

HSP70 is Involved in HBO Preconditioning on DCS in Rats

Wei-gang Xu MD, PhD

Dept. of Diving Medicine

The Second Military Medical University

Shanghai, China

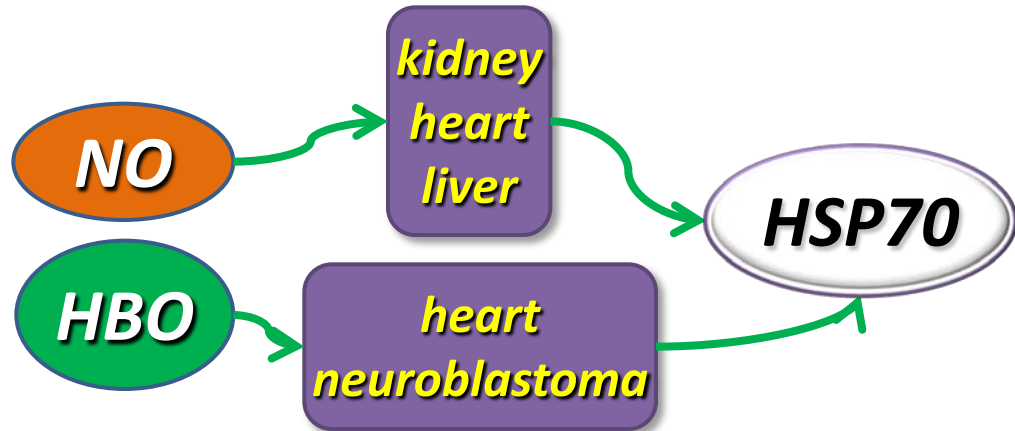
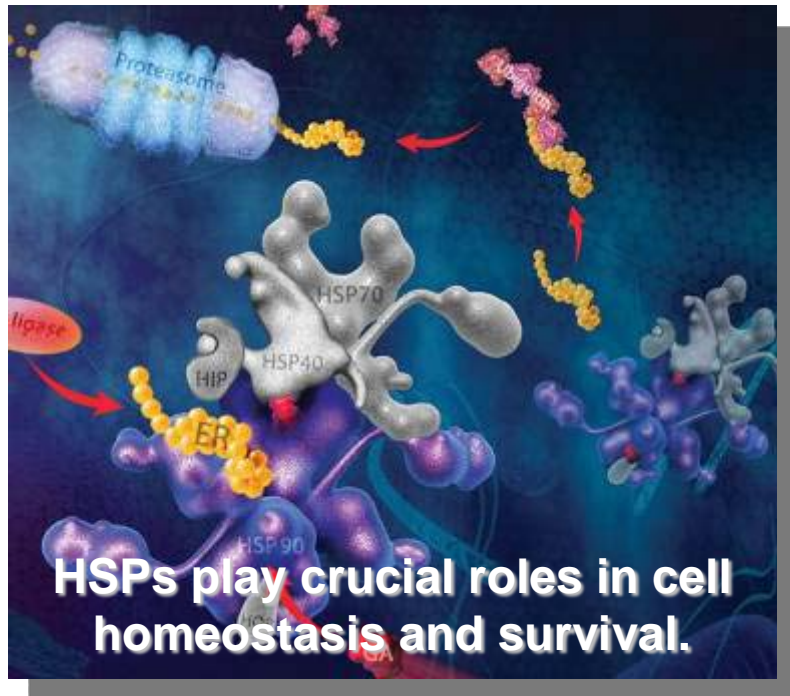
wgxu@hotmail.com, xuweigang@smmu.edu.cn

HBO preconditioning on DCS

- **A single exposure to HBO several hours prior to DCS modeling reduced the incidence of DCS via NO in rats.**
- **The increase of NO following HBO exposure was short-lived.**
- **Other mechanisms might have participated in.**



Part 1. HSP expression after HBO pretreatment



Was the prophylactic effects of HBO on DCS relative to HSPs ?



