitrosative Biomarker Results in All Groups


NO
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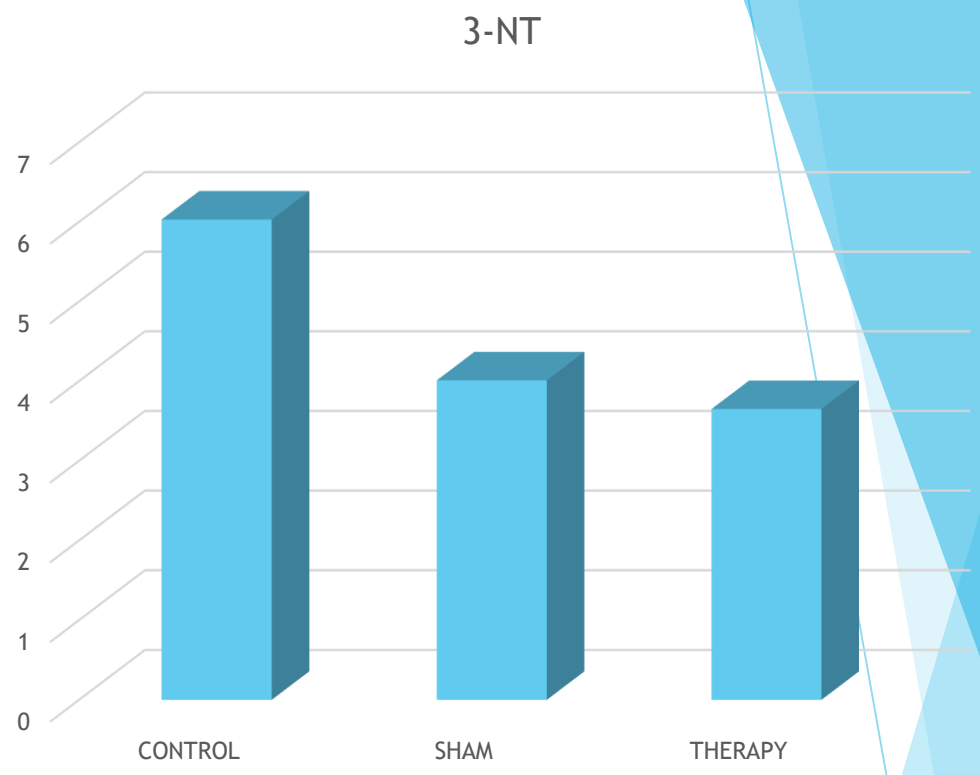
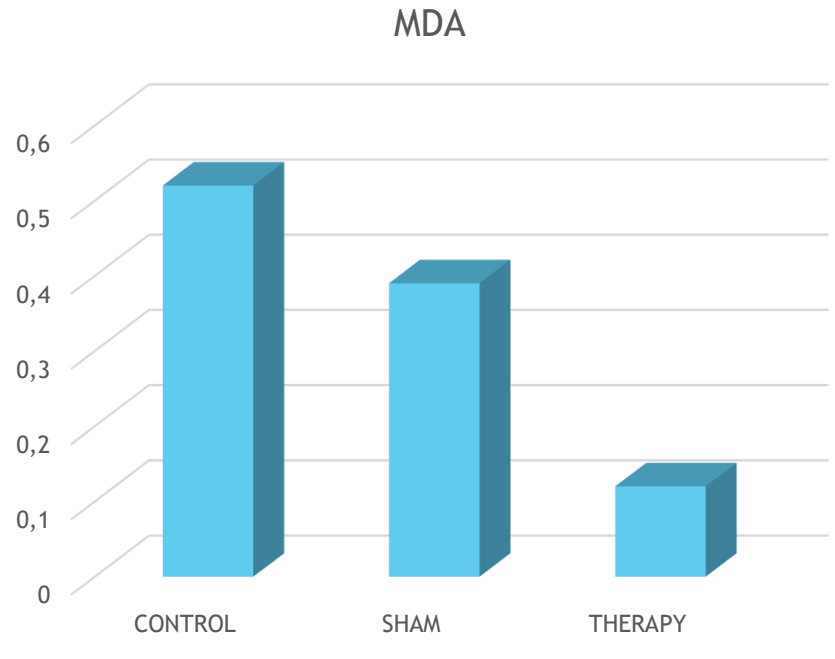
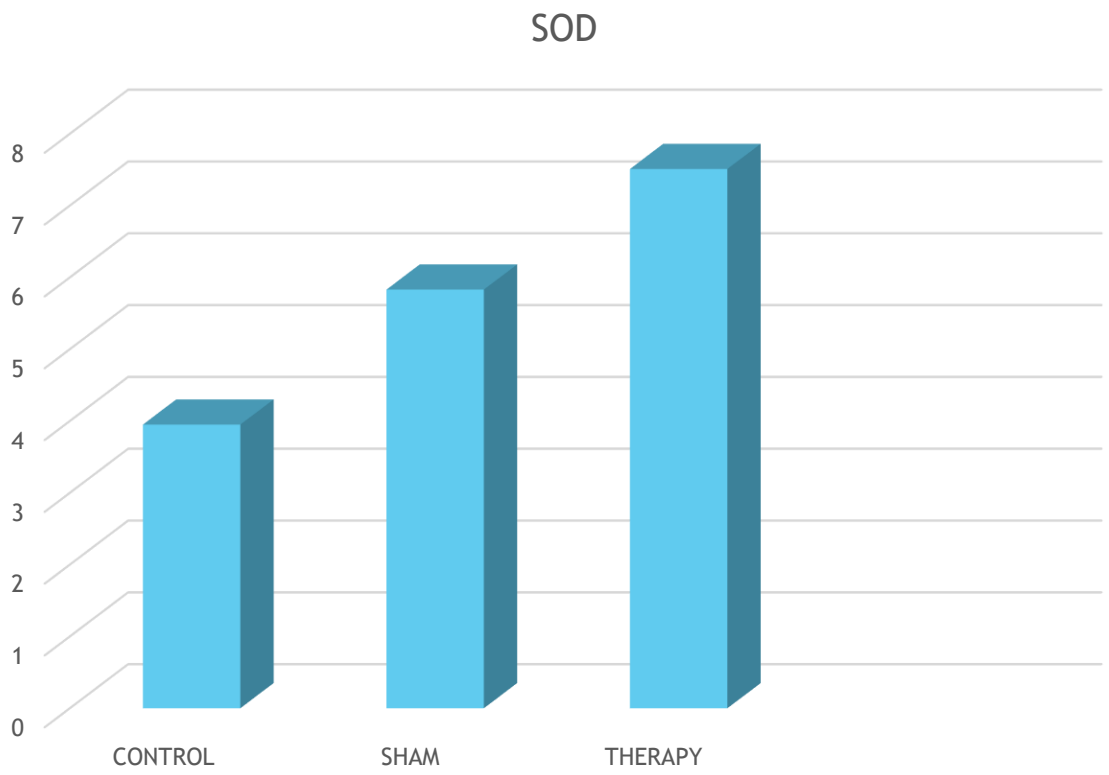
18
16
14
12
10
8
6
4
2
0
CONTROL
SHAM
THERAPY


