

# Brief Hypercapnic Breathing Attenuates Lung Injury Induced by Rapid Decompression

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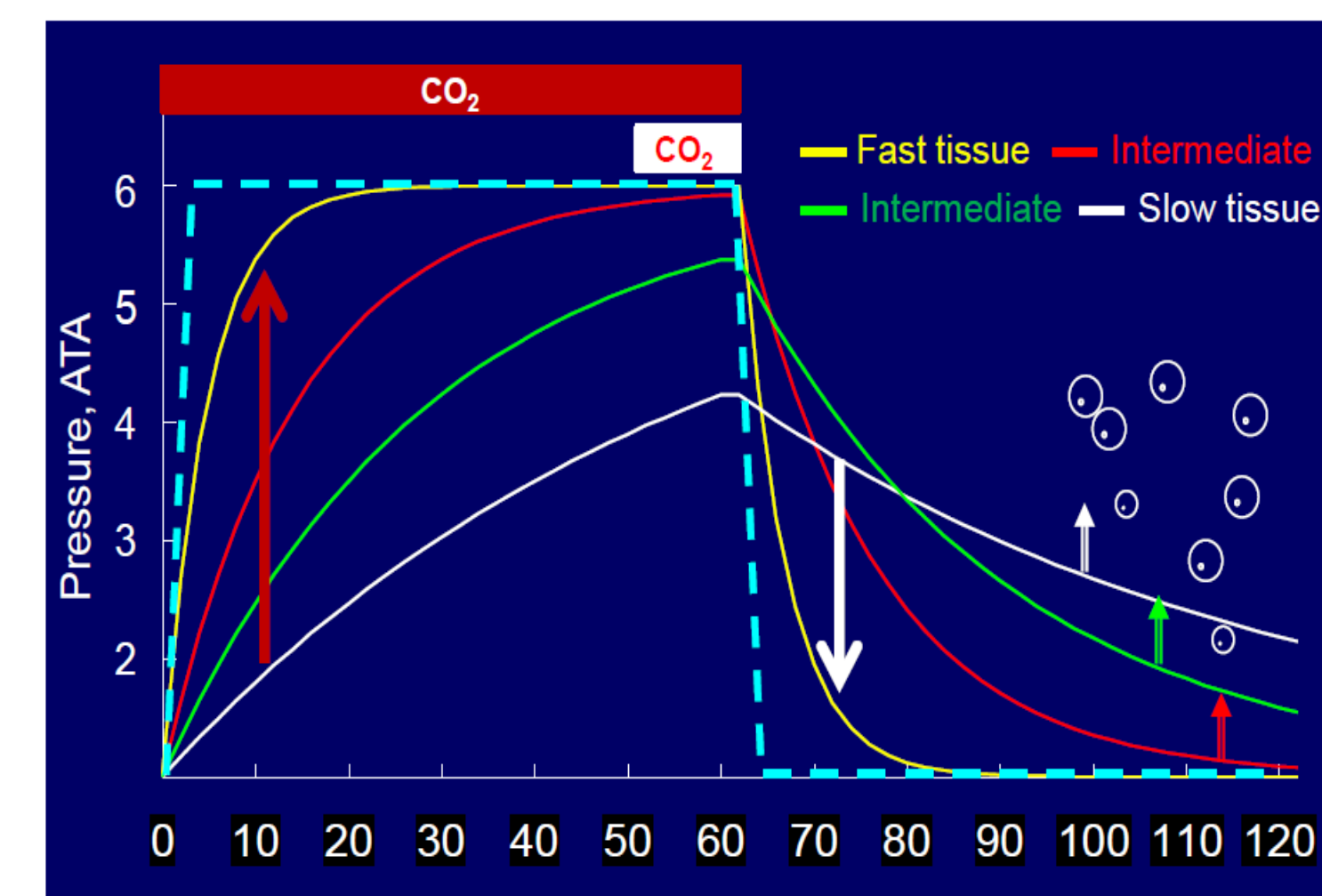
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1. Diving recommendations conclude that exercises performed before, during, or after diving would increase risks of DCS. The major factor mediating this risk has been attributed to CO<sub>2</sub> accumulation during exercise at depth.
2. A growing amount of recent evidences showed that pre-dive exercise protects divers from DCS stress.
3. Hypercapnic (high concentration of CO<sub>2</sub>) breathing can protect several organ systems from tissue injury, including the central nervous system, the myocardium, and the lungs.

**Brief hypercapnia before decompression significantly attenuated acute lung injury and reduced the rate of animal death, whereas a prolonged hypercapnia during the whole bottom time exacerbated lung injury after rapid decompression.**

**Brief hypercapnic ventilation before pulmonary artery air infusion in an isolated rat lung model significantly attenuated gas embolism-induced lung injury.**



The occurrence of signs of DCS in rats after rapid decompression from hyperbaric exposure of 6 ATA.

Signs of DCS	Bottom time					
	60 min			120 min		
	Air (n=15)	CO <sub>2</sub> 60 min (n=15)	CO <sub>2</sub> 10 min (n=15)	Air (n=15)	CO <sub>2</sub> 120 min (n=15)	CO <sub>2</sub> 10 min (n=15)
Dragging of limbs	3	5	1	4	0	1
Unconsciousness	3	3	1	6	5	1
Agitation and rolling	3	1	1	3	0	2
Death	5	2	1	7	8	3
Total†	5	7	3	10	9	4*

†, rats presenting one or more than one signs of DCS.  
\*, p < 0.05 compared with the Air group.

