

# Collagen peptide upregulates osteoblastogenesis from bone marrow mesenchymal stem cells through MAPK- Runx2

Jeevithan Elango <sup>1</sup>, Jeyashakila Robinson <sup>2</sup>, Jingyi Zhang <sup>1</sup>, Bin Bao <sup>1</sup>, Nan Ma <sup>3,4</sup>, José Eduardo Maté Sánchez de Val <sup>5</sup> and Wenhui Wu <sup>1,6,\*</sup>

<sup>1</sup> Department of Marine Bio-Pharmacology, College of Food Science and Technology, Shanghai Ocean University, Shanghai 201306, China; srijeevithan@gmail.com (J.E.); zhangjyj@163.com (J.Z.); bbao@shou.edu.cn (B.B.)

<sup>2</sup> Department of Fish Quality Assurance and Management, Fish Quality Monitoring and Certification Centre, Fisheries College and Research Institute, Tamil Nadu Dr.J.Jayalalitha Fisheries University, Tuticorin 628008, India; jeyashkila@gmail.com

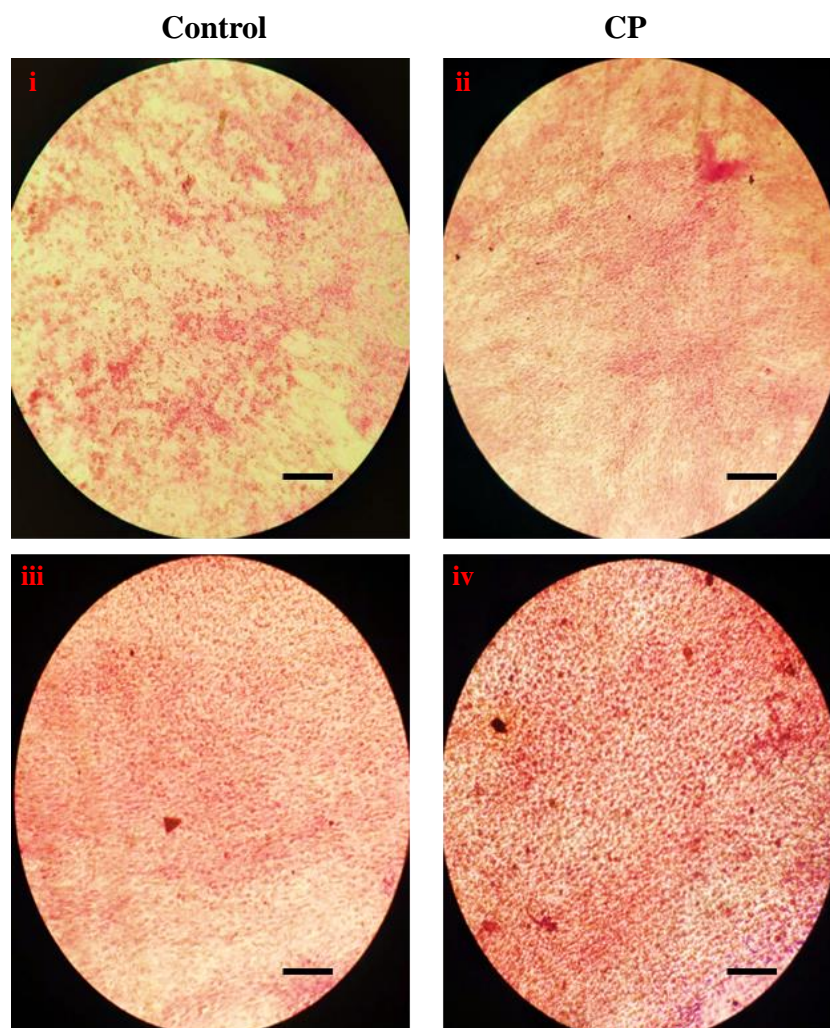
<sup>3</sup> Institute of Biomaterial Science and Berlin-Brandenburg Center for Regenerative Therapies, Helmholtz-Zentrum Geesthacht, Teltow 14513, Germany

<sup>4</sup> Institute of Chemistry and Biochemistry, Free university Berlin, Berlin 14195, Germany; nma@163.com

