

生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	軟骨蛋白消散力和緩衝關節 (Cartilage Proteins Dissipate Forces and Cushion Joints)
生物系統 LIVING SYSTEM	家牛 (Domestic cattle)
功能類別 FUNCTIONS	#壓縮管理 #Manage compression
作用機制標題	乳牛關節中的軟骨由於軟骨分子負電荷之間的排斥力，以及這些相同分子之間具有在壓力峰值附近的吸引力，可保護免受壓縮力的影響 (Cartilage in the joints of cows protect from compressive forces due to repulsion between negative charges of cartilage molecules, as well as attractive forces between these same molecules near the peak of the compressive force.)
生物系統/作用機制 示意圖 (確認版權、註明出處；畫質)	 <p>Image: Daniel Schwen</p>
作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)	

長期以來，人們一直認為構成軟骨 (cartilage) 的分子具有分子間排斥力的特徵，以賦予材料彈性。事實上，構成大部分軟骨結構的帶高負電荷的化合物彼此之間極為排斥。然而，最近的研究證明其中一種化合物 (聚集蛋白聚醣) (aggrecan) 中的一些粘附力 (adhesive force) 可能是消散壓縮力的重要因素。特別是聚集蛋白聚醣在壓縮力下粘在一起，然後在片刻後分開的趨勢，這表現了主要的壓縮耗散 (compression-dissipation) 系統。

The molecules that make up cartilage were long believed to be characterized by repulsive intermolecular forces in order to grant the material its springy nature. In fact, the highly negatively charged compounds that make up much of the structure of cartilage are extremely repulsive to each other. However, recent research has demonstrated that some adhesive forces in one of those compounds (aggrecans) may be significant factors in dissipating compressive force. In particular, the tendency of the aggrecans to stick together under compressive force, then come apart moments after represents a major compression-dissipation system.

文獻引用 (REFERENCES)

長期以來，人們一直假設聚集蛋白聚醣的密集、高度帶負電荷的糖胺聚醣 (GAG) 之間存在分子內和分子間雙電層和空間位阻 (例如熵、排除體積) 排斥相互作用 (FASEB J. , 6 (1992) , pp. 861 – 870)

It has long been hypothesized that intra- and intermolecular electrical double-layer and steric (e.g., entropic, excluded volume) repulsive interactions between the densely packed, highly negatively charged glycosaminoglycans (GAGs) of aggrecan (FASEB J. , 6 (1992) , pp. 861 – 870)

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

Lin Han (2008) .Cartilage aggrecan can undergo self-adhesion.Volume 95, Issue 10, 15
November 2008, Pages 4862-4870
(<https://www.sciencedirect.com/science/article/pii/S0006349508786247>)

延伸閱讀: Harvard 或 APA 格式 (取自 AskNature 原文; 若為翻譯者補充, 請註明)

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

撰寫/翻譯/編修者與日期
柳硯菡翻譯(2022/03/31)；許秋容編修 (2022/5/14)
AskNature 原文連結
https://asknature.org/strategy/cartilage-proteins-dissipate-forces-and-cushion-joints/

更多補充的圖片 (1. 確認版權、註明出處 2. 品質: 盡量 72dpi 或 300K)