

# **Hyperbaric oxygen induces placental growth factor expression in bone marrow-derived mesenchymal stem cells**

徐國基

Shyu KG;Hung HF;Wang BW;Chang H

摘要

## **Abstract**

The bone marrow is home to mesenchymal stem cells (MSCs) that are able to differentiate into many different cell types. The effect of hyperbaric oxygen (HBO) on MSCs is poorly understood. Placental growth factor (PIGF) is an attractive therapeutic agent for stimulating revascularization of ischemic tissue. HBO has been shown to improve diabetic wound healing by increase circulating stem cells. We hypothesized that HBO induces PIGF expression in bone marrow-derived MSCs. The MSCs were obtained from adult human bone marrow and expanded in vitro. The purity and characteristics of MSCs were identified by flow cytometry and immunophenotyping. HBO at 2.5 ATA (atmosphere absolute) significantly increased PIGF protein and mRNA expression. The induction of PIGF protein by HBO was significantly blocked by the addition of Nacetylcysteine, while wortmannin, PD98059, SP600125 and SB203580 had no effect on PIGF protein expression. However, the specific inhibitor of nitric oxide synthase, L-NAME did not alter the PIGF protein expression induced by HBO. HBO significantly increased the reactive oxygen species production and pretreatment with N-acetylcysteine significantly blocked the induction of reactive oxygen species by HBO. HBO significantly increased the migration and tube formation of MSCs and pretreatment with Nacetylcysteine and PIGF siRNA significantly blocked the induction of migration and tube formation by HBO. In conclusion, HBO induced the expression of PIGF in human bone marrow-derived MSCs at least through the oxidative stress-related pathways, which may play an important role in HBO-induced vasculogenesis.

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