


生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	防水脂質層防止脫水 (Waterproof Lipid-layer Prevents Desiccation)
生物系統 LIVING SYSTEM	青蛙、蟾蜍 <i>Rana</i> , <i>Bufo bufo</i> (Frogs and toads)
功能類別 FUNCTIONS	#保護免受液體流失危害 #Protect From Loss of Liquids
作用機制標題	陸生青蛙的皮膚透過含脂質防水層防止水分流失 (The skin of terrestrial frogs protects from water loss via a waterproof, lipid-containing layer.)
生物系統/作用機制 示意圖	
作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)	
<p>這些胞器 (organelle) 的脂質內容物似乎由成疊扁平的脂質囊泡 (lipid vesicle) 所組成 (Landmann, 1986, 1988), 主要由醣神經鞘脂質 (glycosphingolipid)、游離固醇 (free sterol) 和磷脂 (phospholipid) 所構成, 它們是角質層脂質 (stratum corneum lipid) 的前驅物 (precursor)。最終, 胞器的脂質內容物被分泌到胞外小區 (extracellular domain), 在那裡被進一步加工成緊密的脂質雙層, 該脂質雙層封閉了與角質細胞相鄰和重疊的胞外空間, 這種情況可比作「磚塊與灰漿」組織 (Elias, 1983; Elias and Menon, 1991)。有研究提出, 醯基葡萄糖神經醯胺 (acylglucosylceramide) 可以作為分子「鉚釘 (rivet)」來促進脂質囊泡的扁平化和堆疊, 隨後將邊緣與邊緣融合, 以產生由成對雙層組成的薄層, 雙層以平行於皮膚表面互相堆疊 (Engströmet et al, 2000; Wertz, 2000)。在冷凍斷裂 (freeze-fracture) 研究中顯示這會形成多層具有光滑表面的薄片。透過這種方式, 細胞外脂質貫穿整個角質層形成一個連貫區域, 發展成為屏障水分擴散的功能 (Elias and Friend, 1975)。(Lillywhite 2006: 217)</p> <p>The lipid contents of these organelles appear to consist of stacks of flattened lipid vesicles (Landmann, 1986, 1988) comprising primarily glycosphingolipids, free sterols and phospholipids, which are precursors of the stratum corneum lipids. Eventually, the lipid contents of the organelles are secreted into the extracellular domain, where they are further processed into compact lipid bilayers that occlude the extracellular spaces among adjacent and overlapping corneocytes, a condition that has been likened to a 'bricks-and-mortar' organization (Elias, 1983; Elias and Menon, 1991). It has been proposed that acylglucosylceramides serve as</p>	

molecular ‘rivets’ to promote flattening and stacking of lipid vesicles that subsequently fuse edge-to-edge to produce lamellae comprising paired bilayers that are stacked parallel to the skin surface (Engström et al., 2000; Wertz, 2000). These form multiple lamellar sheets with smooth surfaces shown in freeze-fracture studies. In this manner, the extracellular lipids form a continuous domain throughout the stratum corneum and function as the principal barrier to water diffusion (Elias and Friend, 1975). (Lillywhite 2006: 217)

文獻引用 (REFERENCES)

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