

生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	眼睛結構增強夜視能力 (Eye Structure Enhances Night Vision)
生物系統 LIVING SYSTEM	脊椎動物 (哺乳動物、魚類、鳥類、爬行動物) (Vertebrates (Mammals, Fish, Birds, Reptiles))
功能類別 FUNCTIONS	#修改光及顏色 #從環境中感應光 (可見光譜) #Modify Light/Color #Sense Light (Visible Spectrum) From the Environment
作用機制標題	許多脊椎動物的脈絡膜毯 (光神經纖維層) 會透過將光線反射回眼睛的光接受器以增強夜視能力。 (The tapetum lucidum of many vertebrates enhances night vision by reflecting light back to photoreceptors in the eye.)
生物系統/作用機制示意圖 (確認版權、註明出處； 畫質)	 <p>https://unsplash.com/photos/photo-of-animal-eyes-EjUuUK8gtjs</p>
作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)	
<p>「脈絡膜層是一種生物反射系統，其為脊椎動物眼睛的常見特徵。其主要功能是為光敏感視網膜細胞提供第二次光子感光刺激的機會，從而增強低光度下的視覺敏感度...</p> <p>「有些物種 (靈長類動物、松鼠、鳥類、紅袋鼠和豬) 不具有這種結構，它們多為日行性的動物。在脊椎動物中，脈絡膜層表現出各式各樣的結構、組織和組成。因此，視網膜脈絡膜層 (硬骨魚、鱷魚、有袋類、果蝠)、脈絡膜鳥嘌呤脈絡膜層 (板鰐類)、脈絡膜細胞毯 (肉食動物、嚙齒類、鯨目) 和脈絡膜纖維毯 (牛、綿羊、山羊、馬) 被描述...</p> <p>「脈絡膜層是一個神經細胞和組織特化以適應暗光環境的顯著例子，儘管存在這些差異，但所有毯狀變異體都可以透過感光接收器層反射光線來提高視網膜的敏感度。這些</p>	

有關其位置和結構以及反射材料選擇的變動，可能代表著與其攝食行為相關的視覺選擇性適應，以反應特定波長的使用和所需的反射率。」 (Ollivier et al. 2004:11)

“The tapetum lucidum is a biologic reflector system that is a common feature in the eyes of vertebrates. It normally functions to provide the light-sensitive retinal cells with a second opportunity for photon-photoreceptor stimulation, thereby enhancing visual sensitivity at low light levels...

“Some species (primates, squirrels, birds, red kangaroo and pig) do not have this structure and they usually are diurnal animals. In vertebrates, the tapetum lucidum exhibits diverse structure, organization and composition. Therefore, the retinal tapetum (teleosts, crocodilians, marsupials, fruit bat), the choroidal guanine tapetum (elasmobranchs), the choroidal tapetum cellulosum (carnivores, rodents, cetacea), and the choroidal tapetum fibrosum (cow, sheep, goat, horse) are described...

“The tapetum lucidum represents a remarkable example of neural cell and tissue specialization as an adaptation to a dim light environment and, despite these differences, all tapetal variants act to increase retinal sensitivity by reflecting light back through the photoreceptor layer. These variations regarding both its location and structure, as well as the choice of reflective material, may represent selective visual adaptations associated with their feeding behavior, in response to the use of specific wavelengths and amount of reflectance required.” (Ollivier et al. 2004:11)

文獻引用 (REFERENCES)

「脈絡膜層是一種生物反射系統，其為脊椎動物眼睛的常見特徵。其主要功能是為光敏感視網膜細胞提供第二次光子感光刺激的機會，從而增強低光度下的視覺敏感度...

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may represent selective visual adaptations associated with their feeding behavior, in response to the use of specific wavelengths and amount of reflectance required.” (Ollivier et al. 2004:11)
參考文獻清單與連結 (REFERENCE LIST) Harvard 或 APA 格式
Ollivier, F. J., Samuelson, D. A., Brooks, D. E., Lewis, P. A., Kallberg, M. E., & Komáromy, A. M. (2004). Comparative morphology of the tapetum lucidum (among selected species). <i>Veterinary ophthalmology</i> , 7(1), 11–22. https://doi.org/10.1111/j.1463-5224.2004.00318.x
延伸閱讀: Harvard 或 APA 格式 (取自 AskNature 原文；若為翻譯者補充，請註明)
生物系統延伸閱讀資訊連結 (LEARN MORE ABOUT THE LIVING SYSTEM/S)
https://news.mongabay.com/2019/03/virtual-reality-tool-gives-viewers-the-vision-of-a-nocturnal-primate/ 以上非 AskNature 的相關連結，屬相關資訊網址
撰寫/翻譯/編修者與日期
吳軒竹翻譯 (2024/3)；許秋容編修 (2024/05/17)；陳柏宇編修 (2024/11/30)
AskNature 原文連結
https://asknature.org/strategy/eye-structure-enhances-night-vision/

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