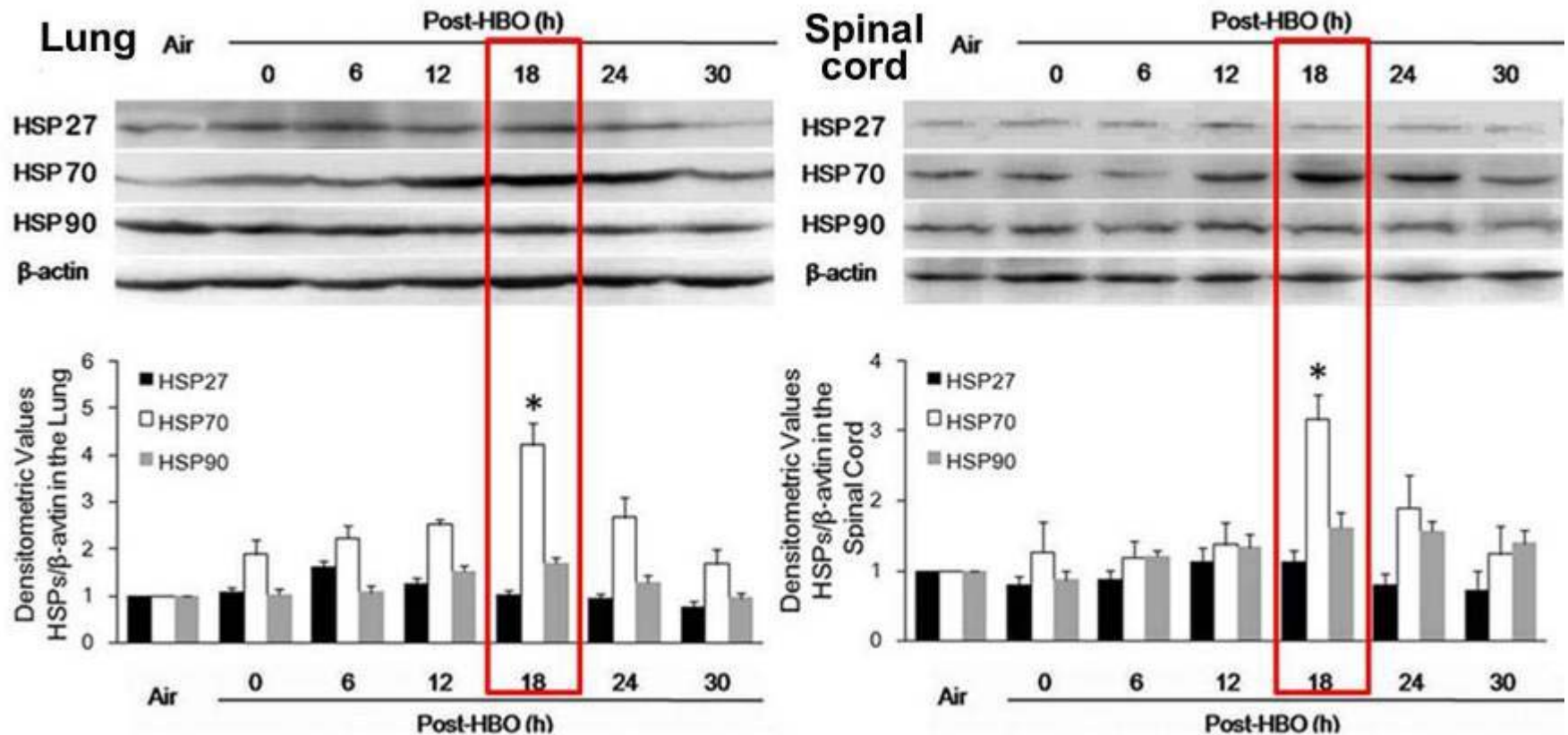
spinal cord, lung

0, 6, 12, 18, 24, 30 h

HSP27
HSP70
HSP90



Part 1. HSP expression after HBO pretreatment

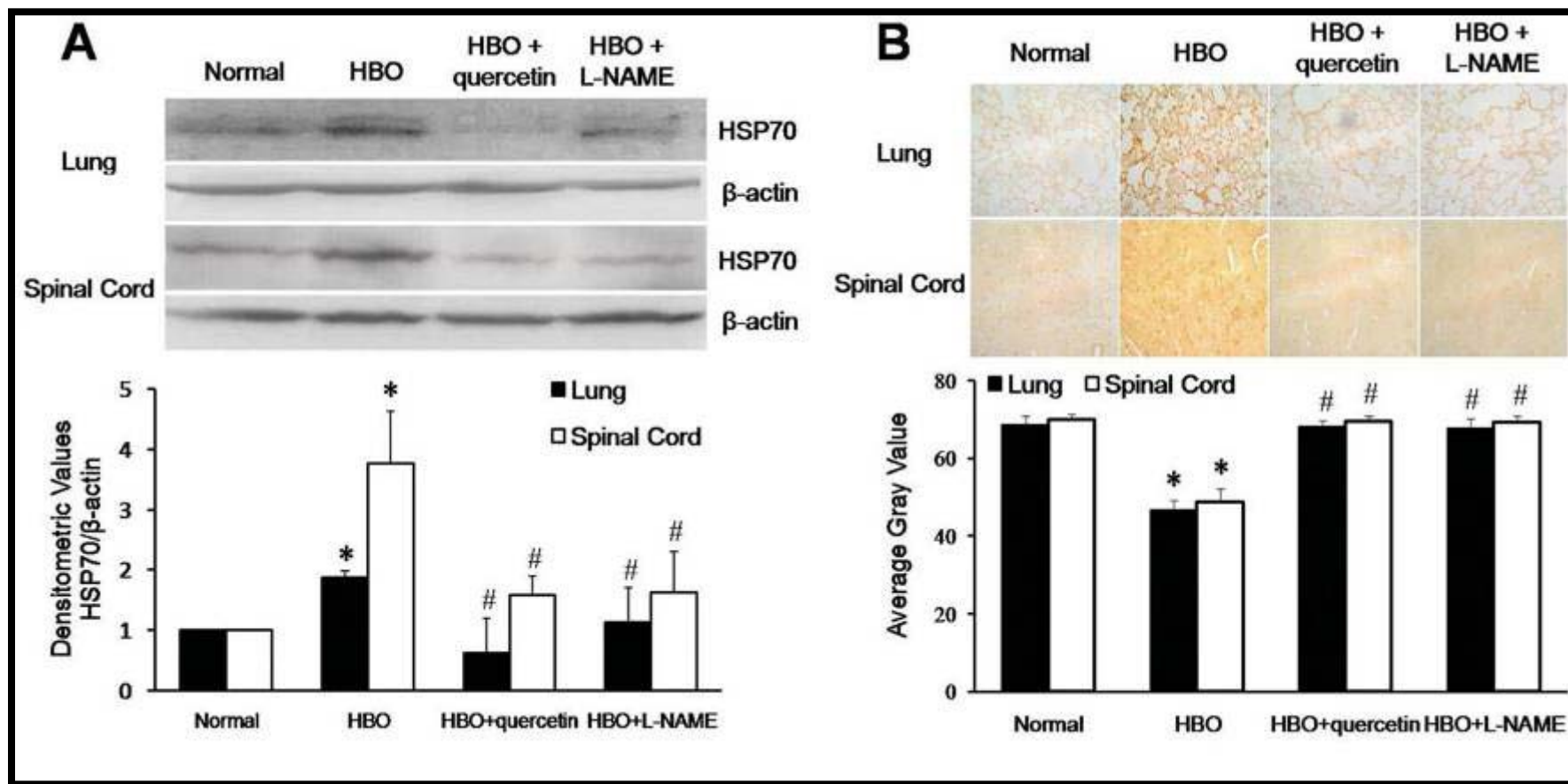


The greatest expression of HSP70 appeared at 18 h following HBO exposure.

($n=6$, * $P<0.05$ vs Air)