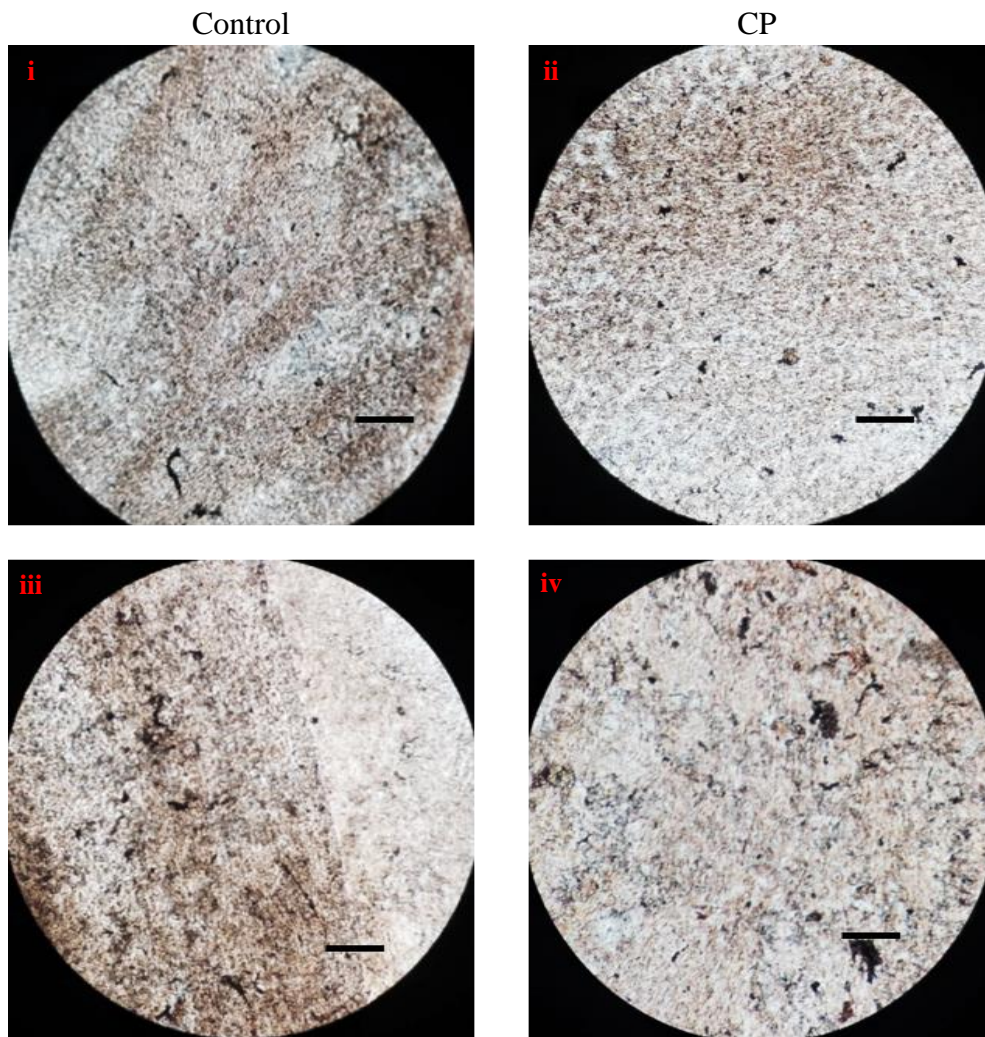
<sup>5</sup> Department of Biomaterials Engineering, Universidad Católica San Antonio de Murcia, Murcia 30107, Spain; jemate@ucam.edu

<sup>6</sup> Laboratory of Quality and Safety Risk Assessment for Aquatic Products on Storage and Preservation, Ministry of Agriculture, Shanghai 201306, China

\* Correspondence: [whwu@shou.edu.cn](mailto:whwu@shou.edu.cn); Tel.: +86-216-190-0388; Fax: +86-216-190-0364



**Supplementary Fig.1.** Alizarin red staining of differentiated BMMS cells (i-ii: 7 days & iii-iv: 14 days treated BMMS cells), Scale bars: 0.1 cm. CP-collagen peptide.



**Supplementary Fig.2.** von Kossa staining of differentiated BMMS cells (i-ii: 7 days & iii-iv: 14 days treated BMMS cells), Scale bars: 0.1 cm. CP-collagen peptide.