
Challenges of Climate Change~ Camels' Adaptation Strategy is Overwhelmingly Useful

Description

Camel has adapted mechanisms that allow it to withstand prolonged water deprivation, high temperature, especially in the absence of readily available water, and survive when feed resources are scarce or of poor quality. Heat tolerance is in part due to its' ability to minimize water loss. The camel retort to hot arid conditions by reducing urine production, absorbed urine, sweating economically, by an increase body temperature and by the 'storage' of CO₂ and glucose in the muscles. Camels can survive up to 14 days without water and can tolerate water losses of up to 30%. A camel may drink more than a third of its body weight as it rehydrates.

In terms of actual water intake, camel drinks 200 to 220 L in 3-10 minutes. In other animals rehydration at these levels would lead to over hydration and possible death. The camel is able to do this as large amounts of water can be stored for up to 24 hours in the gut to avoid a rapid dilution of the blood. The camel's kidneys play a major role in the process of conserving water, having strong capacity of water reabsorption and excretion of very concentrated urine

The camel's blood plays a principal role in adaptive mechanisms to high heat burden and dehydration as its composition and volume remains relatively constant and hemoglobin function remains normal. The erythrocytes of the camel are oval shaped and non-nucleated which resist osmotic variation without rupturing; these cells can swell to twice their initial volume following rehydration. Another unique feature of the erythrocytes is their long life span when the camel is dehydrated. The life span of the erythrocytes of hydrated camels is 90 to 120 days. When camels were chronically dehydrated during summer (40oC mean during day; 20oC mean at night) the life span of erythrocytes was extended to 150 days. Erythrocyte turnover is water and energy expensive. Therefore extending the life span of erythrocytes reduces energy and water expenditure

Featured Image 35

A fully hydrated camel has a diurnal body temperature range of 36 to 38oC. However when dehydrated and exposed to high environmental heat load body temperature may fluctuate by 6 to 7oC, from approximately 34 to 41o C. The increase in body temperature of camels exposed to high heat load, especially following a 2o C reduction below the normal minimum, is advantageous because it allows a considerable amount of heat to be stored during the day and dissipated at night (by radiation) without the expenditure of water. Furthermore, as body temperature increases the temperature gradient between the camel and the external environment is reduced, and again water use is reduced. The camel has a bi-phasic air flow pattern, i.e. the inspiratory and expiratory flow rates through the nasal turbinate are similar. The bi-phasic breathing pattern also reduces water use.

As obvious the main atrocities of climate change are raise in temperature, low rainfall (short of vegetation and drinking water) and sand storms etc, all challenges are accepted by camel with the mechanism of adaptation. Camel can be wisely use as a main strategic tool to while fabricating policies to adapt with the climate change. I hereby stress the policy makers to consider on the true worth of this unique and strange animal.

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