

Protective effect of a hydrogen-rich preservation solution

during cold ischemia in rat lung transplantation.

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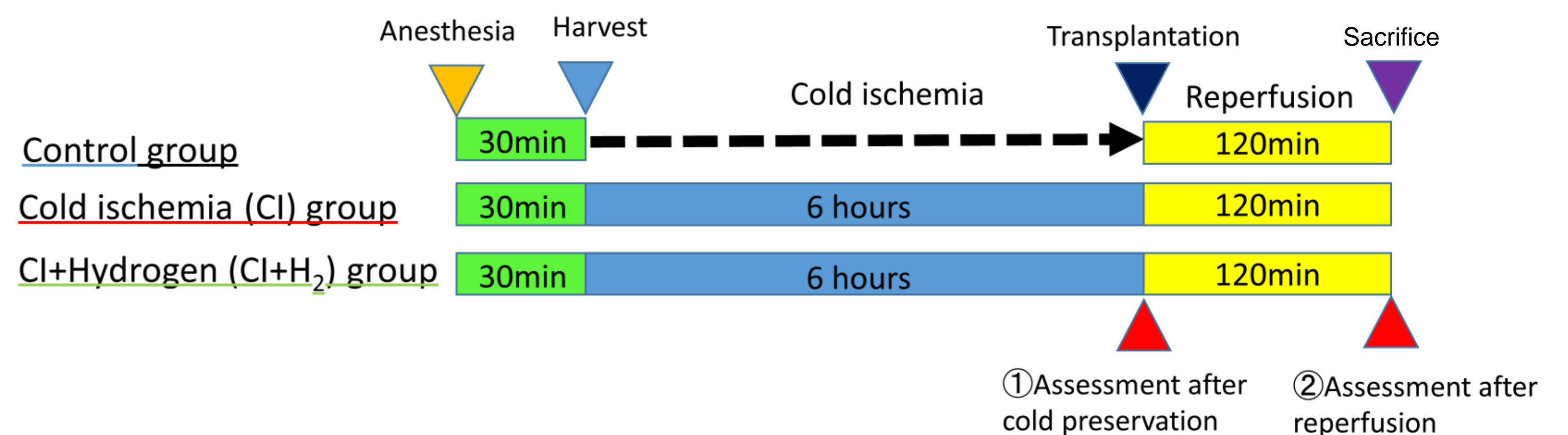
Background

- Molecular hydrogen has been reported to alleviate oxidative stress on ischemia-reperfusion injury in various organs without adverse effects.
- Solubilized hydrogen is safety, simple and practical method to deliver hydrogen in target organ.

In this study, we evaluated the efficacy of a hydrogen-rich preservation solution during cold ischemia in a lung transplantation.