Part 1. HSP expression after HBO pretreatment



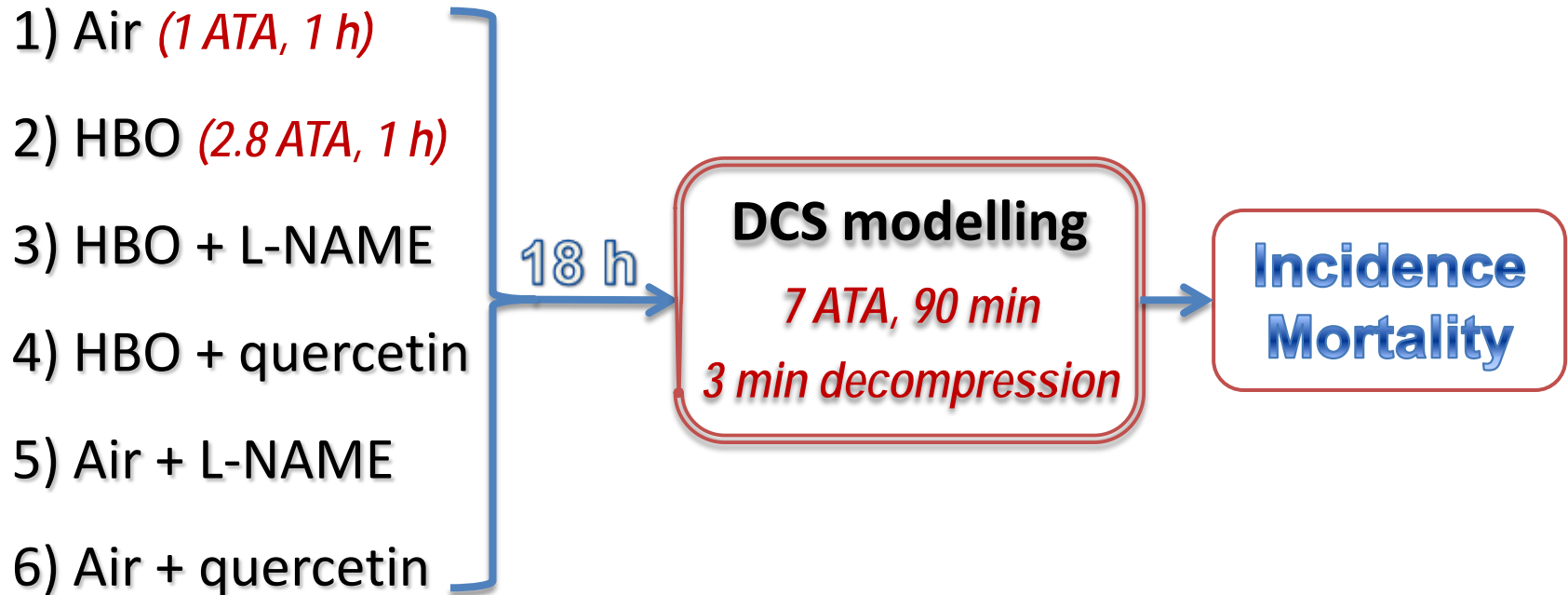
HSP70 significantly increased 18 h after HBO exposure, which could be diminished by quercetin or L-NAME.

($n=6$, * $P<0.05$ vs Normal, # $P<0.05$ vs HBO)

Quercetin — an HSP inhibitor
L-NAME — a NOS inhibitor



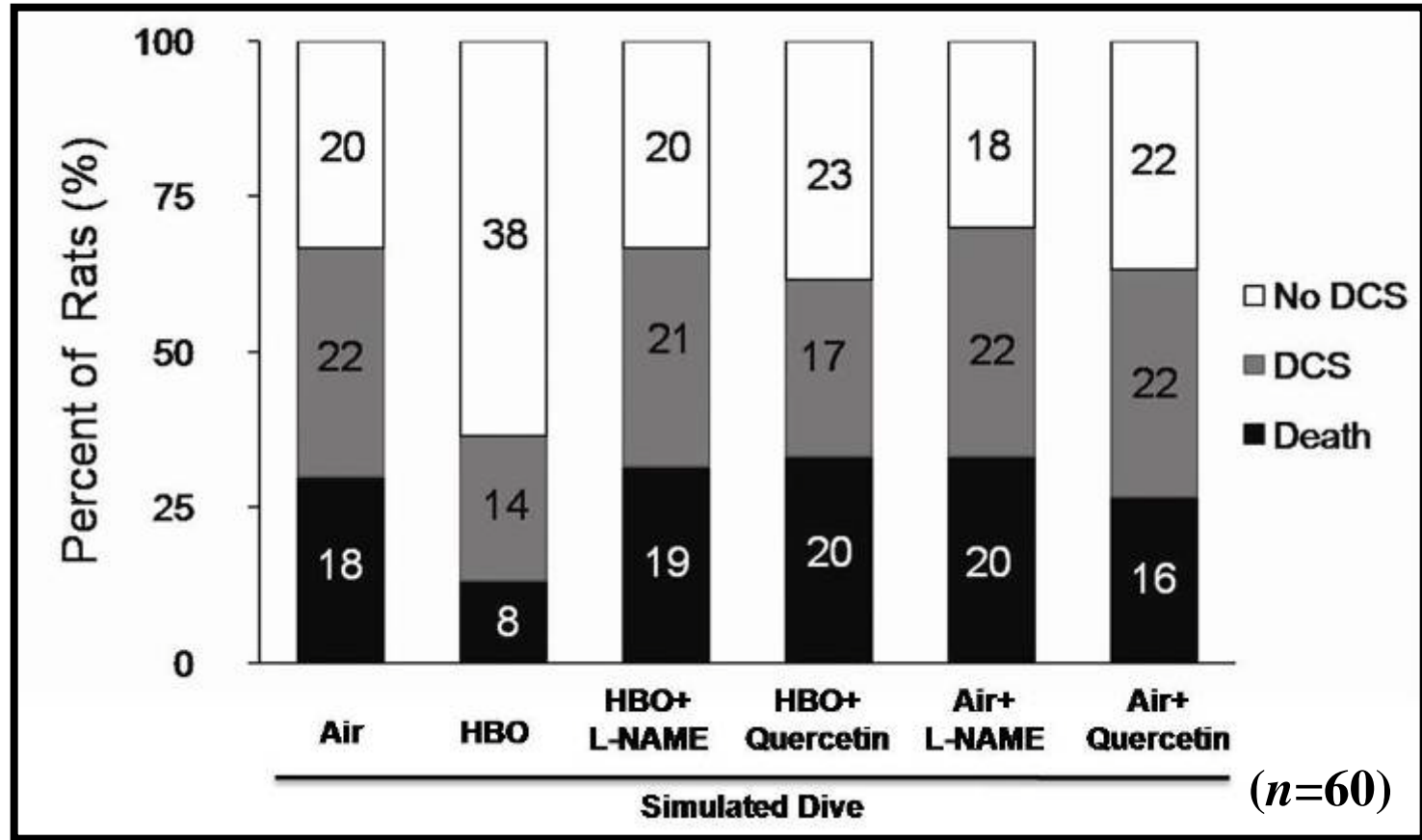
Part 2. Role of HSP70 in HBO preconditioning on DCS



Quercetin — an HSP inhibitor
L-NAME — α NOS inhibitor



Part 2. Role of HSP70 in HBO preconditioning on DCS



HBO exposure effectively reduced the incidence and mortality of DCS, which could be inhibited by L-NAME or quercetin.

