



## Hyperbaric Oxygen Therapy Mechanisms of Action

**Decreases Inflammation:** Inflammation, one of the most common mechanisms of disease and injury, is caused by biochemical by-products that are manufactured by the body's natural immune response. Hyperbaric oxygen markedly decreases inflammation by stimulating the body's own anti-inflammatory defenses. This may be the single most important function of HBOT.

**Direct Pressure to Oxygen Molecules:** Inside the hyperbaric chamber, oxygen molecules are compressed and become more soluble, obeying the scientific principles of Boyle's Universal Gas Law. This phenomenon allows oxygen to effortlessly cross cell membranes and enter all of the body's fluid systems, including plasma, synovial, lymphatic, and interstitial (between cells) and cerebrospinal fluids. Normally, only the red blood cells are capable of transporting oxygen throughout the body. Now, all body fluids combine to provide alternate transport routes for extra oxygen and cumulatively can provide up to 20 times normal O<sub>2</sub>.

**Angiogenesis – The Formation of New Blood Vessels:** Hyperbaric Oxygen stimulates the body to grow new capillaries (angiogenesis), essentially building a new collateral circulatory system to serve injured and healthy tissues alike. The resulting neovascularization is extremely helpful for reaching tissues and organs that have restricted blood flow (ischemic areas) as well as areas of the body that are lacking or compromised in available oxygen (hypoxic areas).

**Hyperoxygenation:** The delivery of 100% oxygen under pressure (1.5 to 3 ATA) within the hyperbaric chamber provides up to 20 times normal oxygen to all tissues within the body. This oxygen super saturation is in marked contrast to breathing room air (21% oxygen at 1 ATA).

**Bactericidal Ammunition – Aids in Killing Bacteria:** Conditions created within the hyperbaric oxygen chamber are not favorable for the viability of bacteria, fungi and viruses – organisms that cannot survive in an oxygen rich environment. Extra oxygen is provided to the white blood cells (leukocytes) which become supercharged in the battle against bacteria responsible for causing infection and illness.

**Superoxide Dismutase (SOD) Stimulation – A Surge of Antioxidant Capabilities:** Superoxide Dismutase (SOD) is an important enzyme found in human cells that inactivates superoxides, the most common free radicals in the body, responsible for destruction of cells. Hyperbaric Oxygen stimulates SOD production thereby helping the body to rid itself of the byproducts of inflammation and damaging free radicals.

**Synergy with Antibiotics:** Hyperbaric Oxygen has been proven to create a synergistic effect when administered in conjunction with certain antibiotics. Synergy can be understood as two or more agents working together to produce a result not obtainable by any of the agents independently. Administration of HBOT biomechanically potentiates the effectiveness of antibiotic therapy. The capabilities of sulfanomides are increased up to ten fold when HBOT is added. Increased oxygen levels from HBOT alone also act as antibiotics by impairing bacterial metabolism.

**Stem Cell Proliferation & Mobilization:** A landmark study conducted at the University of Pennsylvania School of Medicine revealed that Hyperbaric Oxygen Therapy (HBOT) dramatically increases stem cell activity. A typical course of HBOT increases by eight-fold the number of stem cells circulating in a patient's body. Stem cells, also called progenitor cells are crucial to injury repair.

**Increases Fibroblast and Collagen Production:** These essential building blocks of connective-tissue, tendon and skin matrix (fibroblasts and collagen) provide the structural framework throughout the body and play a critical role in wound healing. Fibroblast and collagen reproduction and growth are aided by the added availability of increased oxygen provided during hyperbaric conditions.

**Improves Osteoblast and Osteoclast Production:** Faster regeneration of bone is derived by hyperbaric oxygen's ability to stimulate and increase production of specialized cells (osteoblasts and osteoclasts) responsible for bone repair and formation.