

BAT HIBERNATION AND BODY TEMPERATURE

After hibernation, bats need brown fat to survive the recovery period it needs to warm up and wake up. Bats that hibernate have extra brown fat on their backs and shoulders, which is an adaptation for survival. This adaptation enables the bat to undergo the extreme body temperature changes which must take place once they become awake from hibernation.

Brown fat (a unique thermogenic tissue in mammals) provides the energy bats need to increase their heart rate and respiration. To become active after hibernation, bats must raise their body temperature from approximately 40 degrees Fahrenheit to 100 degrees Fahrenheit quickly. For example, a Big Brown bat's head and front legs warm up first and then the back legs finally awaken. It takes approximately thirty (30) minutes for a Big Brown Bat to be completely warm and capable of its returning to its typical activities.

Study the data from a Big Brown Bat's body temperature change upon awakening from hibernation.

TIME (Minutes)	Heart Temperature (Celsius)	Back Legs Temperature (Celsius)
0	10	10
5	12	10
10	17	11
15	20	13
20	32	18
25	32	18
30	38	34

1. What time is the difference in temperature between the heart and back legs the greatest?
2. Which time interval does the temperature of the back legs increase the most?
3. When does the heart temperature stay the same?
4. When does the temperature of the back legs stay the same?
5. Create a line graph of this data and label the heart temperature increase. Create another line on the graph and label the back legs temperature increase. This line graph will show the data in a different way. Complete on the back of this page.