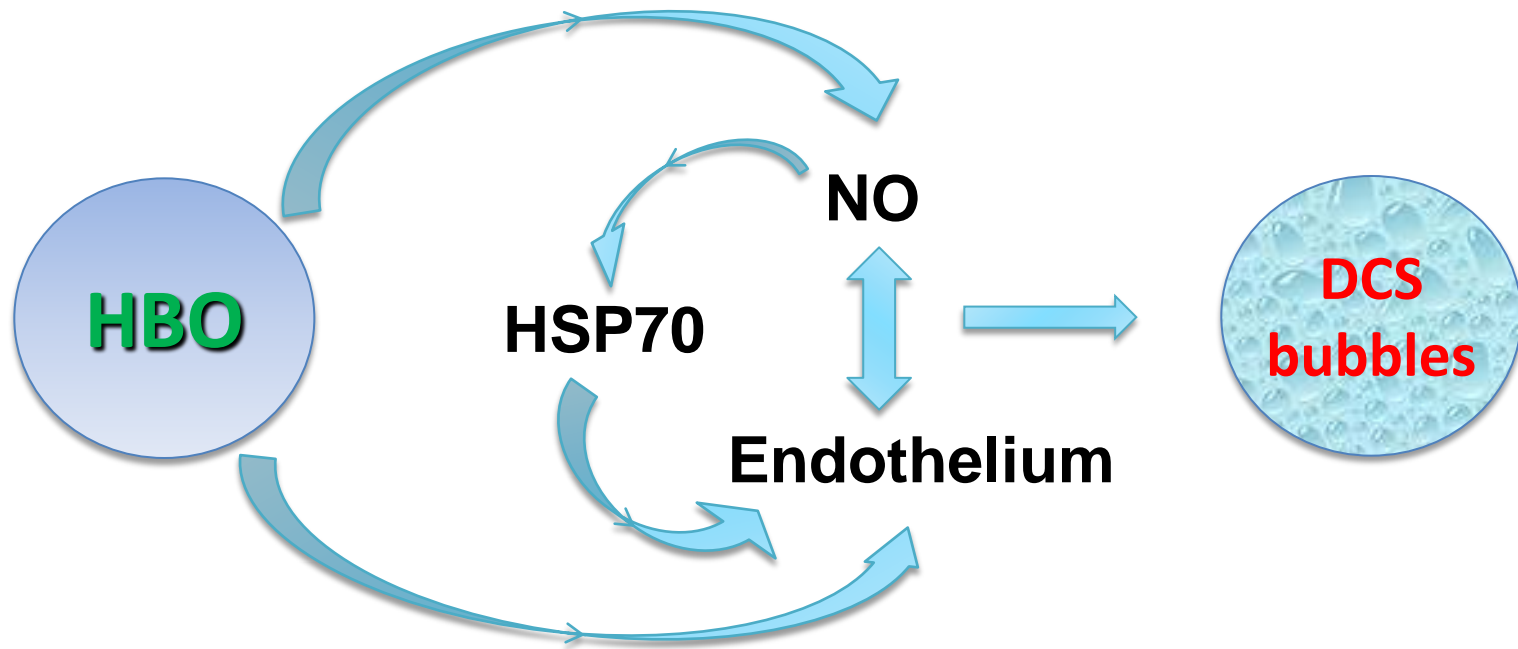


HSP70 participates in the protective action of HBO pre-exposure on DCS in rats.

By which way HSP70 exerts effects?



Part 3. Bubble formation after HBO pretreatment



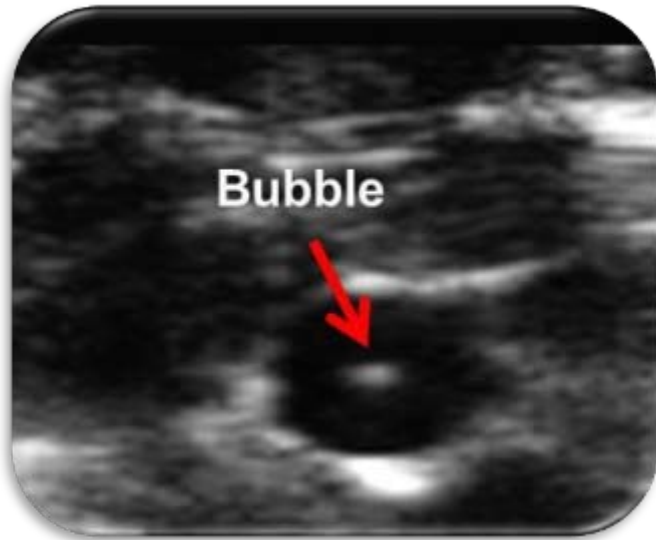
***HBO preconditioning reduces
DCS bubble formation?***



