

Supplementary Material for xeno-free culture of human pluripotent stem cells on  
oligopeptide-grafted hydrogels with various molecular designs

Yeng-Ming Chen<sup>1,§</sup>, Li-Hua Chen<sup>1,§</sup>, Meng-Pei Li<sup>1,§</sup>, Hsing-Fen Li<sup>1</sup>, Akon Higuchi<sup>1,2,3,\*</sup>, S. Suresh Kumar<sup>4</sup>,  
Qing-Dong Ling<sup>5,6</sup>, Abdullah A. Alarfaj<sup>3</sup>, Murugan A. Munusamy<sup>3</sup>, Yung Chang<sup>7</sup>, Giovanni Benelli<sup>8</sup>, Kadarkarai  
Murugan<sup>9,10</sup>, Akihiro Umezawa<sup>2</sup>

<sup>1</sup>Department of Chemical and Materials Engineering, National Central University, No. 300, Jhongda RD.,  
Jhongli, Taoyuan, 32001 Taiwan

<sup>2</sup>Department of Reproduction, National Research Institute for Child Health and Development, 2-10-1 Okura,  
Setagaya-ku, Tokyo 157-8535, Japan

<sup>3</sup>Department of Botany and Microbiology, College of Science, King Saud University, Riyadh 11451, Saudi  
Arabia

<sup>4</sup>Department of Medical Microbiology and Parasitology, Universiti Putra Malaysia, 43400 Serdang, Slangor,  
Malaysia

<sup>5</sup>Cathay Medical Research Institute, Cathay General Hospital, No. 32, Ln 160, Jian-Cheng Road, Hsi-Chi City,  
Taipei, 221, Taiwan

<sup>6</sup>Graduate Institute of Systems Biology and Bioinformatics, National Central University, No. 300, Jhongda RD.,  
Jhongli, Taoyuan, 32001 Taiwan

<sup>7</sup>Department of Chemical Engineering, R&D Center for Membrane Technology, Chung Yuan Christian  
University, 200, Chung-Bei Rd., Chungli, Taoyuan, 320, Taiwan

<sup>8</sup>Department of Agriculture, Food and Environment, University of Pisa, Via del Borghetto 80, 56124 Pisa, Italy

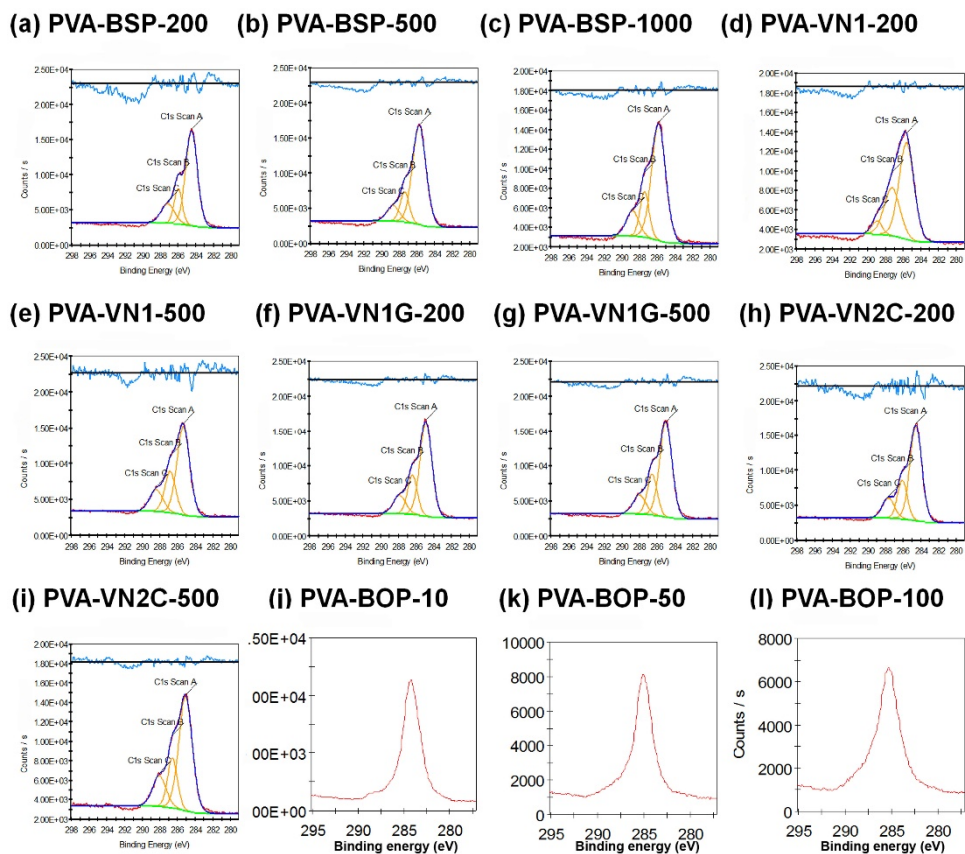
<sup>9</sup>Division of Entomology, Department of Zoology, School of Life Sciences, Bharathiar University, Coimbatore,  
Tamil Nadu, 641 046, India

