

以真菌葡聚糖顆粒作為藥物載體

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摘要

葡聚糖被美國食品藥物管理局歸類為 Generally recognized as safe (GRAS) 可用於食品中，而葡聚糖顆粒也被視作一種新型的微型載體用於裝載食品添加物，由於其安全性高、具有生物相容性等特性，近年來葡聚糖顆粒也被用於裝載營養品、藥物、疫苗等，例如，從酵母製成的中空顆粒被用於裝載疏水性或親水性分子，如：精油、薑黃素(Cur)、癌症標靶藥物等。本報告旨在探討使用真菌葡聚糖顆粒裝載藥物的效率及可行性。實驗方法為將 *Saccharomyces cerevisiae* 及 *Geotrichum candidum* 藉由酸鹼處理的方式將細胞質及胞器流出細胞內部，形成帶有孔洞結構的中空顆粒 (glucan particle, GP)，再將藥物利用室溫攪拌、pH 驅動、真空灌注等方式裝載到 GP 中，利用 SEM、螢光顯微鏡、FTIR、XRD、吸光值等，來分析 GP 裝載量及藥物釋放速率，並利用 HUVEC、PMBC、MDA-MB-231 細胞分析不同劑型對細胞的影響。實驗結果顯示，SEM 下可以觀察到 GP 表面具孔洞結構且表面呈現皺摺狀，相較一般混合組，使用 pH 驅動及真空灌注可以有效裝載藥物，裝載後的 GP 在螢光顯微下發出螢光，當乙醇濃度為 40% Loading content (LC) 達到巔峰 $730.6 \pm 26.5 \mu\text{g/g}$ ，模擬通過消化系統後與 Cur 相比 Cur@GP 展現出較高的生物可及性，分別為 5.18% 及 31.36%，在 24 小時內，無 Chitosan/Alginate 包覆的 GP 藥物已完全釋放，但有包覆的 GP 僅釋放 50% 左右，僅 Diplocone 會使細胞存活率下降至 72%，當 Diplocone 裝載到 GP 中可降低其細胞毒性，使存活率達 84%。綜上所述，使用真空裝載或 pH 驅動皆可有效的將藥物裝載到 GP 當中，GP 外面有包覆一層物質可以控制裝載藥物的釋放速度，被裝載進 GP 中的藥物可以增強其生物可及性，相較於未裝載的藥物可以更好的被生物利用，並且可以降低藥物對細胞產生的毒性。

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