

STUDENT GUIDE

Lesson 3: Homeostasis Lab



Objective: To investigate how the consumption of different pre-workout and protein supplements impacts physiological parameters related to homeostasis during and after exercise.



Introduction

Driving Question: Why might someone who exercises consume whey protein?

What do we still need to know to answer the Driving Question?



Part 1: Reading about Homeostasis

List any new ideas you have about the Driving Question because of the information from the reading.

How do you think this reading relates to the phenomenon we are exploring?



Part 2: Interpreting Homeostasis Models

Complete the information in the table using each of the models.

Model	Regulated Variable	Sensor(s)	Controller(s)	Effector(s)
1				
2				
3				
4				

Briefly summarize the homeostatic mechanism taking place in each of the models in the appropriate spaces below.

Model #1- Body Temperature Regulation under Negative Feedback System

Model #2- Heart Rate Negative Feedback System

Model #3- Effects of Aldosterone and ADH (hormones) on Kidney Function when Fluid Levels in Body are Low

Model #4- Blood Glucose Regulation under Negative Feedback System

How do you think these models relate to the phenomenon we are exploring?



Part 3: Case Study of Homeostasis in Action

To better understand how homeostatic loops and feedback mechanisms work together to maintain regulated physiological variables, complete Figure 1 by filling in information after each letter. Use Chart 1 for reference.

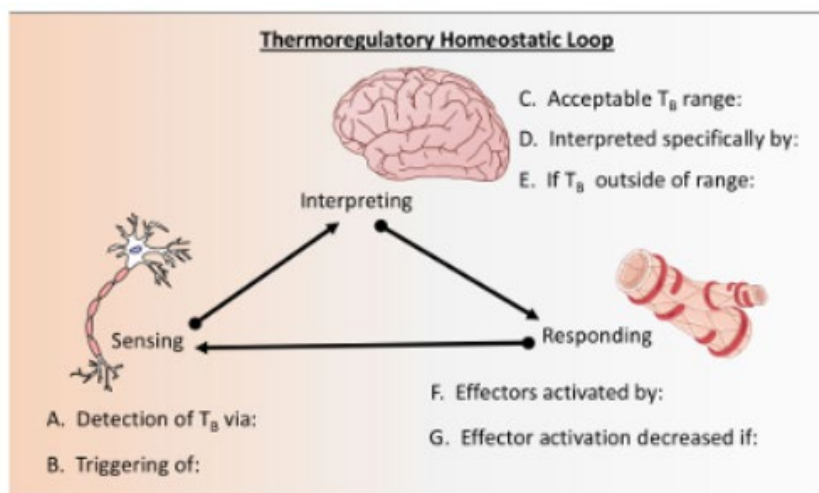


Chart 1. Resting Dairy Cow Vitals	
T_b	38–39.3 °C
Heart Rate	48–84 beats per min
Respiratory Rate	26–50 breaths per min
Source: Merck Veterinary Manual, < http://www.merckvetmanual.com/appendixes/reference-guides >	