Part 3. Bubble formation after HBO pretreatment



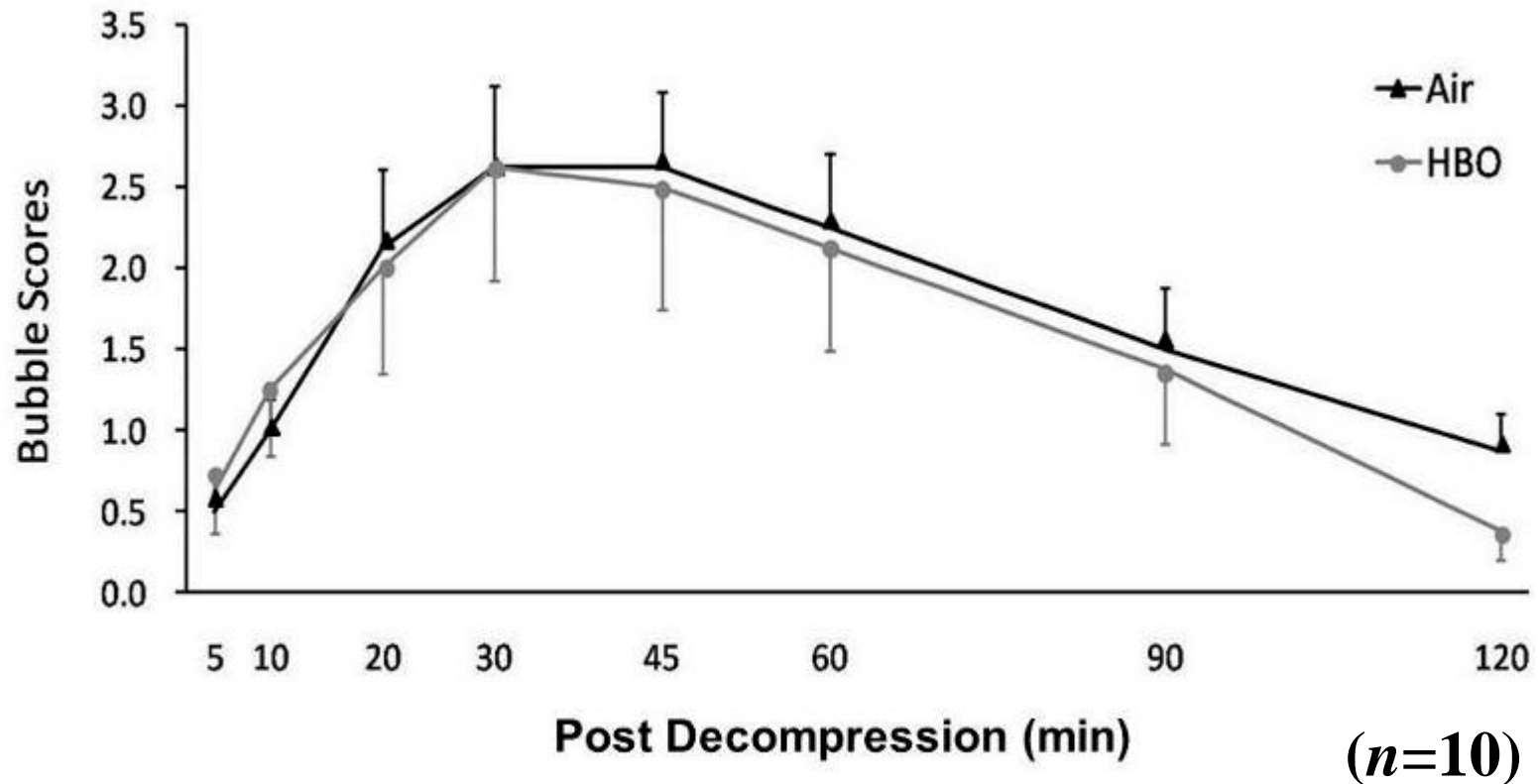
Grading of the ultrasonic images of DCS bubbles



Grade	Definition
0	No observable bubbles
1	Occasional bubbles
2	At least 1 bubble every 4 heart cycles
3	At least 1 bubble every heart cycle
4	At least 1 bubble per cm ² in every image
5	At least 80% of visible lumen obscured by bubble cloud; single bubbles cannot be discriminated



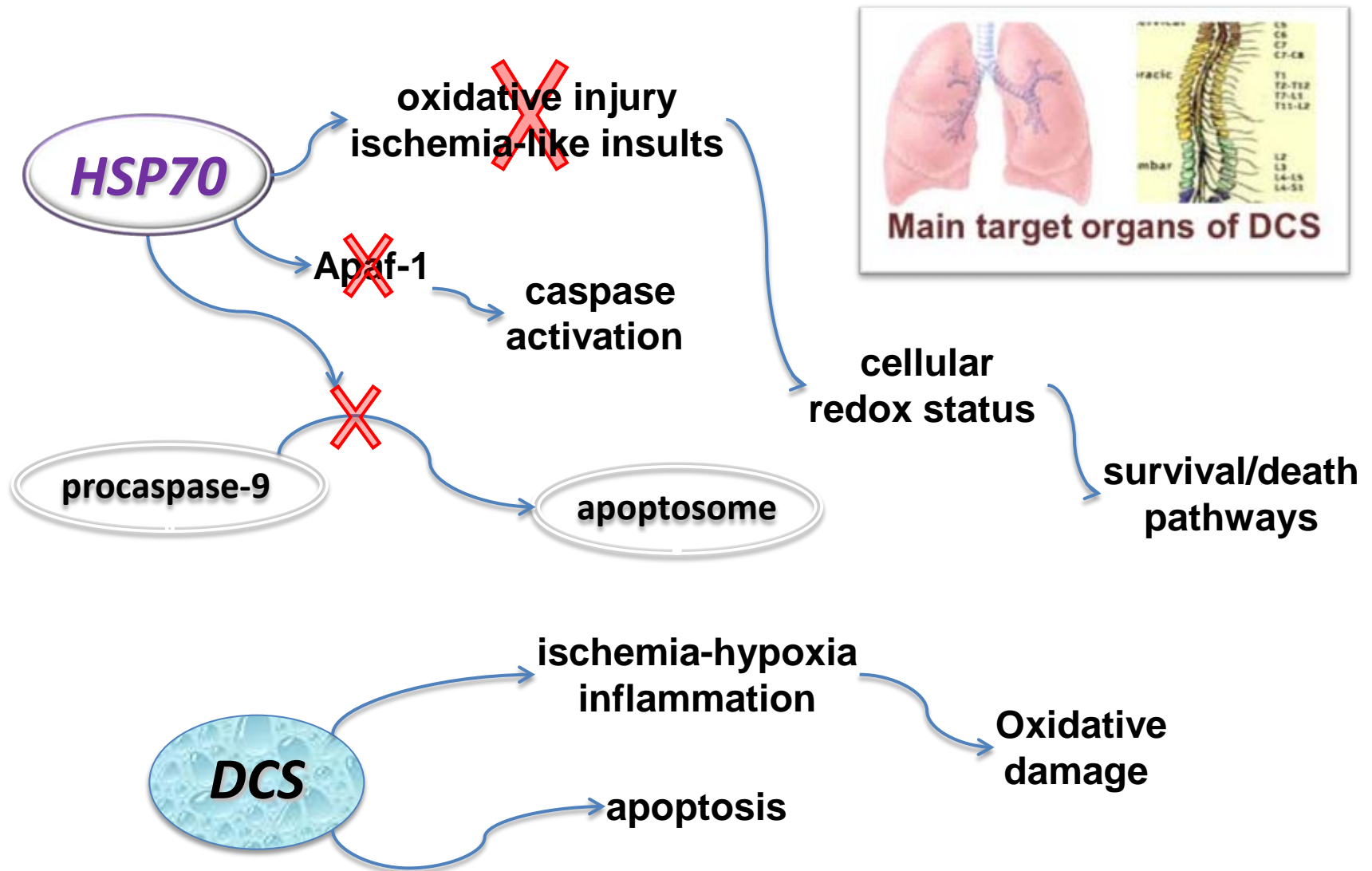
Part 3. Bubble formation after HBO pretreatment



