


生物策略表

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| 類別 | 生物策略 (Strategy) |
| 生物策略 STRATEGY | 脂肪酸防止結冰 (Fatty acids prevent freezing) |
| 生物系統 LIVING SYSTEM | 陸地棉 <i>Gossypium hirsutum</i> (Upland cotton) |
| 功能類別 FUNCTIONS | #改變材料特性 #保護免受溫度危害 #Modify material characteristics #Protect from temperature |
| 作用機制標題 | 棉花幼苗中的脂肪酸藉由改變細胞膜的組成來防止結冰 (Fatty acids in cotton seedlings prevent freezing by changing the composition of the cell membranes.) |
| 生物系統/作用機制 示意圖 |  |
| 作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS) | |
| 文獻引用 (REFERENCES) | |
| <p>根據斯蒂爾沃特市 (Stillwater) 俄克拉荷馬州立大學的 Arnon Rikin 及其同事報導，棉花植株透過改變細胞膜的組成，為寒冷的夜晚做準備。在晚上，膜中的兩種不飽和脂肪酸（亞油酸 linoleic acid 和亞麻酸 linolenic acid）的濃度會增加。這些脂肪酸尾部的雙碳鍵會形成「扭結」(kink)，使脂肪酸分子無法緊密堆積在一起。造成的效果為膜能保持流體，以及蛋白質可以很容易穿過。有趣的是，即使沒有光線的引導，棉花植株也表現出這種反應。也就是說這種適應方式是由生理時鐘觸發的，而不是由每天的光/暗週期所觸發的。(Day 1993; Rikin et al.1993)</p> <p>Cotton plants prepare for cold nights by changing the composition of their cell membranes, reports Arnon Rikin and his colleagues at Oklahoma State University in Stillwater. At night, the concentrations of two unsaturated fatty acids in the membrane--linoleic and linolenic--increase. The double carbon bonds in the tails of these fatty acids create a "kink" that keeps fatty acid molecules from packing together too tightly. In effect, the membrane remains fluid, and proteins are readily able to move through. Interestingly, cotton plants exhibit this response even without light cues. That is to say, the adaptation is triggered by an internal clock, rather than by the daily light/dark cycle. (Day 1993; Rikin et al. 1993)</p> | |

參考文獻清單與連結 (REFERENCE LIST) Harvard 或 APA 格式

Rikin, A., J. W. Dillwith, D. K. Bergman. (1993). Correlation between the circadian rhythm of resistance to extreme temperatures and changes in fatty acid composition in cotton seedlings. *Plant physiology* 101: 31-36. (<https://www.ncbi.nlm.nih.gov/pubmed/12231662>)

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生物系統延伸資訊連結 (LEARN MORE ABOUT THE LIVING SYSTEM/S)

https://en.wikipedia.org/wiki/Gossypium_hirsutum

撰寫/翻譯/編修者與日期

邱珮慈翻譯 (2020/04/10)；許秋容編修 (2020/06/03)；譚國銜編修 (2020/06/05)

AskNature 原文連結

<https://asknature.org/strategy/fatty-acids-prevent-freezing/>