Details of Technology

Name of Technology	Respiratory regulation system inversely correlating with temperature	Life Science
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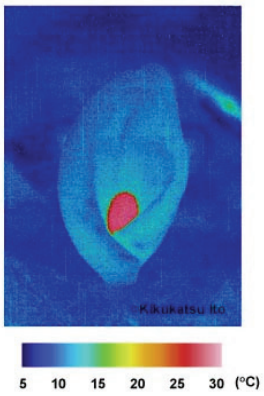
Key words	skunk cabbage, homeothermality, thermogenic factor, thermosensor, respiratory regulation	

What kind of technology is this?

Outline

- **Regulation system for maintaining homeothermality in skunk cabbage**
- **Respiratory regulation system acting in inverse correlation with the temperature, so which a decrease in the surrounding temperature stimulates the mitochondrial respiratory activity and an increase in temperature inhibits this activity.**

Skunk cabbage which naturally grows in cold places including Iwate prefecture in Japan is a thermogenic plant belonging to Araceae. The distinctive characteristic of the plant is its "homeothermality," in which the plant can actively regulate temperature in the spadix, a thermogenic organ. For example, the plant can maintain temperature in the spadix at around 20℃ for 5 to 7 days even when the surrounding temperature fluctuates in a range extending below the freezing point. The present research has been performed to clarify the mechanism securing homeothermality in skunk cabbage. We have identified the thermogenic factor expressed specifically in the spadix and have demonstrated that a thermal monitoring system exists in the spadix.



What are its applications?

- Regulation of expression of biological functions in response to thermal change
- Energy conversion device etc. based on the thermal regulation system of skunk cabbage

Related patents	Japanese Patent No. 3658623, Japanese Patent Laid-Open No. 2005-27513
Related materials	Ito, K. et al., *Plant Cell Environ*. 26: 783-789. (2003). Ito, K. et al., *Plant Cell Physiol*. 45: 257-264 (2004). Ito, T. & Ito, K., *Phys. Rev. E*. 72: 051909 (2005). Ito, K. *et al*., *Biochem. Biophys. Res. Commun*. 349: 383-390 (2006). Onda, Y. *et al., FEBS Lett.* 581: 5852-5858. (200). Onda, Y. *et al., Plant Physiol*. 146: 636-645. (2008). Ito, K., *Techno Current* 404: 2-13 (2005).

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