<sup>10</sup>Department of Zoology, Thiruvalluvar University, Serkkadu, Vellore 632 115, India

Correspondence should be addressed to A.H. (higuchi@ncu.edu.tw)

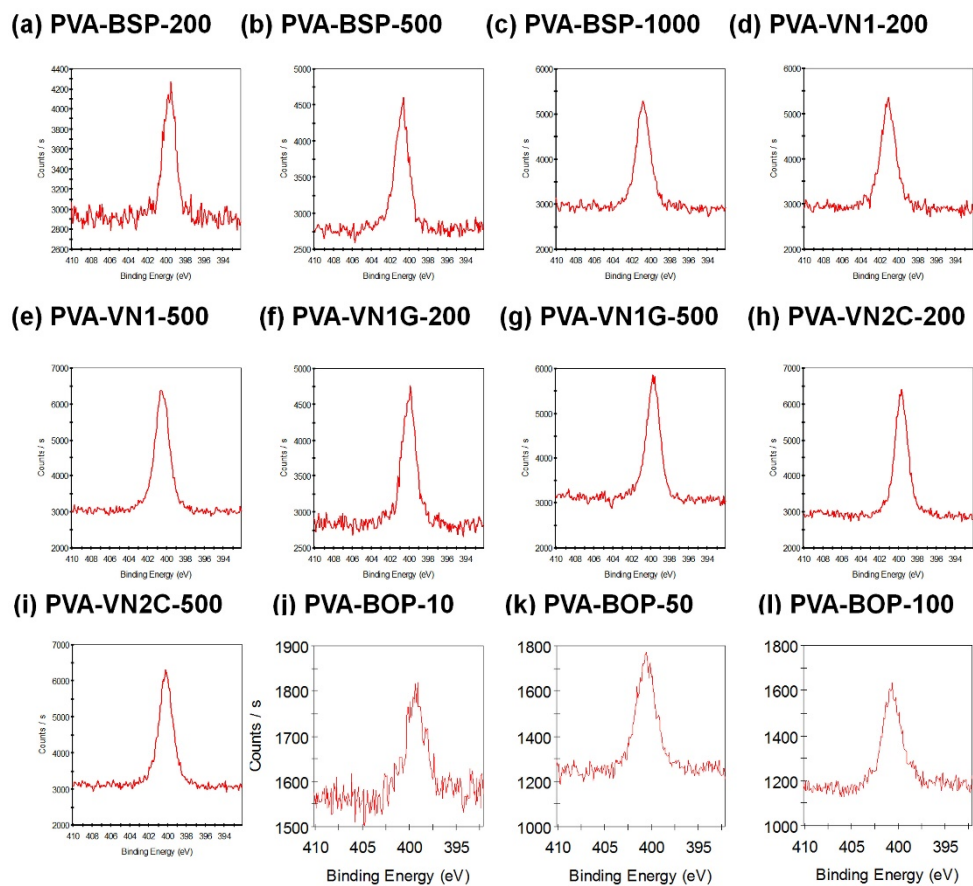
<sup>§</sup>These authors contributed equally to this work.

## SUPPLEMENTARY FIGURES



**Supplementary Figure 1 Characterization of PVA hydrogels grafted with various oligopeptides.**

High-resolution XPS spectra of the C1s peaks analyzed on the surface of PVA-BSP-200 (a), PVA-BSP-500 (b), PVA-BSP-1000 (c), PVA-VN1-200 (d), PVA-VN1-500 (e), PVA-VN1G-200 (f), PVA-VN1G-500 (g), PVA-VN2C-200 (h), PVA-VN2C-500 (i), PVA-BOP-10 (j), PVA-BOP-50 (k), and PVA-BOP-100 (l) hydrogels.



**Supplementary Figure 2 Characterization of PVA hydrogels grafted with various oligopeptides.** High-resolution XPS spectra of the N1s peaks analyzed on the surface of PVA-BSP-200 (a), PVA-BSP-500 (b), PVA-BSP-1000 (c), PVA-VN1-200 (d), PVA-VN1-500 (e), PVA-VN1G-200 (f), PVA-VN1G-500 (g), PVA-VN2C-200 (h), PVA-VN2C-500 (i), PVA-BOP-10 (j), PVA-BOP-50 (k), and PVA-BOP-100 (l) hydrogels.