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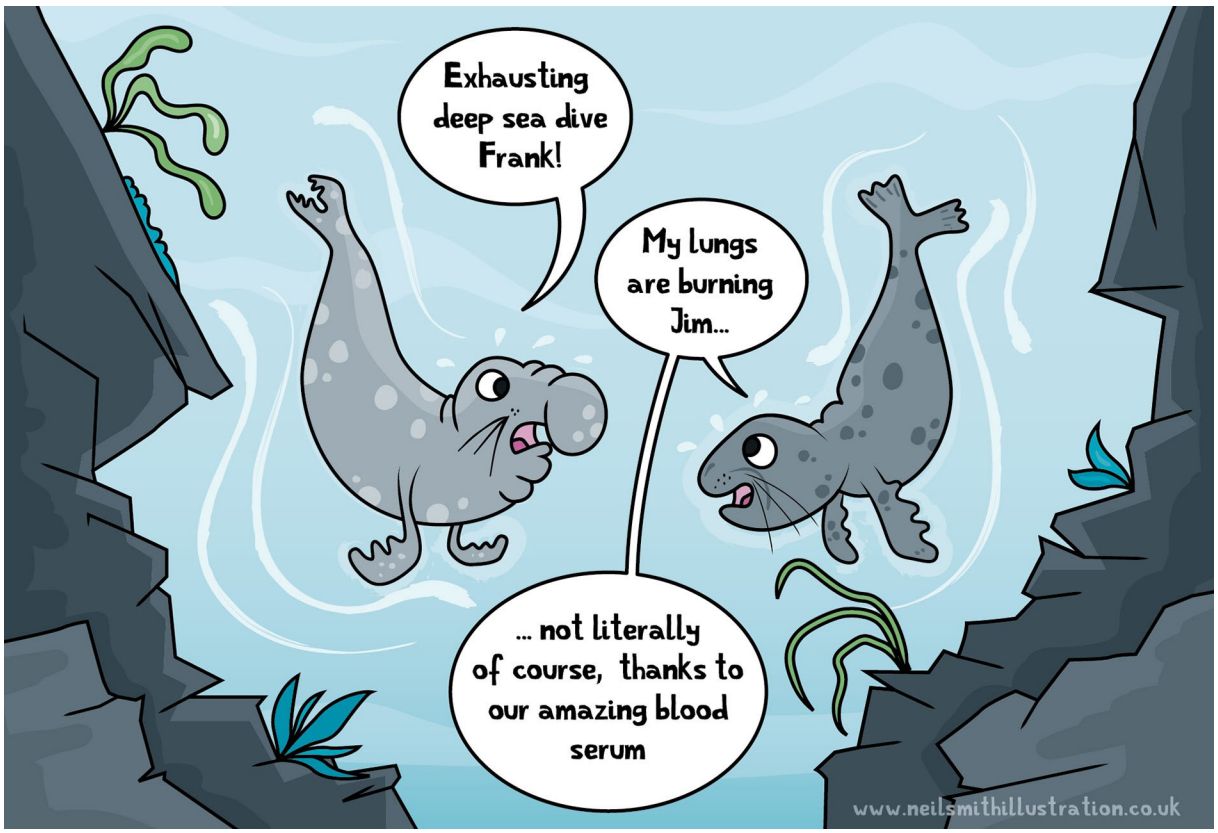
INSIDE JEB

Collapsing seal lungs protected by amazing anti-inflammatory blood serum



Seal lungs can take a terrible pounding when one of the mammals leaves the surface. Collapsing during deep descents to protect the animal from the bends, the delicate tissues must incur damage as they are crushed, and endure blood and oxygen flooding back when the animals return to the surface. In addition, the fragile tissues could suffer inflammation, which is usually triggered to heal injury. Yet Allyson Hindle from Harvard Medical School, USA, and colleagues from various institutions across the USA say, 'There is no evidence that diving damages pulmonary function in these species'. Wondering how elephant and Weddell seals protect their lungs from the potentially damaging inflammatory response that should be triggered by diving injuries, the team tested whether blood samples from the two species offered any protection from the effects of inflammation triggered by a bacterial toxin, lipopolysaccharide.

Impressively, the toxin barely triggered any inflammatory response in the seal blood, in contrast to human blood samples, which experienced inflammation that was 50 to 500 times greater. And when the team added seal blood extract to cells from the seals' immune systems, the extract quenched the inflammatory response and was also able to reduce inflammation in mouse immune cells. 'These data suggest that seal serum possesses anti-inflammatory properties, which may protect deep divers from naturally occurring inflammatory challenges such as dive-induced hypoxia–reoxygenation and lung collapse', says the team, which would like to identify the protective compounds in the hope of being able to use them to extend the survival of organs used in life-saving transplant surgery.

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Bagchi, A., Batten, A. J., Levin, M., Allen, K. N., Fitzgerald, M. L., Hückstädt, L. A., Costa, D. P., Buys, E. S. and Hindle, A. G. (2018). Intrinsic anti-inflammatory properties in the serum of two species of deep-diving seal. *J. Exp. Biol.* **221**, doi:10.1242/jeb.178491.

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