3-NT
7
6
5
4
3
2
1
0
CONTROL
SHAM
THERAPY


MDA
0,6
0,5
0,4
0,3
0,2
0,1
0
CONTROL
SHAM
THERAPY


SOD
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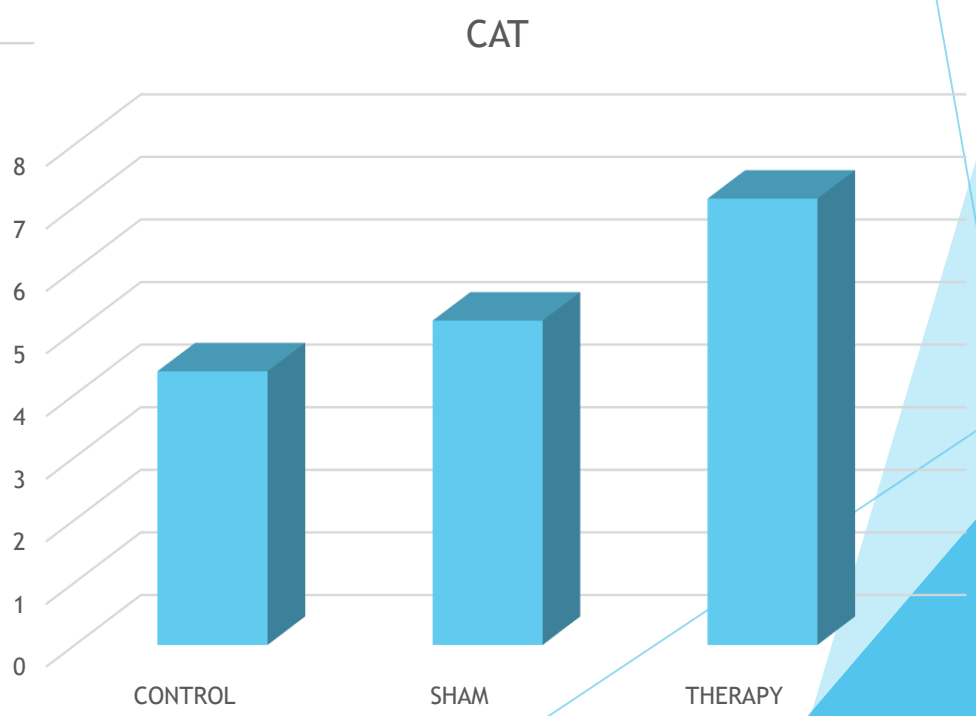
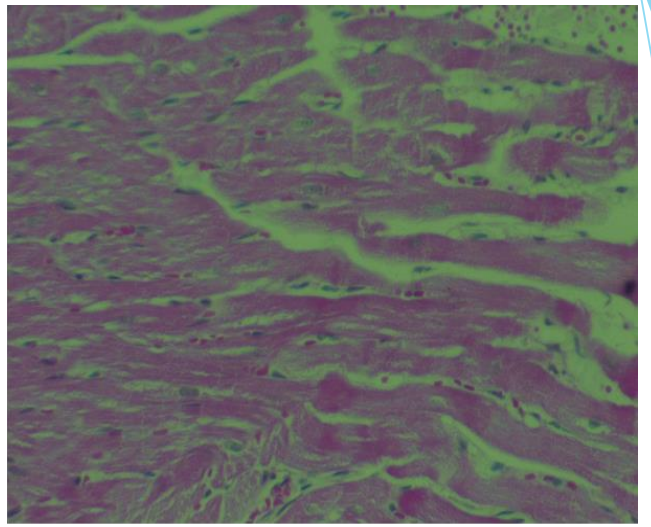
CONTROL
SHAM
THERAPY

