

## Healing Mechanisms activated by Hyperbaric Oxygen Therapy

The use of Hyperbaric Oxygen Therapy (HBOT) for treating the “bends” is well known, and more recently it is known for its use for non – healing diabetic foot ulcers. By enhancing oxygen delivery, HBOT stimulates healing processes that are relevant across many disease states. Since hemoglobin molecule binding sites are maximally saturated with oxygen at atmospheric pressure, enhancing the oxygen carrying capacity of blood depends on dissolving Oxygen molecules in plasma. Under hyperbaric ( increased pressure ) conditions a hyperoxic state is achieved which initiates healing processes.

HBOT triggers release of stem cells. 1 Stem cells are necessary for the continuous renewal and repair of all organs throughout our life. This includes our brain. A recent article in Neurology Today presented work with Down’s syndrome patients and correlates the early dementia that is part of the symptoms complex with a failure in the process of releasing stem cells. 2

In a hyperoxic environment, the chemistry of oxygen free radicals is different: oxygen radicals interact directly at a DNA level to up – regulate healing reactions and growth hormones and down - regulate destructive pathways. More than 8100 genes have been studied. 6

HBOT interrupts the cascade of injury following hypoxia / anoxia to minimize injury. Dr. Mathius made this discovery when studying patients with severe anoxic brain injury . 4, 5

HBOT stimulates intracellular healing. Oxygen has a critical role in our metabolism, and an injured / diseased cell may rejuvenate in an oxygen rich environment. 5 The hyperoxia in HBOT stimulates angiogenesis and is one of the ways that permanent healing is achieved. 3

HBOT should not be viewed as a disease specific treatment, but instead as a healing treatment modality.

## References:

1. Stephen R. Thom et al. Stem cell mobilization by hyperbaric oxygen. *Am J Physiol Heart Circ Physiol* 290: 1378-1386, 2006.
2. Jamie Talan Stem Cell Defects Associated with Down Syndrome. *Neurology Today*: 7November 2013 – Volume 13 – Issue 21 p 1, 13 – 16.
3. Cassandra A. Godman et al. Hyperbaric oxygen induces a cytoprotective and angiogenic response in human microvascular endothelial cells. Original Paper. *Cell Stress Society International* 2009.
4. Mathieu, D et al. Hyperbaric oxygenation in acute ischemic encephalopathy ( near - hanging ) . *Eur J Neurol* 7 ( Suppl 3 ):151.
5. K K Jain HBOT therapy in global cerebral ischemia / anoxia and coma. In *Textbook of Hyperbaric Medicine*. Hogrefe & Huber 2004.
6. Stephen R. Thom. Oxidative stress is fundamental to hyperbaric oxygen therapy. *J Appl Physiol* 106:988-995, 2009.