Methods

Lewis rat 290-310g Left orthotopic lung transplantation

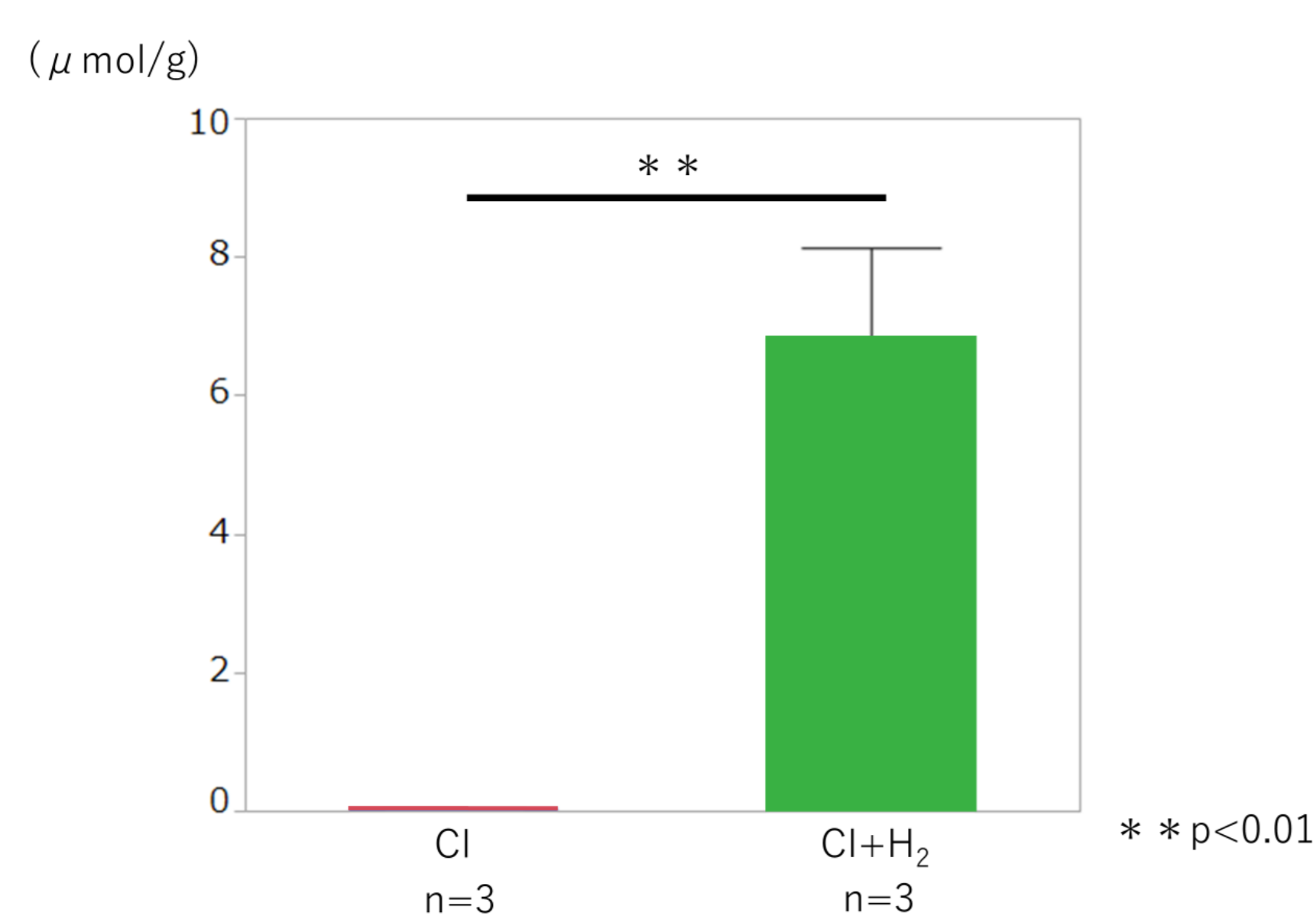


- Anesthesia: pentobarbital 120mg/kg i.p.
- Ventilation setting: (O₂ 100%, Tidal volume (VT) 7ml/kg, RR 70/minutes, PEEP 2cmH₂O)
- Preservation solution (perfadex®) flushed through the main pulmonary artery with 20 mL
- In the hydrogen group, hydrogen added to the preservation solution more than 1 ppm using hydrogen generation agent “水素水7.0 aquela”.
- Orthotopic left lung transplantation using cuff technic.

