

COMMENTARY

Endothermy explained

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WHEN it comes to body temperature regulation, animals can either be ectothermic or endothermic.

Last week I looked at animals that utilised ectothermy as a means of managing the efficiency of the energy their bodies use. Animals that employ ectothermy are basically using the external conditions to regulate their body temperature.

For instance, with reptiles, if they are too cool, they will bask in the sun and let the heat raise their body temperature to the optimum level, on the other hand if they are too hot they will go in the shade. Animals that are endotherms rely on the energy they get from the food they consume in order to regulate their body temperature.

As I mentioned in last week's article, both ectotherms and endotherms have certain characteristics as well as advantages and disadvantages associated with their particular type of body temperature regulation method. This week I will be looking at an endothermic lifestyle and comparing it with ectotherms.

First of all, endotherms can do



things that ectotherms cannot, for instance, endotherms are also capable of night hunting in areas where the overhanging vegetation would make it shady. Ectotherms cannot do this as if they stay in such an area too long, their body temperature would drop too far below the optimum. However, endotherms can maintain a constant body temperature on their own, regardless of the temperature of its surroundings. Therefore endotherms have more time than ectotherms to forage for their food.

Ectotherms are also capable of exhibiting a burst of energy, which only lasts a few minutes and are used for intensive activity, like running away from potential

predators or if they are predators, to pounce on prey. However, in endotherms this burst of energy is sustained for a longer period of time. The reason being that in animals, energy is produced when glycogen molecules are broken down to produce lactate molecules, a process which requires oxygen, so that energy can be continually released as needed by the animal. However, with ectotherms, after the oxygen has been used, it has to wait a long time for the lactate to be re-synthesised to glycogen.

Endotherms are referred to as "high-energy" systems. This is because they use of a lot of fuel in moving around and staying warm. However, nature has com-

pensated for this by giving them more time to forage so that they get food in the necessary quantities to supply this great demand for energy. But endotherms are not energy efficient. An example of how inefficient endotherms can be seen by how the young feed.

The offspring of ectotherms do not compete with the adults of the same species as they feed on different food. Also, as the animal grows it can go into a state of suspended animation if its desired food becomes scarce. However, with endotherms, the parents have to spend energy protecting the young from predators and the elements, by building a nest or burrow. They also have to hunt or forage for food for themselves and their offspring.

Since both parent and offspring feed on the same type of food, it is a great sacrifice, energy-wise as they have to give up some of their food to their young. This parental care can last from days to months to years. Almost all endotherms must be fed by their parents until they are fully grown and able to consume food in the same form as the adult rather than in a regurgitate state.

Therefore, endotherms are not energy efficient animals, especially when it comes to growth and producing young. However, endotherms are very successful,

that is, there are a lot more species of endotherms present on our planet than ectothermic species.

A good example of the success of endotherms is the hummingbird. This tiny creature burns up large amounts of energy as it is an active forager but has a small surface area; therefore it loses heat at a rapid rate. This energy is replenished through a diet of sugar solution which includes amino acids and other high nutrition ingredients. However, with such a specific diet there are numerous species of hummingbirds throughout the world. This is because hummingbirds provide a valuable service to plants by acting as pollinators. Therefore in exchange for their services, the plants provide nectar with the nutrition requirements needed by hummingbirds, thereby targeting them and their pollination skills.

Therefore it can be seen that different methods of temperature control are used, by animals each with their strengths and weaknesses. However, it was found that endotherms are not very energy efficient however, there exists more species than of ectotherms. It appears that nature has favoured endotherms. But as is shown with endotherms like hummingbirds, nature provides for endotherms if it provides a valuable service in return.