

Sensor with temperature regulation capability inspired by plant transpiration mimicking environmentally sensitive protein

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Transpiration is a process of loss of water vapor from parts of plants, mainly in leaves. It is beneficial for maintaining the plant temperature and keeping the plants cool in hot condition. Stomatic transpiration accounts for most of the water loss by a plant. The mechanisms in guard cells surround stomatal pores integrate hormonal stimuli, light signals, water status, CO₂ temperature, and other environmental conditions to modulate stomatal apertures for regulation of surface temperature of the plants under diverse conditions. Based on the recent advances in understanding the stomatal opening mechanism in guard cells, we try to find the environmental sensitive receptors. Biological biosensors incorporated with a genetically modified form of a native protein receptor or supermoleculars imitating a protein receptor demonstrate the unique property of respond to the tiny environmental changes. Application of biosensor range from laboratory assays to continuous or spot monitoring for temperature variation.

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