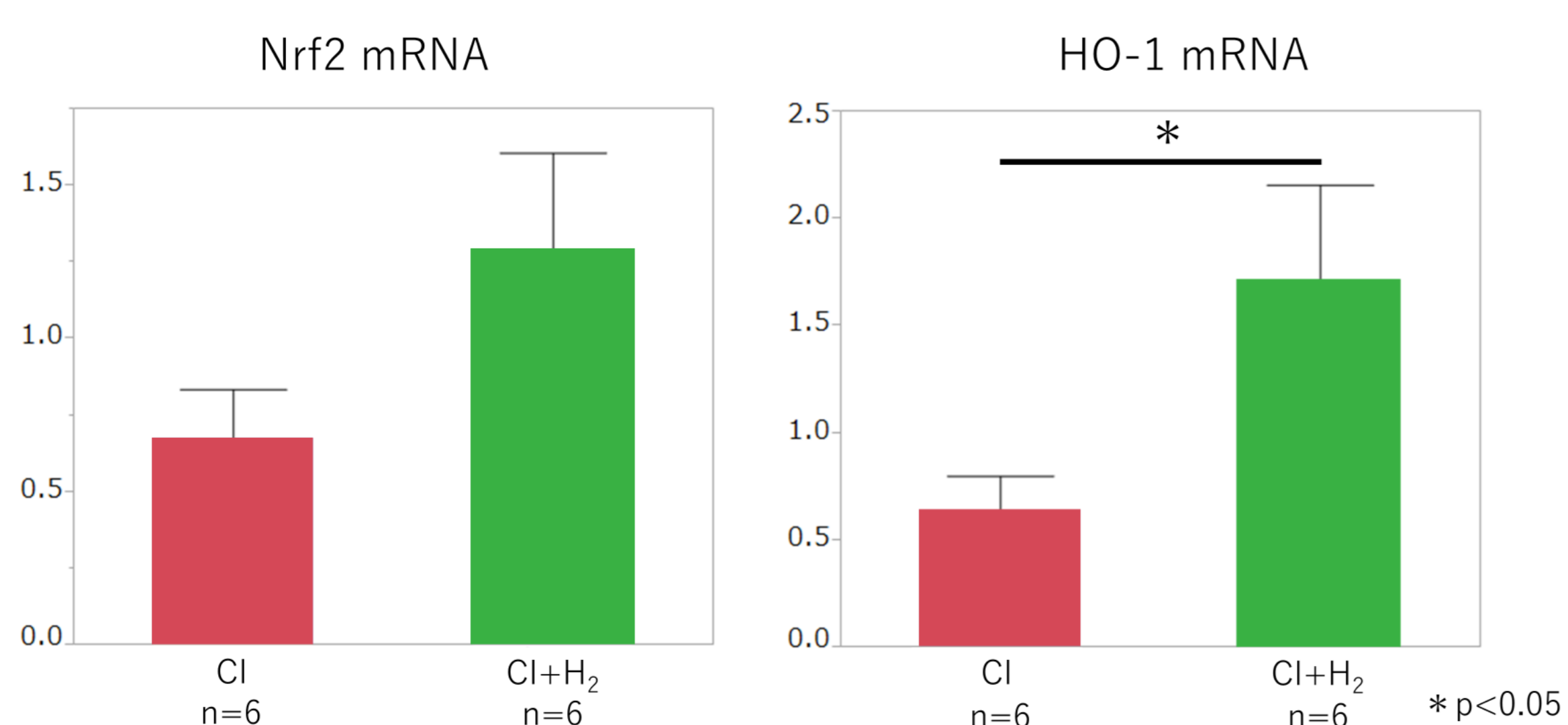
Result

①Assessment after cold preservation

Hydrogen concentration in the lung graft

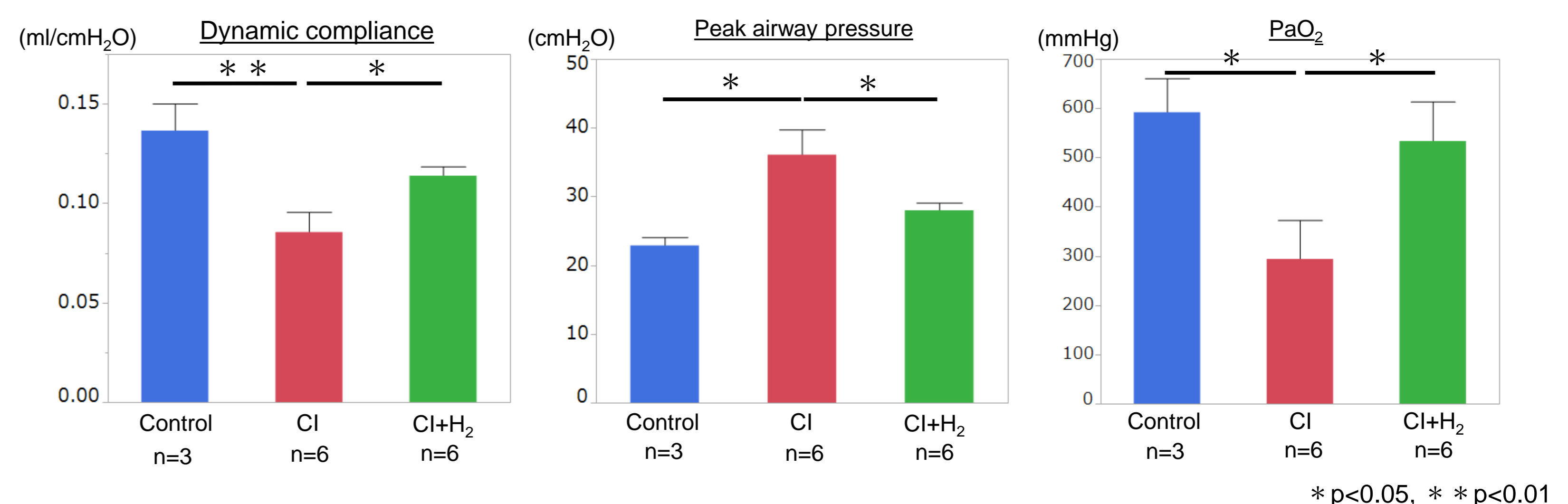


Gene expression in the lung graft qRT-PCR (ΔΔCT methods)