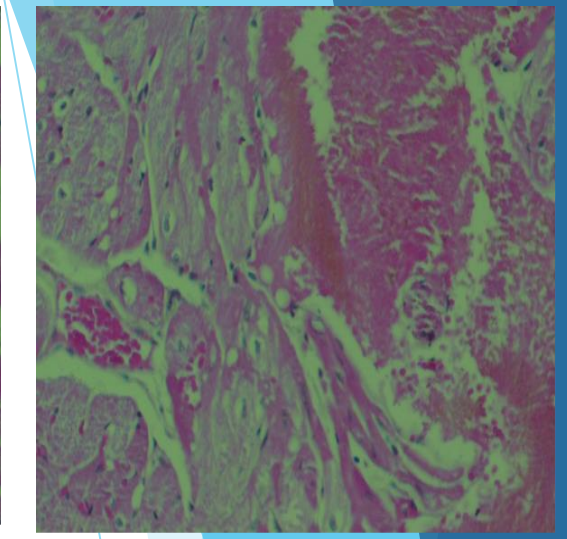

CAT
8
7
6
5
4
3
2
1
0
CONTROL
SHAM
THERAPY

HISTOPATHOLOGICAL EVALUATION

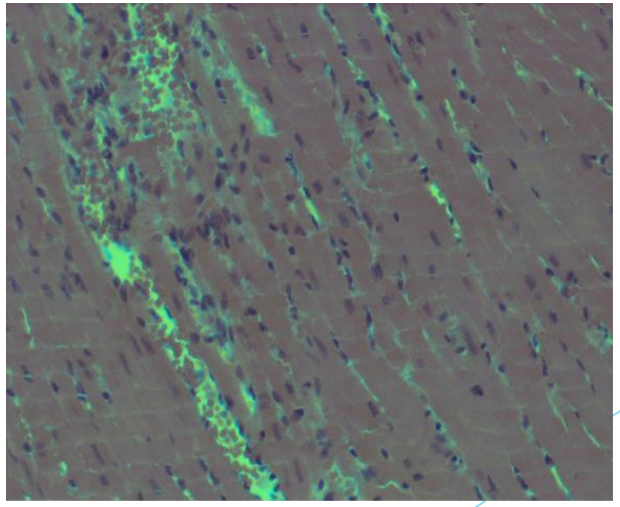
- In the control and sham groups; Myocardial edema (p = 0.303) Myocytolysis (p = 0.602) Hemorrhage (p = 0.407) PMNL infiltration (p = 0.027) Statistically significant difference was found only in PMNL infiltration (MannWhitney U Test).
- The lycopene treatment group was compared with the control and sham groups; Myocardial edema (p = 0.025) Myositolysis (p = 0.039) Hemorrhage (p = 0.516) PMNL infiltration (p = 0.016).
- Statistically significant differences were found in terms of myocardial edema, myocytolysis and PMNL infiltration (MannWhitney U Test).



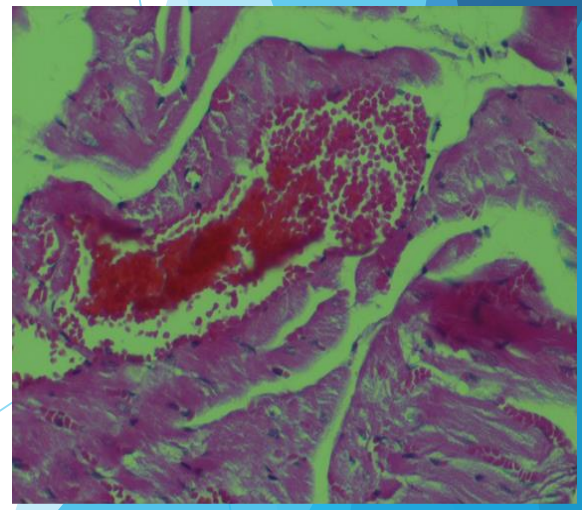
Picture 1: Miyokard Hemoraji



Picture 2: Miyokard Ödem



Picture 3: Miyositolizis



Picture 4: PMNL infiltrasyonu

CONCLUSION

- We thought that lycopene may play the protective the role against heart I/R damage due to its high antioxidant activity.