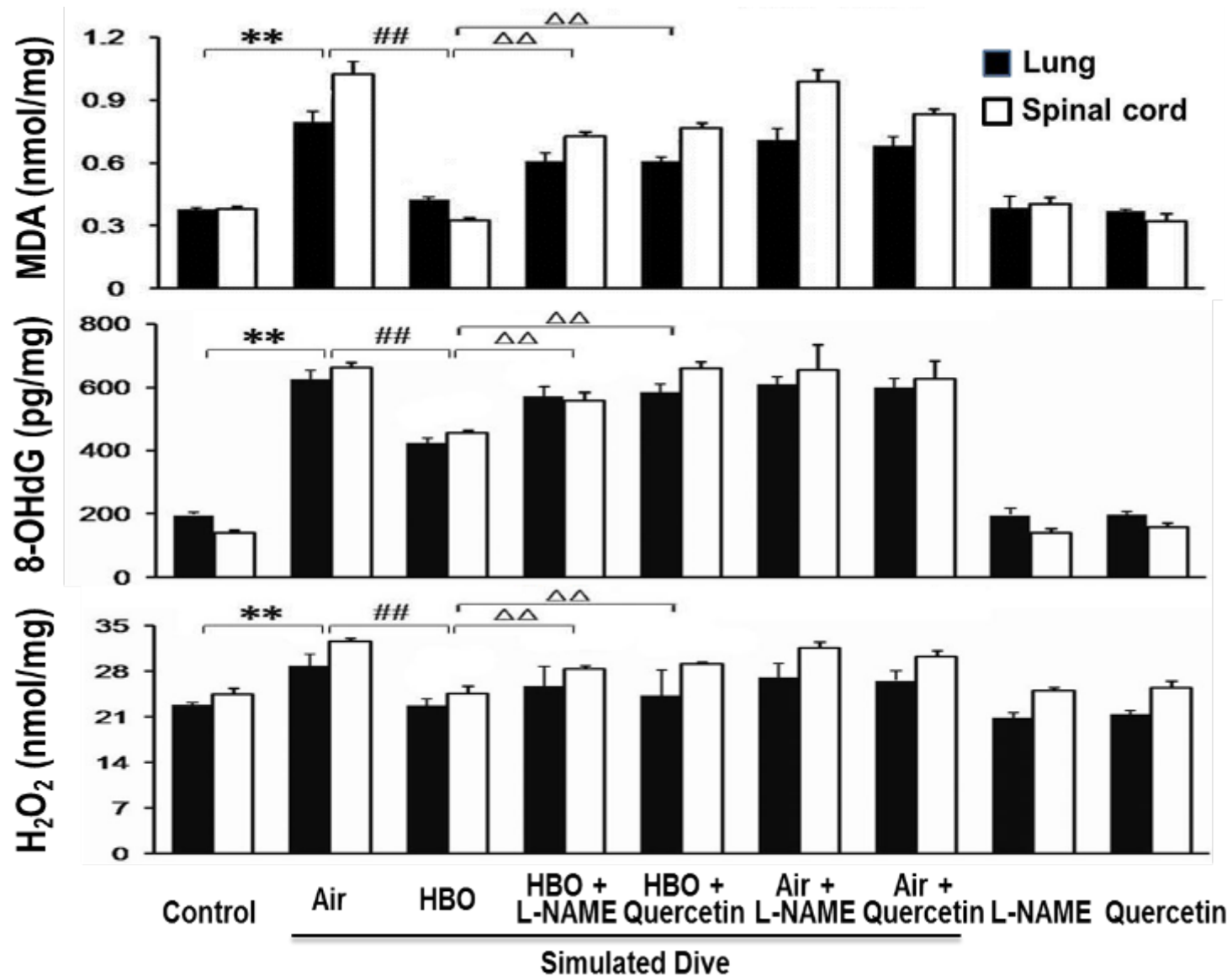
There's no difference of the DCS bubble scores between HBO and Air pretreated rats.



Part 4. How HSP70 exerts beneficial effect



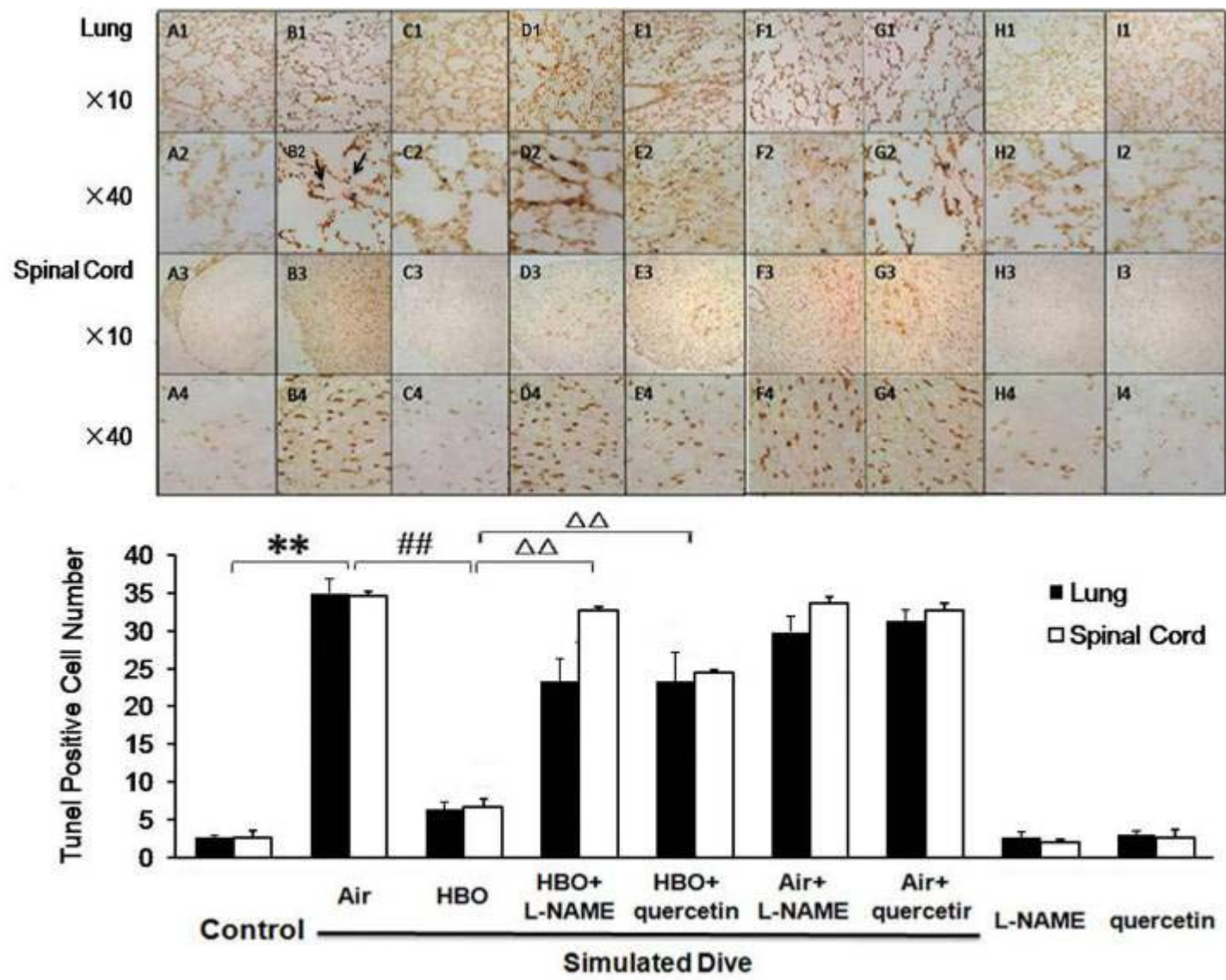
Part 4. How HSP70 exerts beneficial effect



