Phytochrome Encyclopedia Article

Phytochrome

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Phytochrome

A plant grown in the dark appears long and spindly, is pale yellow, and has unexpanded leaves. When transferred to light, the growth rate of the stem slows, **chloroplasts** begin to develop and accumulate chlorophyll, and the primary leaves begin to expand and develop. Many of these dramatic changes are the result of activation of light receptors (photoreceptors) called phytochromes. Phytochromes are proteins with an attached pigment molecule that allows them to detect light, especially in the red and far-red region of the spectrum. Depending on the light conditions, a phytochrome molecule may be converted to an active form or reconverted to an inactive form.

Most plants have more than one gene coding for different phytochromes, and these different products of the phytochrome gene family frequently control different responses to the light environment. Phytochromes regulate many aspects of plant growth and development by measuring the duration, intensity, and wavelengths of light. From the information gathered through phytochromes, a plant can determine the season, time of day, and whether it is growing beneath other plants versus in an open field. These photoreceptors control numerous functions throughout the life of the plant, including whether seeds germinate, how rapidly cells expand and divide, which genes are expressed, what shape and form a plant will take, and when the organism will flower and produce new seeds.

See Also

Photoperiodism; Rhythms in Plant Life.

Bibliography

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