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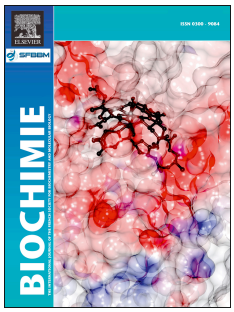

HAMSCs/HBMSCs coculture system ameliorates osteogenesis and angiogenesis against glucolipotoxicity

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Osteoporosis and vascular lesions induced by glucolipotoxicity are common complications of diabetes mellitus (DM). In order to deal with these complications, we designed a new therapeutic strategy, i.e. coculture system containing human amnion-derived mesenchymal stem cells (HAMSCs) and human bone marrow mesenchymal stem cells (HBMSCs). Two *in vitro* coculture models, transwell and mixed cocultures, were proposed for 7 days with variable HAMSCs: HBMSCs ratios. Then, supernatant from each coculture was used to reverse the deficiency of HBMSCs and human umbilical vein endothelial cells (HUVECs) impaired by high glucose and palmitic acid (GP). We found that glucolipotoxicity caused by GP remarkably inhibited cell proliferation, osteogenic differentiation and superoxide dismutase (SOD) activity, as well as induced the reactive oxygen species (ROS) level in HBMSCs. Meanwhile, glucolipotoxicity suppressed cell proliferation, tube formation capacity and angiogenic potential of HUVECs. Though, HAMSCs/HBMSCs coculture system reduced HBMSCs dysfunction by antioxidant properties and promoted angiogenesis in HUVECs. The mixed HAMSCs/HBMSCs coculture at the optimal ratio of 3/1 showed significantly greater cell proliferation, antioxidant properties, osteogenic and angiogenic differentiation than HBMSCs or HUVECs alone. In conclusion, the current coculture system of HAMSCs/HBMSCs can be a potential therapeutic material for advancing bone and vascular regeneration against DM-induced glucolipotoxicity.