

金屬-多酚網絡在生物醫學材料上的應用

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摘要

心血管疾病(Cardiovascular disease, CVD)是與心臟和血管相關的疾病。天表沒食子兒茶素沒食子酸酯(Epigallocatechin gallate, EGCG)為茶多酚的一種，EGCG 的酚羥基使其能與其他分子反應，並能與金屬離子形成金屬-多酚網絡(Metal-polyphenol network, MPN)，可以調節金屬離子的釋放，並具備抗氧化和抗菌能力。本報告旨在探討不同金屬結合 EGCG 的性能，並評估其抗氧化、抗發炎和生物相容性，以評估其在生物材料應用中的潛力。結果顯示，Cu 與 EGCG 成功配位，Cu 和 EGCG 成功配位且在 72 小時內均能持續釋放銅離子，可以消除活性氧和抑制 TNF- α (Tumor Necrosis Factor- α , TNF- α)和 IL-6(Interleukin 6, IL-6)。Zn 與 EGCG 成功配位，EGCG/Zn Ps 具有持續釋放鋅離子、抗氧化、抗發炎的能力，憶及良好的生物相容性 EGCG-Zn Ps (Zinc based metal-EGCG capsules, EGCG/Zn Ps)能夠持續釋放鋅離子且能清除 H₂O₂ 以及抑制 TNF- α 和 IL-6。EGCG-Fe 封裝 Atorvastatin (ATV)具有抗氧化和抗發炎具有中空且規則的球形結構，EGCG-Fe 會使 ATV 持續釋放，且在過氧化氫下會加速釋放，EGCG-Fe-ATV 具有抗氧化，可清除過氧化氫與 DPPH，EGCG-Fe-ATV 具有抗發炎，抑制發炎因子 IL-6 和 TNF- α 的表達，EGCG-Fe 和 EGCG-Fe-ATV 均具有良好的生物相容性。

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