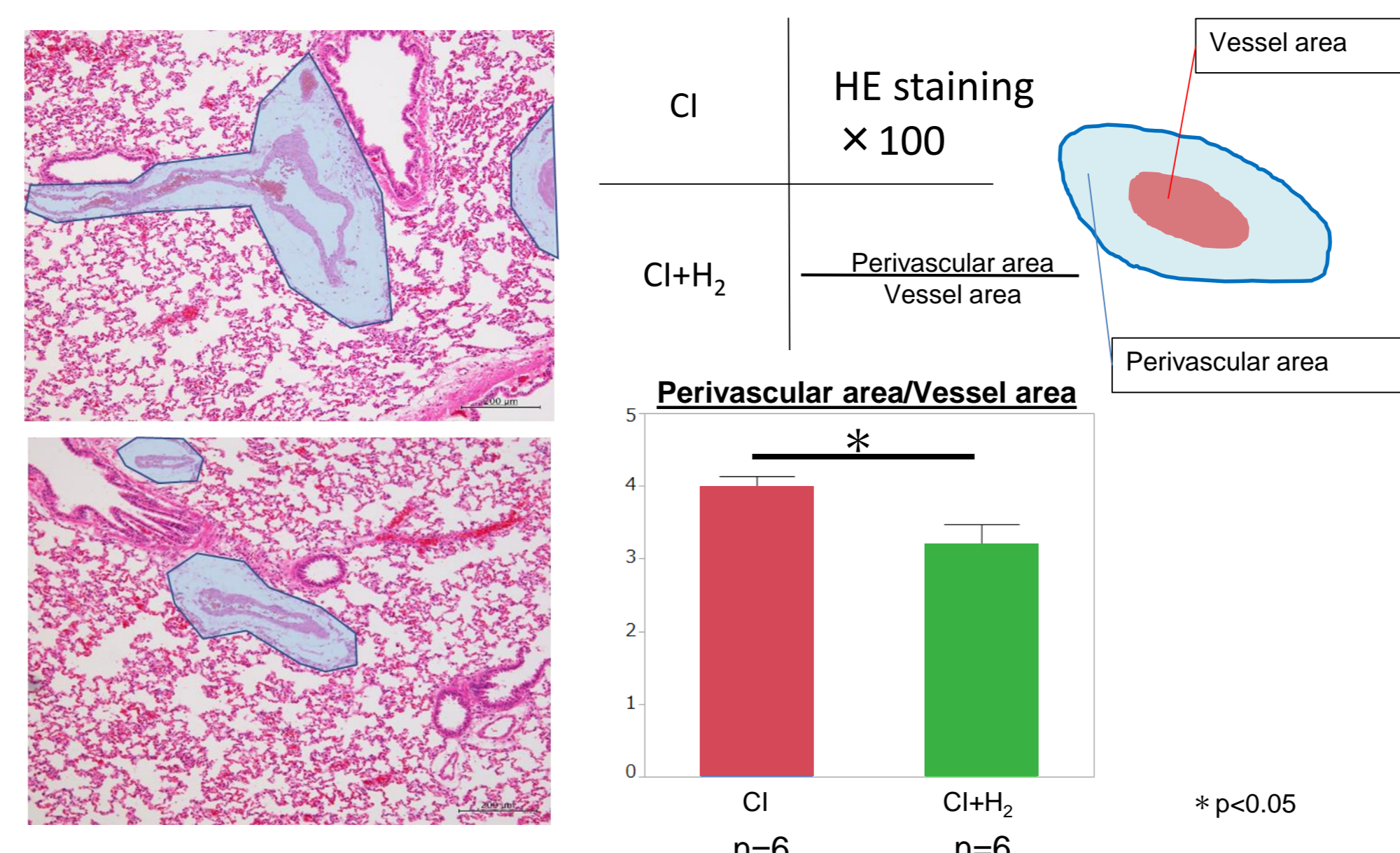


②Assessment after reperfusion