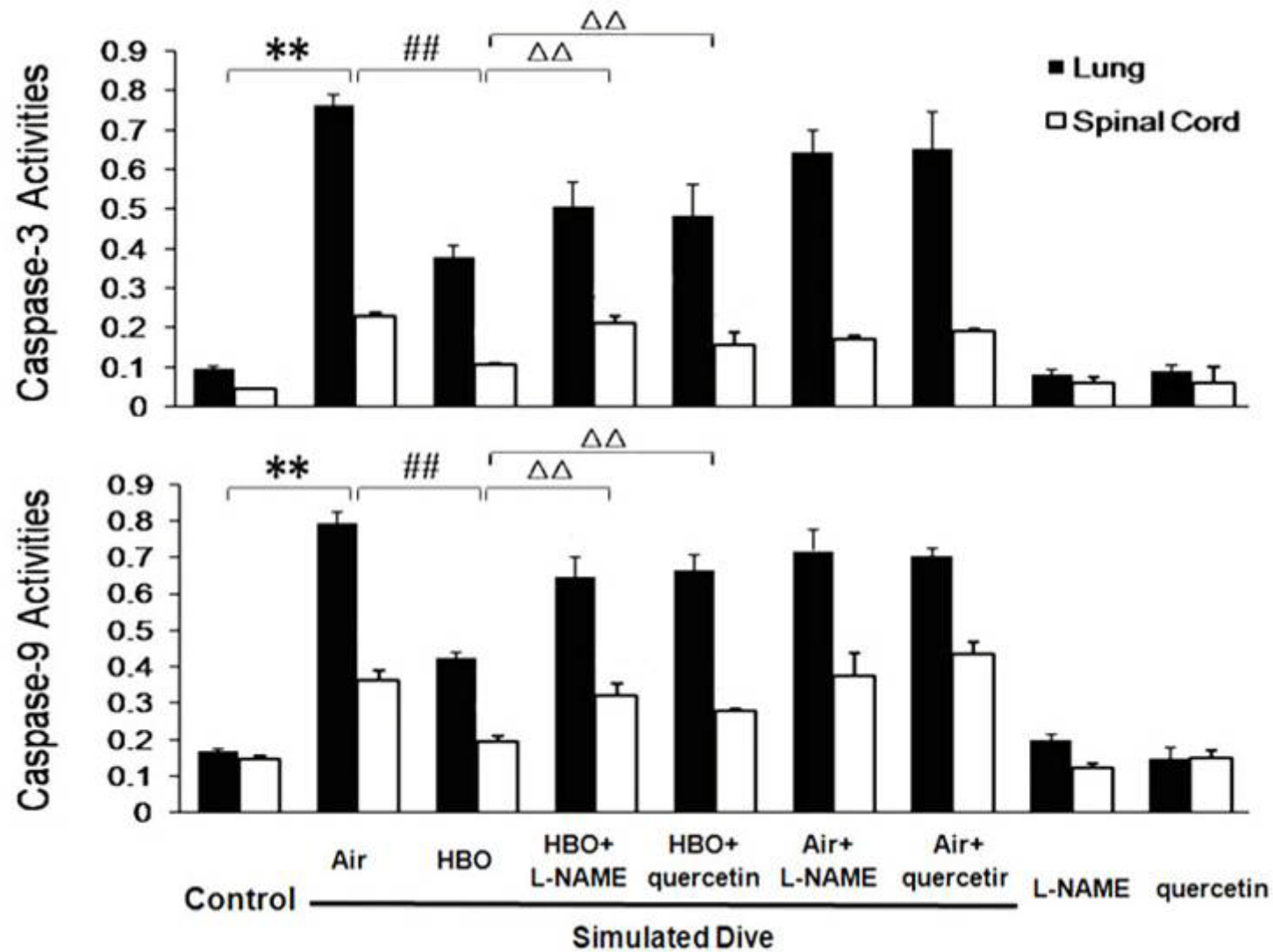
($n=6-14$; **, ##, • $P<0.01$)



