

1 探討不同抗菌劑裝載於水凝膠對傷口修復之影響

2 陳姿婷(5140)

3 2024/03/20

4 大綱

5 一、前言

6 二、醣蛋白水凝膠對於皮膚傷口癒合

7 三、 β -葡聚醣結合抗菌肽裝載於水凝膠對傷口癒合之過程

8 四、大麥 β -葡聚醣添加 ZnO 用於傷口癒合

9 五、兒茶素結合金屬有機骨架奈米複合水凝膠有利於傷口修復

10 六、結論

11 摘要

12 由於水凝膠具有出色的保水能力、良好的機械性能以及生物相容性等特性，廣泛
13 應用於藥物輸送、傷口敷料。水凝膠因具有裝載生物活性劑的潛力，從而賦予生物活
14 性和抗菌功能。透過不同抗菌劑裝載於水凝膠中，提升其抗菌性和傷口癒合能力。本
15 報告旨在探討水凝膠裝載不同抗菌劑對傷口癒合及抗菌性之影響。Lactoferrin-
16 Graphene oxide/Gelatin 呈現出多孔結構，而添加 Lactoferrin 至 Graphene oxide/Gelatin
17 中進一步增強了水凝膠的抗菌性能，體內實驗也進一步證實了 Lactoferrin-Graphene
18 oxide/Gelatin 加速傷口癒合能力。而 β -D-glucan 和 $\text{CH}_3(\text{CH}_2)_6\text{C}(\text{O})\text{-GIKKIHKKI-NH}_2$ 可
19 同時釋放顯著抑制細菌生長，且使用大鼠模型的體內實驗表明，顯著加速傷口的癒
20 合。而不論弱鹼性或強鹼性薄膜均具有抗菌作用，嵌入 ZnO 顆粒進而強化抗菌性。而
21 金屬有機骨架具有多孔結構增強載藥能力，含有兒茶素的奈米複合水凝膠具有抗菌特
22 性。綜合上述四篇研究結果均顯示 Lactoferrin-Graphene oxide/Gelatin、 β -D-glucan
23 aldehyde / $\text{CH}_3(\text{CH}_2)_6\text{C}(\text{O})\text{-GIKKIHKKI-NH}_2$ 、大麥 β -葡聚醣/ZnO 薄膜及及兒茶素/金屬
24 有機骨架均具有良好的多孔結構、抗菌性，可作為傷口敷料。

1 參考文獻

- 2 Alsayed, A. R., Hasoun, L. Z., Khader, H. A., Basheti, I. A., & Permana, A. D. (2022). Bovine
3 colostrum treatment of specific cancer types: Current evidence and future
4 opportunities. *Molecules*, 27(24), 8641.
- 5 Hezari, S., Olad, A., & Dilmaghani, A. (2022). Modified gelatin/iron-based metal-organic
6 framework nanocomposite hydrogel as wound dressing: Synthesis, antibacterial activity,
7 and *Camellia sinensis* release. *International Journal of Biological Macromolecules*, 218,
8 488-505.
- 9 Li, L., Wang, Y., Huang, Z., Xu, Z., Cao, R., Li, J., & Zhu, H. (2023). An additive-free
10 multifunctional β -glucan-peptide hydrogel participates in the whole process of bacterial-
11 infected wound healing. *Journal of Controlled Release*, 362, 577-590.
- 12 Razzaq, H. A., d'Ayala, G. G., Santagata, G., Bosco, F., Mollea, C., Larsen, N., & Duraccio, D.
13 (2021). Bioactive films based on barley β -glucans and ZnO for wound healing
14 applications. *Carbohydrate Polymers*, 272, 118442.
- 15 Ren, Y., Ma, S., Zhang, D., Guo, S., Chang, R., He, Y., & Guan, F. (2022). Functionalized
16 injectable hyaluronic acid hydrogel with antioxidative and photothermal antibacterial
17 activity for infected wound healing. *International Journal of Biological*
18 *Macromolecules*, 210, 218-232.
- 19 Tharayil, J. M., & Chinnaiyan, P. (2023). Biogenic synthesis of ZnO from *Rubia cordifolia* root
20 extract: a study on sono-photocatalytic dye degradation and anti-bacterial assay. *Results*
21 *in Engineering*, 20, 101567.
- 22 Wang, Y., Wang, M., He, X., Wei, Y., Liang, Z., Ma, S., & Huang, D. (2024). A versatile LTF-
23 GO/gel hydrogel with antibacterial and antioxidative attributes for skin wound
24 healing. *Journal of the Mechanical Behavior of Biomedical Materials*, 150, 106342.