

**Surface characterization, biocompatibility and osteogenic differentiation of drop-casted multilayer graphene oxide film towards human Wharton's jelly derived mesenchymal stem cells**

**ABSTRACT**

Graphene oxide (GO) materials have been extensively employed in mesenchymal stem cell (MSCs) research due to its unique nano topography. Herein, various concentrations of GO flakes were used to fabricate different thickness of multilayer graphene oxide (m-GO) films using a simple drop casting method and characterized by FTIR and AFM. The biocompatibility of m-GO films in culturing WJ-MSCs was investigated based on cell morphology, cell viability and osteogenic differentiation ability. Importantly, WJ-MSCs adhered and proliferated successfully on the m-GO films (6.25  $\mu\text{g}$ , 12.5  $\mu\text{g}$  and 25  $\mu\text{g}$ ) and showed no difference in cell morphology and viability after 5 days culture. Moreover, the WJ-MSCs growth on GO films (6.25  $\mu\text{g}$ , 12.5  $\mu\text{g}$  and 25  $\mu\text{g}$ ) enhanced the osteogenic differentiation as compared to the control (glass coverslip). Hence, the simple and inexpensive drop-casted fabrication strategy could provide biocompatible m-GO films to unlock the wider potential of WJ-MSCs in tissue engineering application.