Preparation of PCL anisotropic particles and their interactions with proteins and cells

Honghao Zheng, Changyou Gao*

MOE Key Laboratory of Macromolecular Synthesis and Functionalization, Department of Polymer Science and Engineering, Zhejiang University, Hangzhou 310027, China

* E-mail address: cygao@zju.edu.cn

Introduction

The cellular environment has great influence on cells by providing signals that can modulate cell phenotypes and functions. Physical cues such as topography, roughness, and elasticity are of particular importance. Many micro- and nanofabrication processes have been employed to control the physical properties of materials in both 2D and 3D environments. In this research, we prepared a kind of PCL anisotropic particles with special and interesting surface topography and studied their interactions with proteins and cells.

Results and discussion

Scanning electron microscopy (SEM) results suggested that each PCL particle had both fuzzy and smooth surfaces(Figure 1).

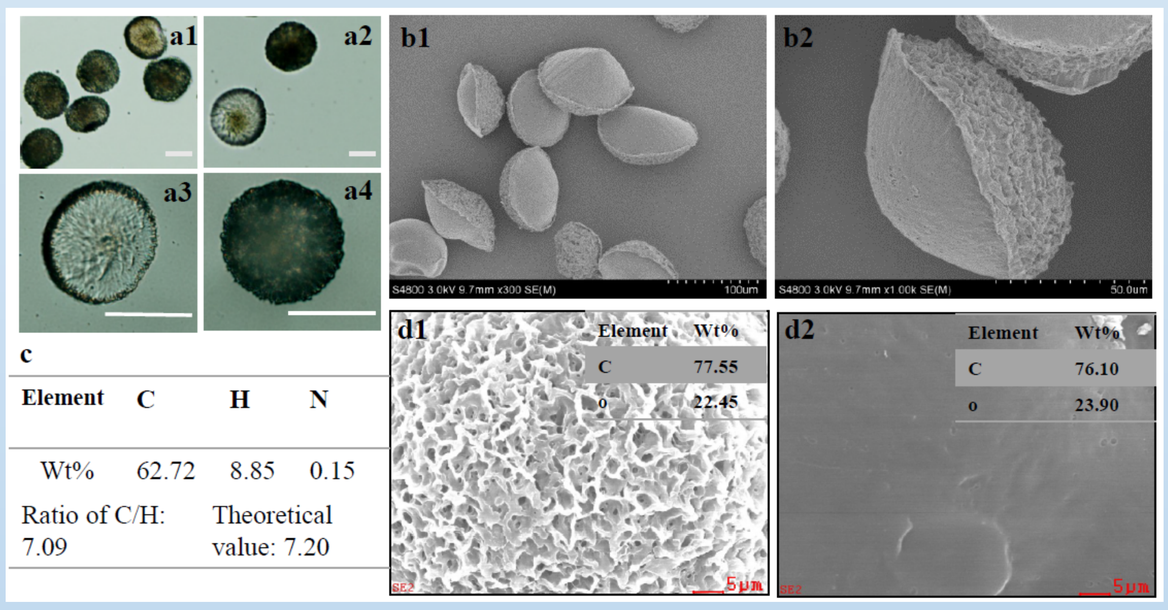

Figure1 Microscope images (a) and SEM images (b) of PCL anisotropic particles. Element analysis values of the particles(c). SEM-EDX results of fuzzy surface (d1) and smooth surface (d2) on the particle. Scale bar: 50 μm.

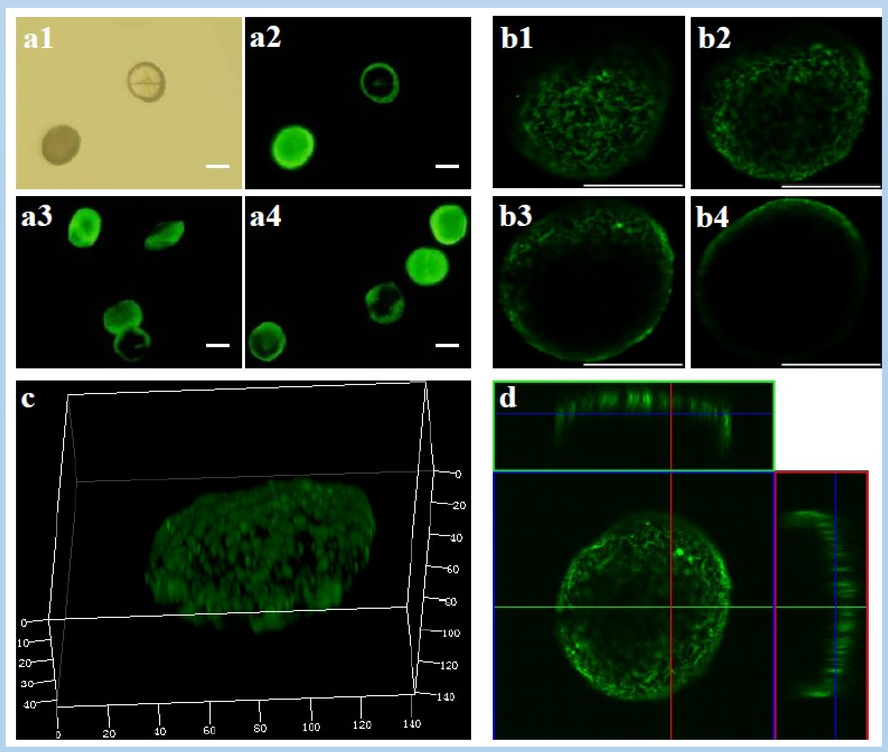

Figure2 Fluorescent images (a2, a3, a4) and transmission mode image (a1) of PCL particles after FITC-BSA adsorption. Series of *Z-scanning CLSM images (b1~b4) and 3D reconstruction images (c, d) of the particle. Scale bar: 50 μm*

Fluorescence microscope images showed that some particles had strong fluorescence intensity, while other particles exhibited weak or no fluorescence after FITC-BSA adsorption(Figure2a1~a4). The CLSM revealed that the fluorescence distribution on the particles was not uniform due to the anisotropy of the particles(Figure2c,d).