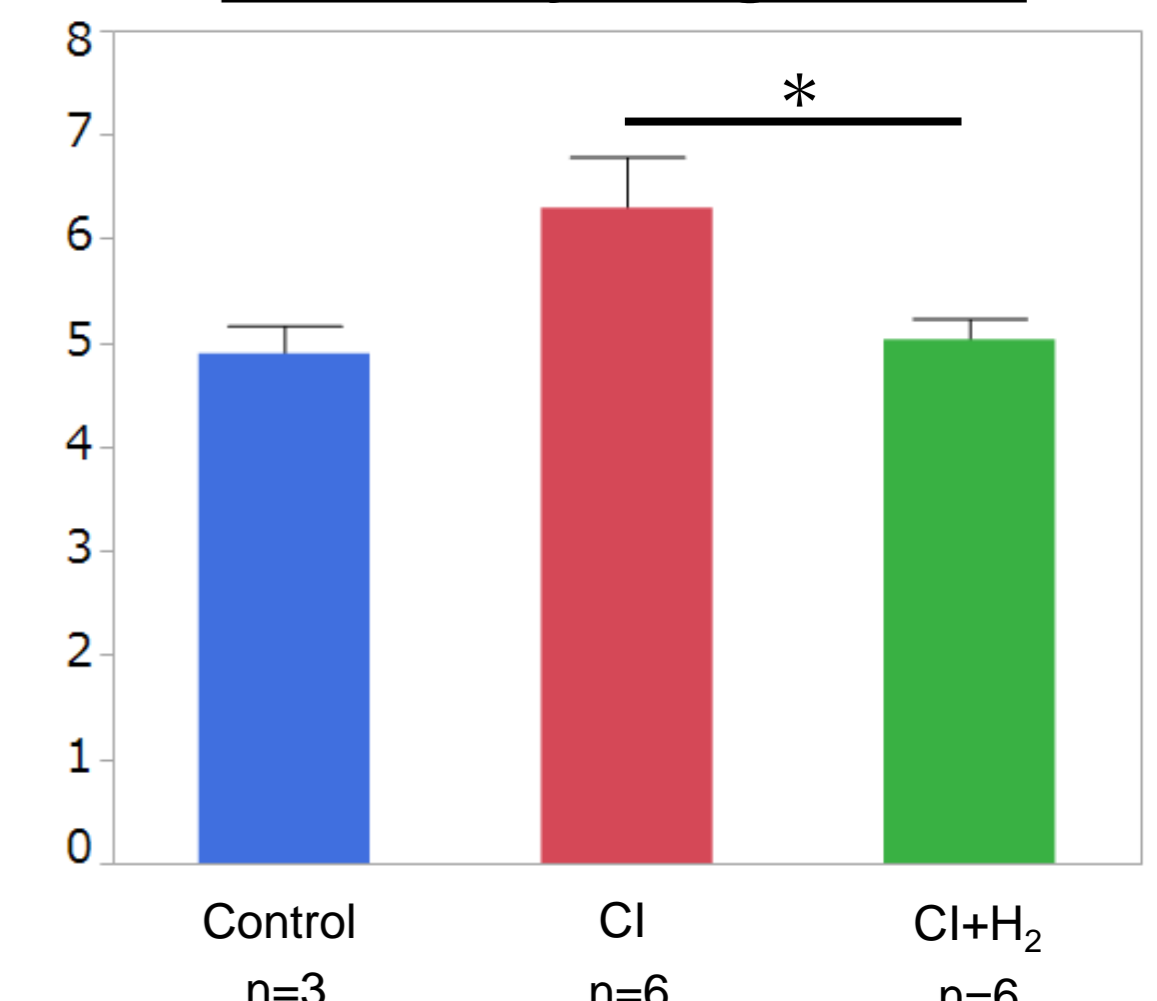
Lung function



