



north american veterinary  
regenerative medicine association

**The 2<sup>nd</sup> North American Veterinary Regenerative Medicine Conference, June 2 – 4, 2011  
Lexington, Kentucky**

## **Hyperbaric oxygen treatment affects canine mesenchymal stem cells in vivo.**

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Hyperbaric oxygen therapy (HBOT) has been shown to be effective in improving and accelerating the healing process in many diseased tissues which is achieved through several different mechanisms. In our pilot study we evaluated the effect of hyperbaric oxygen treatment (HBOTx) on the canine mesenchymal stem cells (MSC) isolated from peripheral blood, bone marrow and adipose tissue using six healthy research dogs where each dog was its own control. Canine MSC were isolated from peripheral blood, bone marrow, and adipose tissue before and after HBOTx using 100% oxygen at 2.5 atmospheres of pressure for 60 minutes for three days. We confirmed differentiation ability of MSC into specific type of cells, such as adipocytes, chondrocytes, and osteocytes by specific staining. The canine MSC expressed genes associated with multipotency, while their differentiated cells expressed appropriate lineage-specific genes. Our data indicate that the HBOTx causes increased production of the canine MSC in bone marrow and leads to release of canine MSC into the peripheral blood circulation. Increased circulating multipotent MSCs may be one of mechanism by which HBOT improves tissue healing. The dog is a valuable translational model that is suitable for evaluation of novel therapies such as those employing stem cells in spontaneously-occurring disease settings.