Cell assay indicated that the endothelial cells preferred to adhere on the fuzzy surface while the HepG2 cells exhibited no interest in the particles .

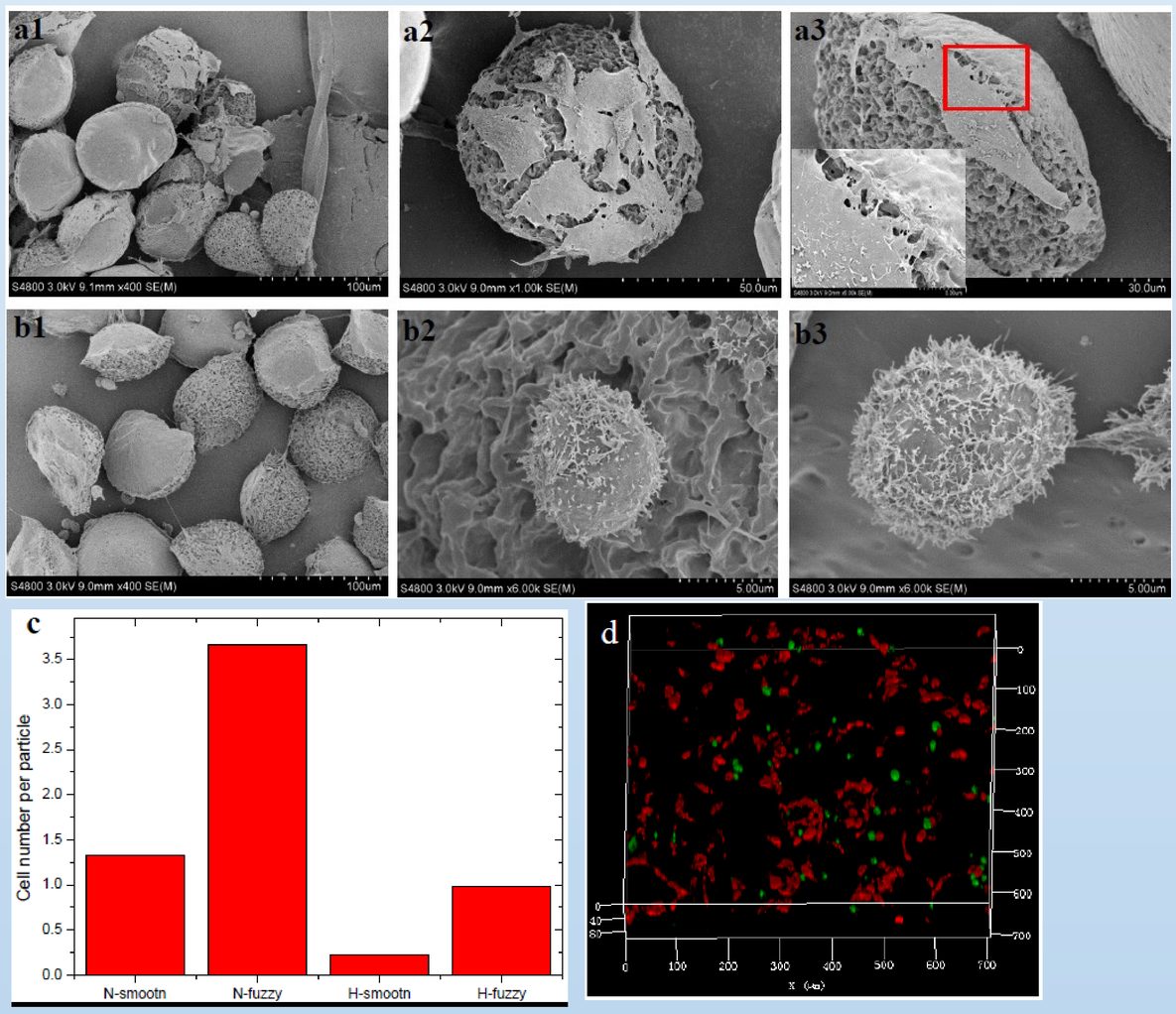

Figure3 SEM images of NIH3T3 cells (a) and HepG2 cells (b) adhering on the particles. The statistical results (c) of the cell number on different surfaces.

Conclusions

In summary, we prepared a kind of PCL anisotropic particles with special and interesting surface topography . SEM results showed that each PCL particle had both fuzzy and smooth surfaces. Fluorescence microscope images showed that some particles had strong fluorescence intensity, while other particles exhibited weak or no fluorescence after FITC-BSA adsorption. CLSM revealed that the fluorescence distribution on the particles was not uniform due to the anisotropy of the particles. Finally, cell assay indicated that the endothelial cells preferred to adhere on the fuzzy surface while the HepG2 cells exhibited no interest in the particles .

Acknowledgements

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Reference

[1] Meicong Wang, Lie Ma, Dan Li, Changyou Gao. Polymer, 2013; 54; 277-283.