# Myocardial Ischemia Reperfusion

Version: 1
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*(note that the following list should be linked to the appropriate location.)*


## Summary:

The most common cause of cardiovascular mortality in man is the outcome from myocardial ischemic injury. Accordingly, it is necesarry to study the corresponding process of heart injury recovery in many mouse models relevant to human cardiovascular disease. This protocol describes the surgical induction of myocardial injury via transient occlusion of a coronary artery followed by reperfusion (ischemia-reperfusion injury).

## Reagents and Materials:

| Reagent/Material | Vendor | Stock Number |
|---|---|---|
| Pentobarbital | | |
| Buprenorphine | | |
| Betadine | | |
| 70% alcohol | | |
| PE-50 tube | | |
| Cryo-probe | | |
| 6-0 sutures | | |
| 7-0 sutures | | |
| 8-0 sutures | | |

## Protocol:

1. Mice are anesthetized with pentobarbital (50 mg.kg, IP).
2. The ventral neck and left parasternal region is shaved and disinfected with Betadine followed by 70% alcohol.
3. The mouse is positioned supine on a heating pad and a small incision is made through the skin underlying the trachea.
4. The trachea is exposed, a small puncture is made in the trachea, and endotracheal intubation is performed using a PE-50 tube.
5. The endotracheal tube is connected to a small rodent ventilator (Harvard Apparatus) for mechanical ventilation of the mouse.
6. ECG electrode leads are placed subcutaneously to monitor the ECG during myocardial infarction (MI).

7. With the use of a surgical microscope, a left thoracotomy is performed and the fourth intercostal space is entered using scissors and blunt dissection.
8. An 8-0 silk suture is placed through the myocardium into the anterolateral left ventricular wall around the left anterior descending (LAD) coronary artery. A sterile PE-50 tube is placed against the LAD and the suture is tied against the tube resulting in ligation of the LAD. During the ischemic period, the surgical area is covered with sterile gauze soaked in warm saline. Following the ischemic period, the tube is removed and the LAD ligature cut resulting in restoration of blood flow and reperfusion.
9. The chest is closed in layers with 7-0 sutures.
10. The mouse is gradually weaned from the ventilator to resolve any possible pneumothorax.
11. Once spontaneous respiration resumes, the endothracheal tube is removed and the trachea incision is closed with 8-0 suture. The skin is then closed with 6-0 suture.
12. The mouse is maintained on the heating pad until fully recovered from anesthesia.
13. Buprenorphine is administered SC immediately following surgery and every 8-12 hr for 72 hr.