

Enhanced Viability of HK-2 Cells Encapsulated in Chitosan Hydrogel Compared to Sodium Alginate Hydrogel

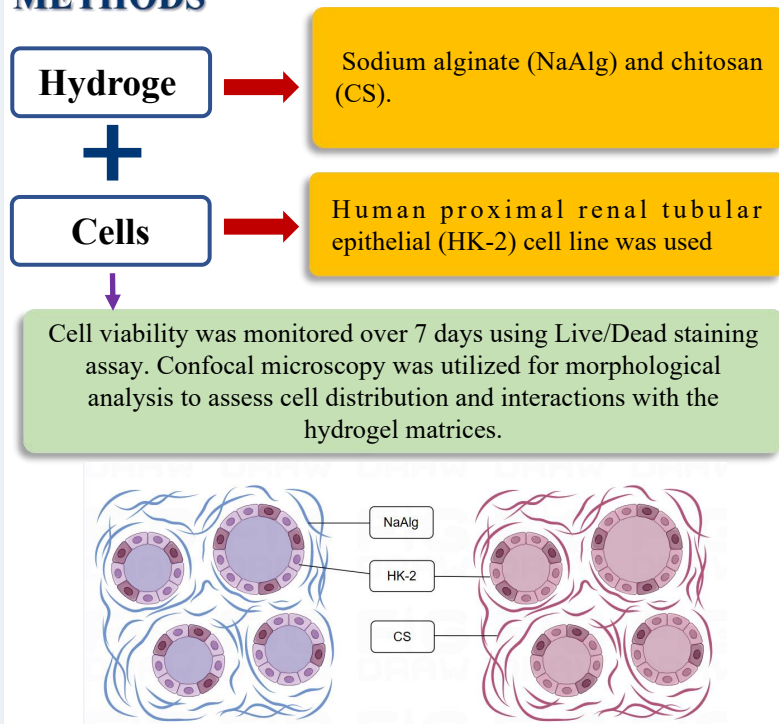
Niu Zejiixin, Bingxuan Zheng, Ge Deng, Dou Meng, Tian Puxun

Department of Kidney Transplantation, Nephropathy Hospital, the First Affiliated Hospital of Xi'an Jiaotong University, Xi'an 710061, Shaanxi, China (Email address:jesia1222@stu.xjtu.edu.cn)

INTRODUCTION

- Cell encapsulation within hydrogels holds promise for diverse biomedical applications such as tissue engineering and drug delivery. The selection of hydrogel material significantly impacts cell viability and function.
- This study compares the viability of human kidney epithelial cells (HK-2) encapsulated in two hydrogel types: sodium alginate (NaAlg) and chitosan (CS).

METHODS



RESULTS

- The study revealed significantly higher viability of HK-2 cells when encapsulated in CS hydrogels compared to NaAlg hydrogels.

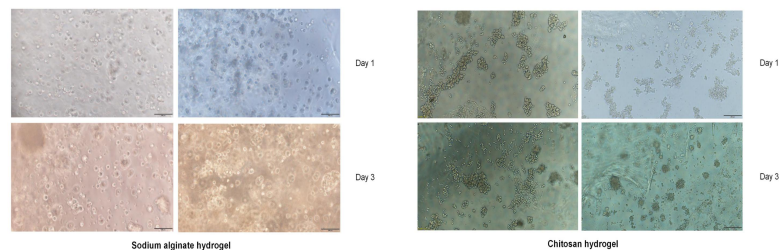


Fig. 2. Growth of HK-2 cells in sodium alginate hydrogel and chitosan hydrogel.

- Live/Dead staining indicated a higher percentage of live cells in the CS group, reflecting enhanced metabolic activity.

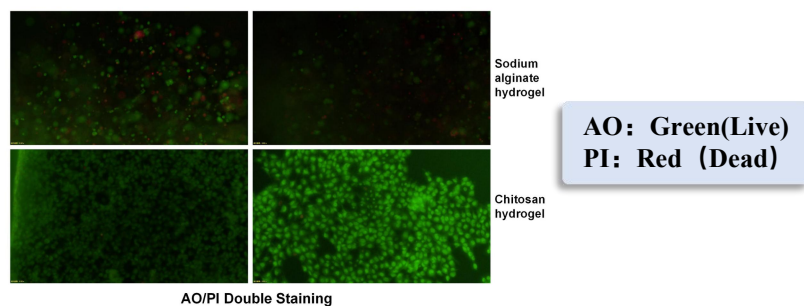


Fig. 3. AO/PI immunofluorescence staining of HK-2 cells in sodium alginate hydrogel and chitosan hydrogel

RESULTS

- HK-2 cells grew spherically in the hydrogel, and immunofluorescence staining showed significant expression of renal tubular epithelial important marker (Lotus Tetragonolobus Lectin, LTL) in HK-2 cells in chitosan hydrogel.

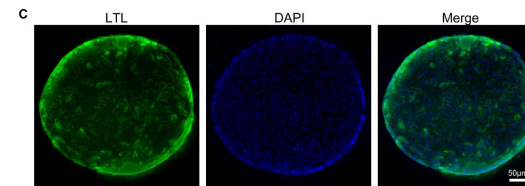


Fig. 4 Immunofluorescence staining showed that renal tubules were mainly composed of proximal tubular epithelial cells, and HK-2 cells showed good activity in chitosan hydrogels.

CONCLUSION

- These findings highlight the potential of CS hydrogels as excellent scaffolds for HK-2 cell inclusion, with important implications for renal tissue engineering strategies and applications needed to maintain renal cell function.
- Chitosan hydrogels were better than sodium alginate hydrogels in 3D culture of HK-2 cells to maintain cell activity and proximal tubular epithelial characterization
- Future studies should delve into the mechanisms that enhance activity and optimize CS hydrogel components for specific biomedical uses.