

## Chapter 39: Plant Responses to Internal and External Signals

### Concept 39.1 Signal transduction pathways link signal reception to response

This concept brings together the general ideas on cell communication from Chapter 11 with specific examples of signal transduction in plants. As with animals, plants have receptors that trigger signal transduction pathways when activated. Let's begin with a review of three steps in signal transduction.

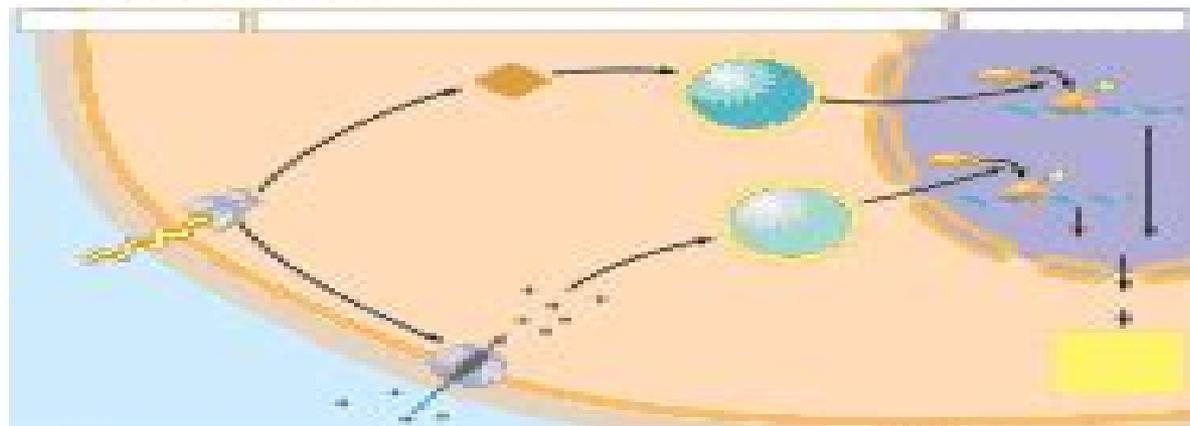
**Step 1: Reception.** Cell signals are detected by receptors that undergo changes in shape in response to a specific stimulus.

**Step 2: Transduction.** Transduction is a multistep pathway that amplifies the signal. This effect allows a small number of signal molecules to produce a large cellular response.

**Step 3: Response.** Cellular response is primarily accomplished by two mechanisms:

- a. increasing or decreasing mRNA production
- b. activating existing enzyme molecules

1. Have you ever seen a shriveled potato sending out skinny, pale sprouts? What is this called?
2. If you move the potato into the light, the sprout will respond by forming short, sturdy stems and broad, green leaves. What is this response to light called?
3. The figure below gives a specific example of a signal transduction in plants for the *growing or de-etiolation* response described above. Label these parts of the figure: reception, transduction, response, phytochrome, signal,  $Ca^{2+}$  channel, second messenger (cGMP), protein kinase, transcription factor, and DNA.



# Ap Biology Reading Guide Answers Chapter 39

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## **Table of Contents Ap Biology Reading Guide Answers Chapter 39**

1. Understanding the eBook Ap Biology Reading Guide Answers Chapter 39
  - The Rise of Digital Reading Ap Biology Reading Guide Answers Chapter 39
  - Advantages of eBooks Over Traditional Books
2. Identifying Ap Biology Reading Guide Answers Chapter 39
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Ap Biology Reading Guide Answers Chapter 39
  - User-Friendly Interface
4. Exploring eBook Recommendations from Ap Biology Reading Guide Answers Chapter 39
  - Personalized Recommendations
  - Ap Biology Reading Guide Answers Chapter 39 User Reviews and Ratings
  - Ap Biology Reading Guide Answers Chapter 39 and Bestseller Lists
5. Accessing Ap Biology Reading Guide Answers Chapter 39 Free and Paid eBooks
  - Ap Biology Reading Guide Answers Chapter 39 Public Domain eBooks
  - Ap Biology Reading Guide Answers Chapter 39 eBook Subscription Services
  - Ap Biology Reading Guide Answers Chapter 39 Budget-Friendly Options

6. Navigating Ap Biology Reading Guide Answers Chapter 39 eBook Formats
  - ePub, PDF, MOBI, and More
  - Ap Biology Reading Guide Answers Chapter 39 Compatibility with Devices
  - Ap Biology Reading Guide Answers Chapter 39 Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Ap Biology Reading Guide Answers Chapter 39
  - Highlighting and Note-Taking Ap Biology Reading Guide Answers Chapter 39
  - Interactive Elements Ap Biology Reading Guide Answers Chapter 39
8. Staying Engaged with Ap Biology Reading Guide Answers Chapter 39
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Ap Biology Reading Guide Answers Chapter 39
9. Balancing eBooks and Physical Books Ap Biology Reading Guide Answers Chapter 39
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Ap Biology Reading Guide Answers Chapter 39
10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
11. Cultivating a Reading Routine Ap Biology Reading Guide Answers Chapter 39
  - Setting Reading Goals Ap Biology Reading Guide Answers Chapter 39
  - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Ap Biology Reading Guide Answers Chapter 39
  - Fact-Checking eBook Content of Ap Biology Reading Guide Answers Chapter 39
  - Distinguishing Credible Sources
13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
14. Embracing eBook Trends
  - Integration of Multimedia Elements

- Interactive and Gamified eBooks

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