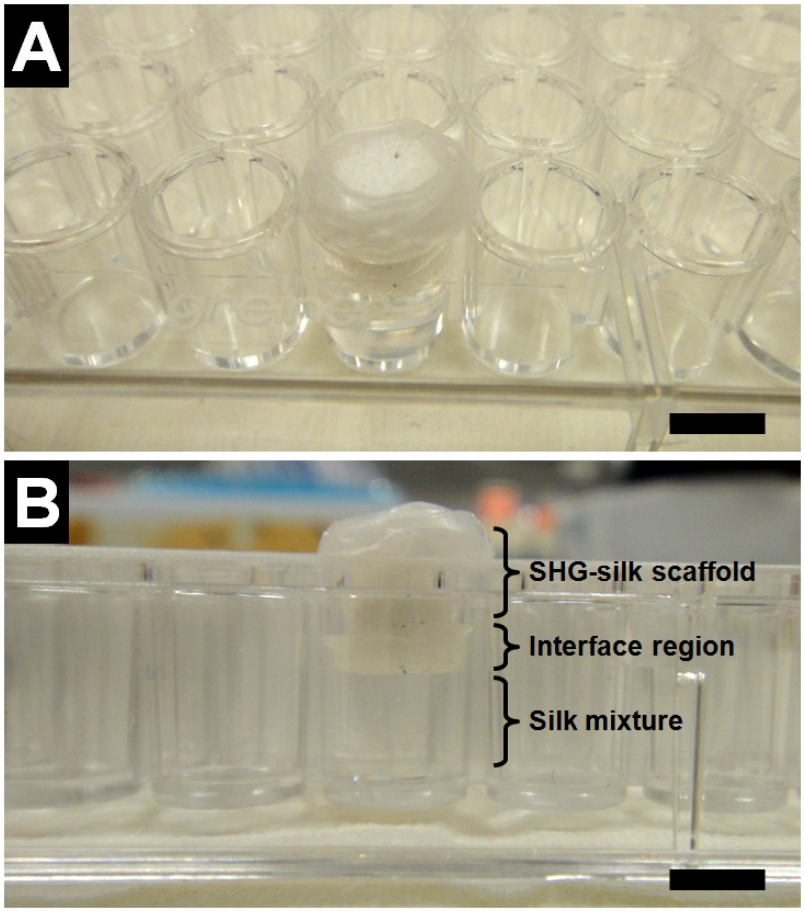
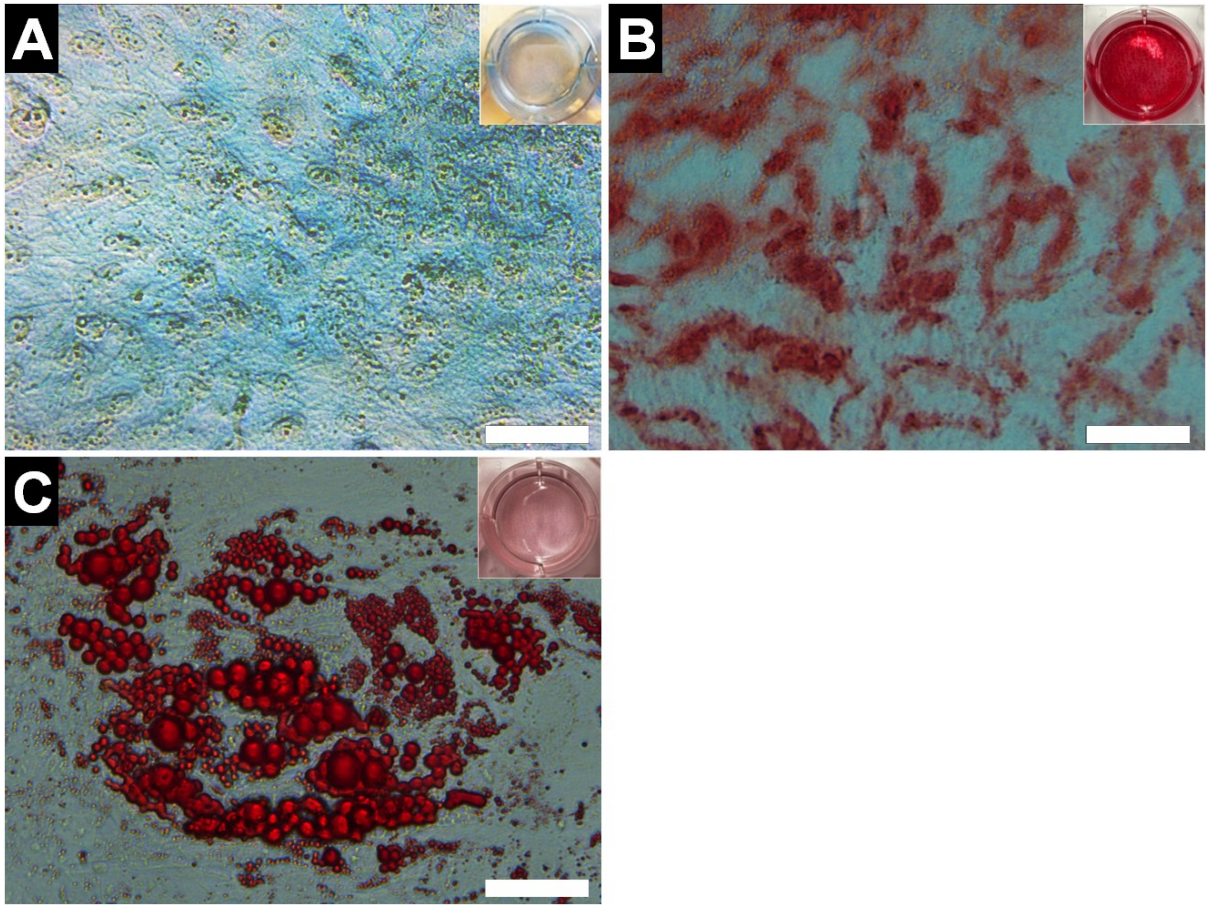
Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.



Supplementary Fig. 1 The method of biphasic scaffold fabrication involved **(A)** wrapping the top half of the SHG-silk scaffold (bone phase) in paraffin film, and **(B)** mounting the SHG-silk scaffold inside the mixture of silk and methanol prior to silk scaffold (cartilage phase) formation. The paraffin film allowed the position of the SHG-silk scaffold to be adjusted and secured, thereby allowing control over its degree of immersion within the silk mixture and hence size of the interface region. A biphasic scaffold with two distinct and well-integrated phases was formed after freezing and thawing. Scale bar = 5mm.



Supplementary Fig. 2 The multipotency of hMSCs used for the *in vitro* experiments was tested by monolayer and micromass culture in inductive media, and confirmed by **(A)** chondrogenic differentiation at 21 days evidenced by the accumulation of sulfated glycosaminoglycans stained with Alcian blue, **(B)** osteogenic differentiation at 21 days evidenced by the accumulation of mineralised calcium phosphate stained with Alizarin red, and **(C)** adipogenic differentiation at 21 days evidenced by intracellular accumulation of lipid-rich vacuoles stained with Oil Red O. Scale bar = 50µm.