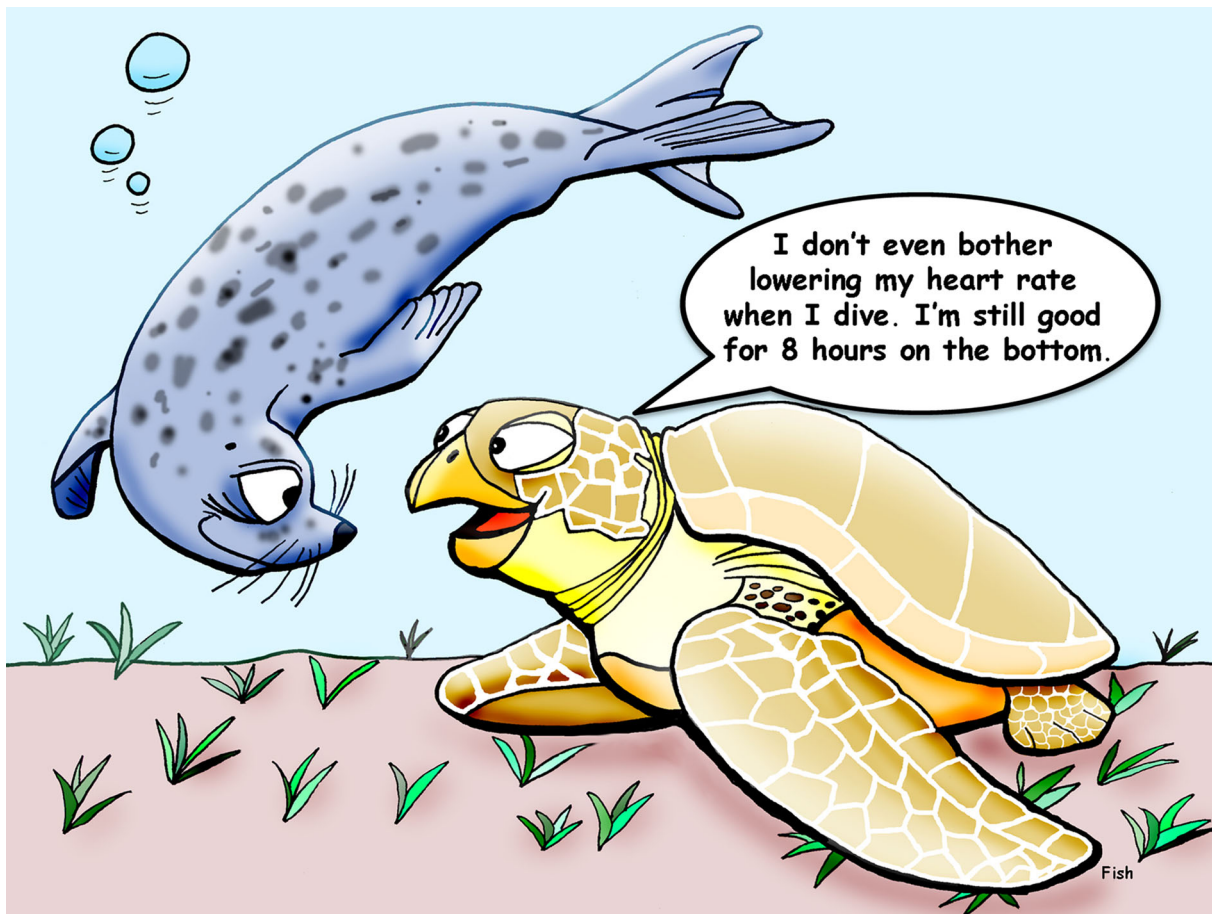


INSIDE JEB

Diving loggerhead turtles don't drop heart rate to conserve oxygen



Warm-blooded (endothermic) diving marine mammals have a suite of handy adaptations that allow them to conserve oxygen and remain submerged for extended periods: they pack their muscles with oxygen-storing myoglobin, cut off the blood supply to their limbs and reduce their heart rates. Yet, ocean-going loggerhead turtles, which do not appear to benefit from many of these advantages, are capable of remaining submerged for up to 8 h at a time. How do they pull off this remarkable feat? Intrigued by the charismatic seafaring reptiles, Cassandra Williams and Paul Ponganis, from the Scripps Institution of Oceanography, USA, teamed up with Kasufumi Sato, from The University of Tokyo, Japan,

to find out how the enigmatic creatures regulate their heart rate when submerged.

As fishers in Japan's Otsuchi Bay occasionally catch loggerhead turtles in their nets, Sato's students were able to collect some of the animals for a brief stay at The University of Tokyo's marine station. While the turtles were in captivity, the trio measured their heart rates and activity patterns and discovered that, unlike mammals, the animals do not reduce their heart rates during dives. In fact, their diving heart rates were indistinguishable from their heart rates when resting on the bottom of the tank and when resting in shallow water with their heads protruding above the

surface. However, the reptiles' hearts started to race when they began moving and foraging for squid beneath the water, and were highest when the animals were swimming at the surface between dives. 'We found that activity level is the main driver of heart rate in loggerhead turtles, regardless of whether turtles were underwater', says Williams.

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Williams, C. L., Sato, K. and Ponganis, P. J. (2019). Activity, not submergence, explains diving heart rates of captive loggerhead sea turtles. *J. Exp. Biol.* **222**, jeb200824. doi:10.1242/jeb.200824

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