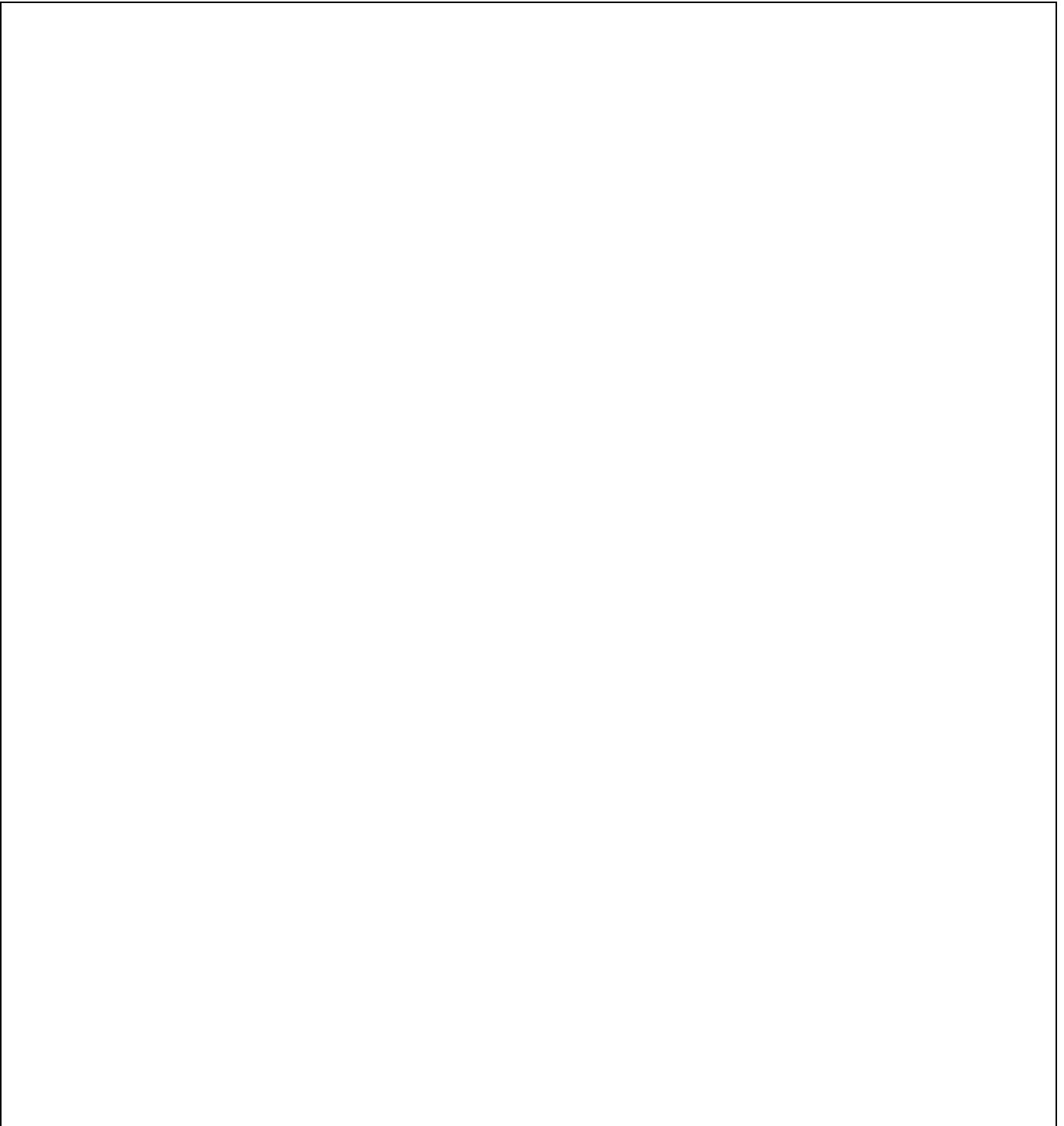
Figure 1. Thermoregulatory homeostatic loop. Relationship between sensors, interpreters, and effectors to maintain homeostasis of the regulated variable (body temperature). Temperature-sensitive neurons send information to the brain, which then interprets the information and causes a response by effectors such as blood vessels in the dermis.

Suppose you are taking the vitals of a very sick cow and notice that her body temperature is 43°C yet none of her effectors have been activated to initiate cooling, and her other vitals are within their normal range. Which components of the homeostatic loop you completed above might be different as compared to a healthy cow?



Part 4: Homeostasis Lab

In the space below, summarize your experimental design. Be sure to include details about the general design of the experiment, the physiological parameters that you will be measuring, and information related to how you plan to collect your data.



Use the space below to record your experimental results.

In the space below, provide a summary of your data. Use this space to organize your thoughts, using direct evidence from your experimental findings, and connect this evidence to the phenomenon and related Driving Question.



Part 5: Constructing an Explanation About the Impact of PreWorkout and Protein Supplements on Homeostasis During and After Exercise

Use the findings from your investigation to construct an explanation to the Driving Question: **Why might someone who exercises consume whey protein?**