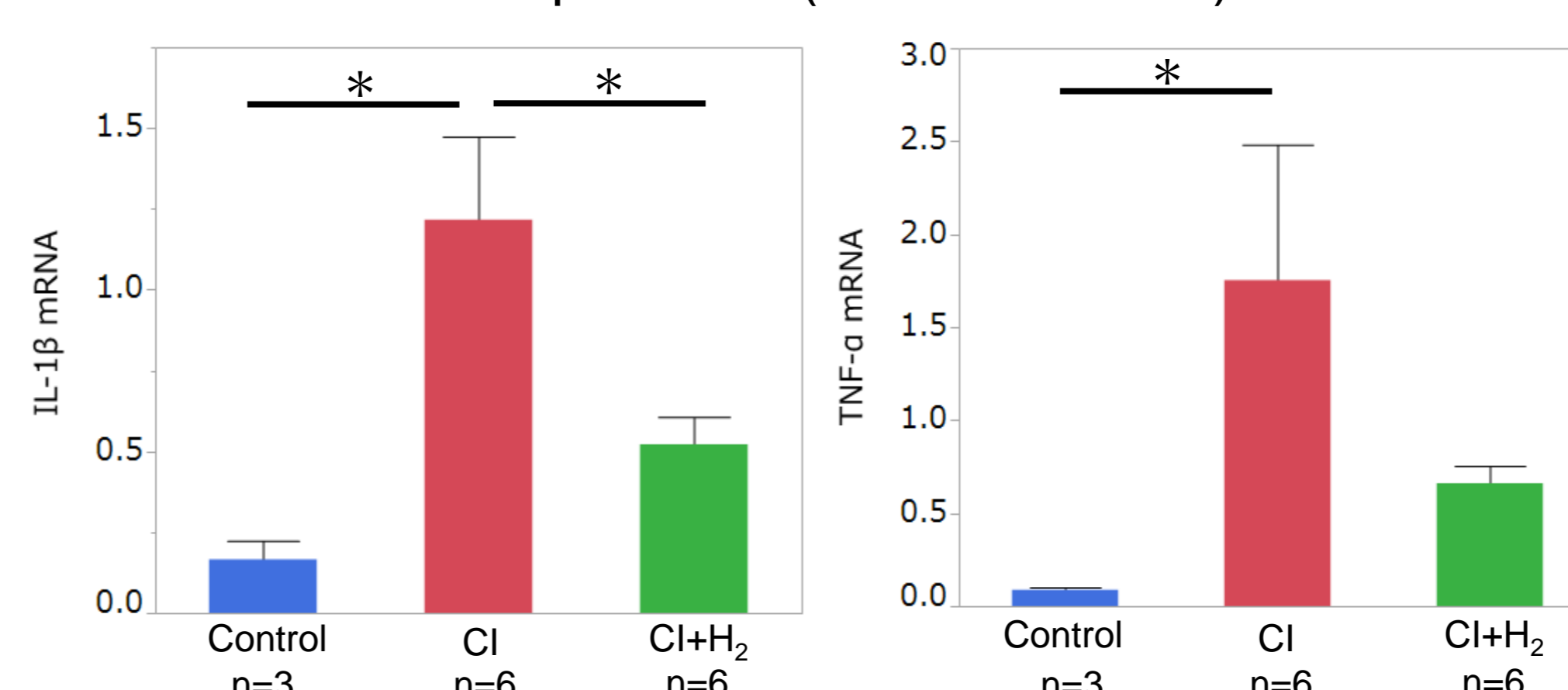
Histology (Hematoxylin eosin staining)



