生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	為快速、高效游泳而設計的身體 (Body Designed for Fast, Efficient Swimming)
生物系統 LIVING SYSTEM	短鰭鯖鯊 (Short-finned Mako Shark)
功能類別 FUNCTIONS	#在液體中/上移動 #改變速度 #In/on liquids #Modify speed
作用機制標題	短鰭鯖鯊和一些金槍魚的身體設計得宜，能夠快速、高效地游泳，這要歸功於其內部化的紅肌肉以及與力量傳遞系統相關聯的構造。 (The bodies of shortfin mako sharks and some tuna are designed for fast, efficient swimming thanks to internalized red muscle associated with a force-transmission system.)
生物系統/作用機制示意圖 (確認版權、註明出處；畫質)	

作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)

透過不同的進化途徑，鯊魚科鯖鯊和金槍魚已經演化成了相同的機械構造，即內部化的紅肌肉與高度衍生的力量傳遞系統相關聯，這兩個特徵形成了它們鯖行式游泳模式的基礎。研究表明，不僅外部環境的物理需求塑造了大型遠洋遊弋者的身體形狀，而且它們複雜的運動系統的內部生理和形態在演化過程中也得到了精心調整。

Through distinct evolutionary pathways lamnid sharks and tunas have converged on the same mechanical design principle, that of having internalized red muscle associated with a highly derived force-transmission system, two features that form the basis for their thunniform swimming mode. Our study shows that not only have the physical demands of the external environment sculpted the body shapes of large pelagic cruisers, but also the internal physiology and morphology of their complex locomotor systems has been finetuned over the course of their evolution.

文獻引用 (REFERENCES)

Convergent evolution in mechanical design of lamnid sharks and tunas.
Nature | 05/05/2004 | Jeanine M. Donley, Chugey A. Sepulveda, Peter Konstantinidis, Sven Gemballa, Robert E. Shadwick
(https://www.nature.com/articles/nature02435)

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

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生物系統延伸資訊連結 (LEARN MORE ABOUT THE LIVING SYSTEM/S)
撰寫/翻譯/編修者與日期
楊昊澤翻譯 (2023/3/20)；陳柏宇編修 (2024/11/30)
AskNature 原文連結
https://asknature.org/strategy/body-designed-for-fast-efficient-swimming/

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