Occurrence, function and potential medicinal applications of the phytohormone abscisic acid in animals and humans.


Source

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Abstract

Abscisic acid (ABA) is an important phytohormone that regulates plant growth, development, dormancy and stress responses. Recently, it was discovered that ABA is produced by a wide range of animals including sponges (Axinella polypoides), hydroids (Eudendrium racemosum), human parasites (Toxoplasma gondii), and by various mammalian tissues and cells (leukocytes, pancreatic cells, and mesenchymal stem cells). ABA is a universal signaling molecule that stimulates diverse functions in animals through a signaling pathway that is remarkably similar to that used by plants; this pathway involves the sequential binding of ABA to a membrane receptor and the activation of ADP-ribose cyclase, which results in the overproduction of the intracellular cyclic ADP-ribose and an increase in intracellular Ca²⁺ concentrations. ABA stimulates the stress response (heat and light) in animal cells, immune responses in leukocytes, insulin release from pancreatic β cells, and the expansion of mesenchymal and colon stem cells. ABA also inhibits the growth and induces the differentiation of cancer cells. Unlike some drugs that act as cell killers, ABA, when functioning as a growth regulator, does not have significant toxic side effects on animal cells. Research indicated that ABA is an endogenous immune regulator in animals and has potential medicinal applications for several human diseases. This article summarizes recent advances involving the discovery, signaling pathways and functions of ABA in animals.

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