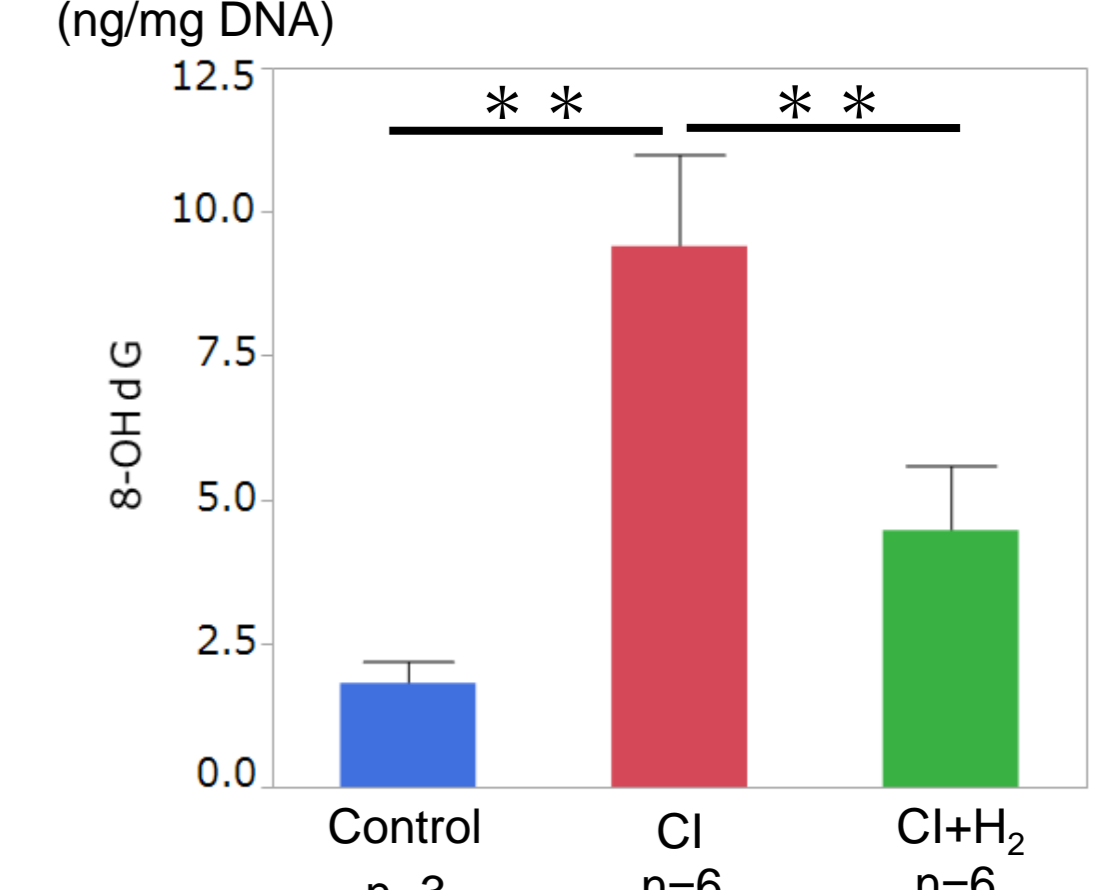
Wet to dry weight ratio



Proinflammatory cytokine in the left lung tissue qRT-PCR (ΔΔCT methods)



Oxidative stress marker ELISA for 8-OHdG



International Society for Heart and Lung Transplantation
COI Disclosure

Lead presenter: Masao Saito

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S. Hirano is corporate board member (Miz co.,Ltd).

Conclusion

Hydrogen-rich preservation solution used for lung graft during cold ischemia attenuated ischemia-reperfusion injury through anti-oxidant and anti-inflammatory effects in a rat lung transplantation model.