Part 4. How HSP70 exerts beneficial effect



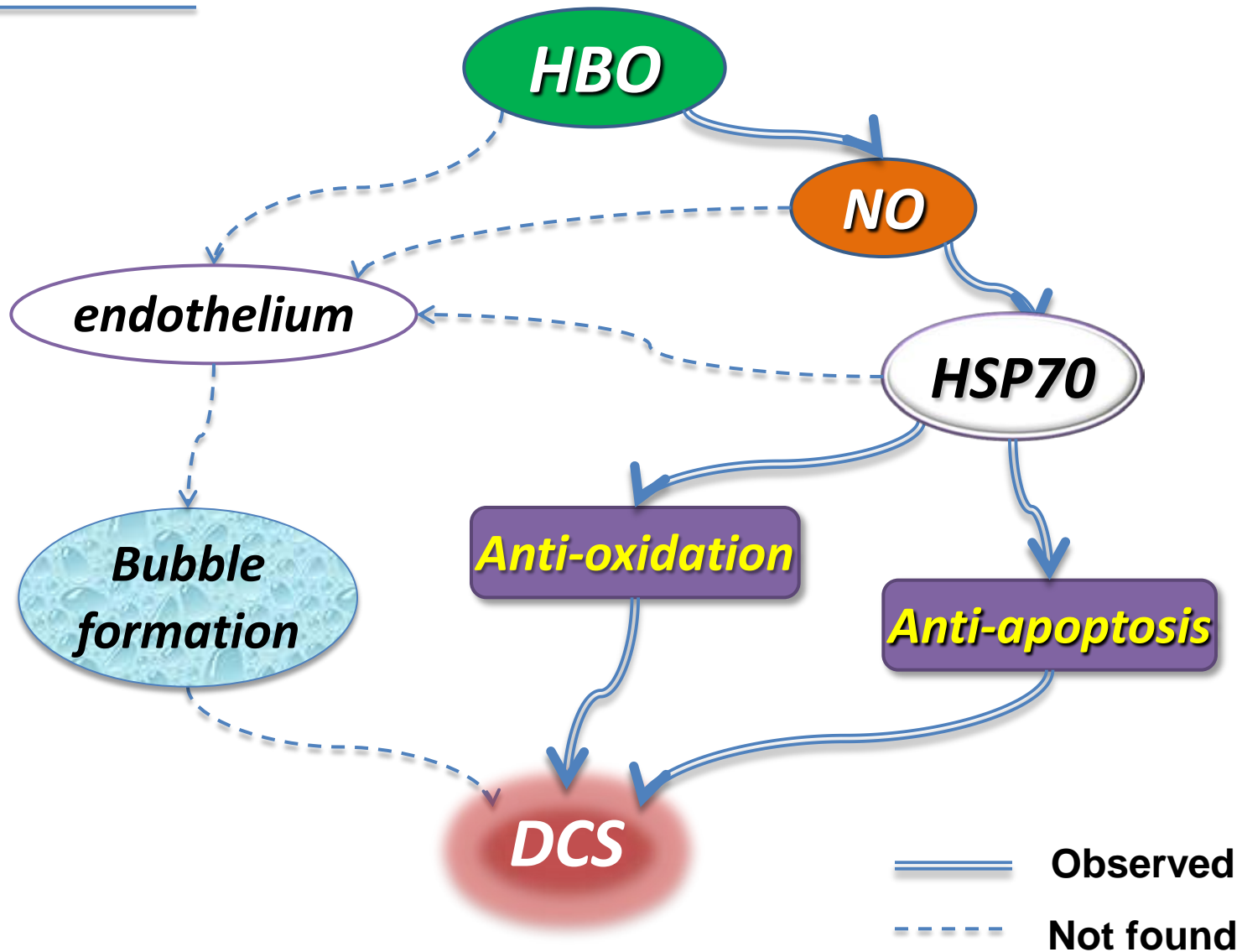
Part 4. How HSP70 exerts beneficial effect



($n=6-14$; **, ##, • $P<0.01$)



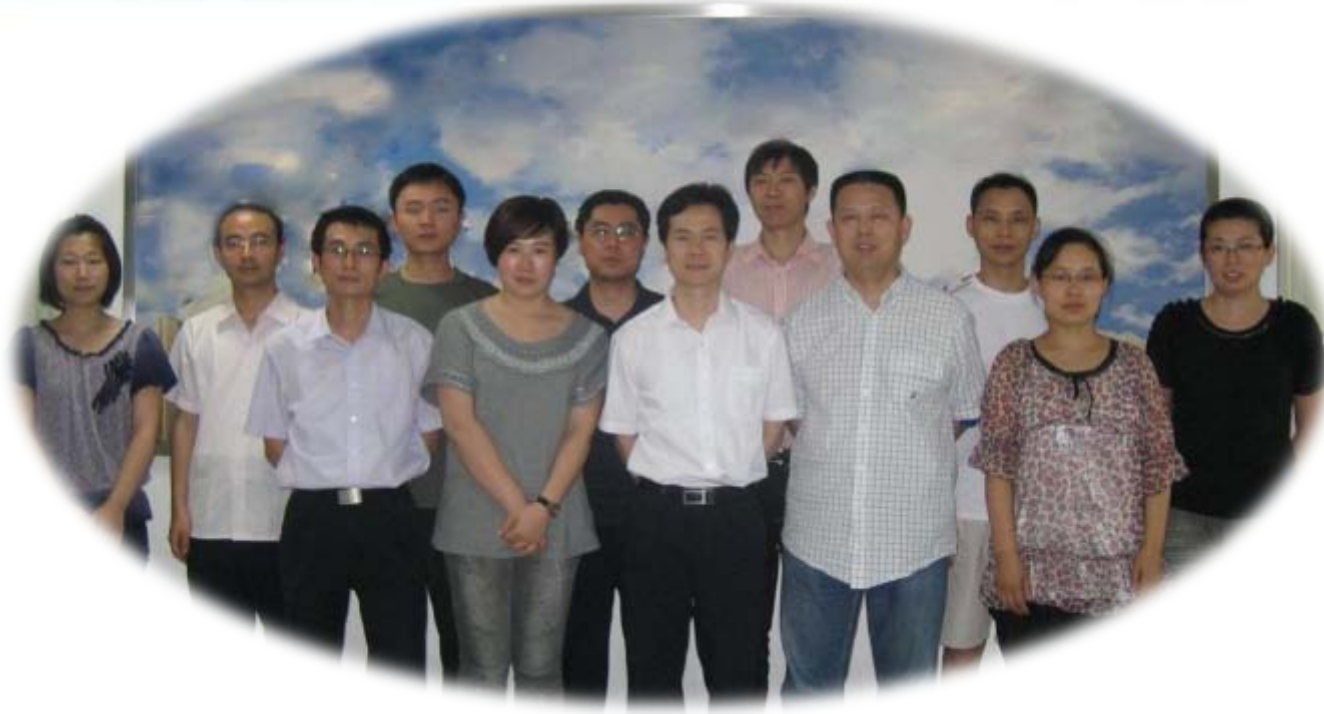
Conclusion



FUTURE WORK

- *How HBO induces HSP70 expression in spinal cord and lung?*
- *Whether a double or multi-exposure of HBO could further enhance the expression of HSPs and the beneficial effects against DCS?*





Any questions ?

This work was supported by the NSFC No. 81171873.

