

# Emperor Penguin can stay under water for up to 27 minutes, new research reveals

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Diving Emperor Penguins are shown during a foraging trip from the Cape Washington colony in Antarctica. Credit: Paul Ponganis, University of California

New research has revealed how the Emperor Penguin is able to dive to depths of over 500m and stay under water for up to 27 minutes – deeper and longer than any of its fellow avian species.

Researchers from the University of California will be presenting their new findings at the International Penguin Conference (IPC) which begins in Bristol today [02 September].

It's the first time the conference has been held in Europe, with 200 delegates from 30 countries sharing their latest research and knowledge at the University of Bristol and Bristol Zoo Gardens between 2 and 6 September.

Alexandra Wright and Dr Paul Ponganis investigated the heart rate response of Emperor Penguins as they made foraging trips to see from the Cape Washington Colony in Antarctica.

They measured heart rates using an electrocardiogram (ECG) recorder and looked at dive behaviour with a time depth recorder (TDR) and found that the penguins slow their heart from the normal rate of around 70 beats per minute to as low as 10 beats per minute.

Emperor Penguins also have unusually structured hemoglobin to allow it to function at low [oxygen levels](#), solid bones to reduce barotrauma - physical damage to body tissues caused by a difference in pressure between a gas space inside, or in contact with the body, and the surrounding fluid, and the ability to reduce metabolism and to shut down non-essential organ functions.

The profound decline in heart rate - known as bradycardia – decreases [oxygen consumption](#), conserves the respiratory and [blood oxygen](#) stores, and isolates muscle, which must rely instead on its own oxygen store which is bound to the muscle protein, myoglobin.

Although this heart rate response contrasts with other birds and terrestrial mammals, it is similar to the dive response of marine mammals.

**More information:** Britain is to host the International Penguin Conference from 2 to 6 September in Bristol.

Provided by University of Bristol

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