



Nobles Awards

On Monday, October 7, 2019, the Nobel Prize in Medicine was awarded. The winners were William Kaelin, Gregg Semenza and Peter Ratcliffe, two Americans and a British man who discovered the molecular mechanism by which cells adapt to the lack of oxygen.



The scientists found that cells have the ability to make adjustments in their metabolic rates for the functioning of the body when there is insufficient oxygen. These investigations started from the theory that cells need oxygen to produce energy.

“We are literally delighted that the 2019 Nobel Prize in Medicine and Physiology has been awarded to three scientists who, through their work, were able to study the intrinsic molecular variables in the detection and response to certain degrees of oxygen in cells. We always refer to the value of hypoxia and hyperoxia in different health conditions and diseases, because we are aware that we must recover these concepts in order to be able to practice medicine in the 21st century”, says Dr. Jorge Cubrías Morales, doctor at BioBarica Spain and president of the Spanish Society of Nutrition and Orthomolecular Medicine.

What is interesting about the discovery is that it opens up new possibilities to treat different pathologies directly influenced by the lack of oxygen, such as cardiovascular diseases, cardiovascular accidents and cancer. In the case of tumors, their growth depends on the supply of oxygen to the blood.



“Without oxygen there is no life and with excess oxygen there can be death. The status of the cell in terms of youth, nutrition and toxicity makes it more tolerant to these alterations or it ends up dying. Against this, the hormesis mechanisms very present in the conceptual bases of current ortho-molecular practice arise. The fact of deepening the knowledge of the importance of oxygen for our cells is great news that we will certainly welcome and must welcome with the intention of putting it into practice for the benefit of the patient”, adds Dr. Cubrías Morales.

Why is oxygen necessary for the function of cells?

Oxygen is metabolically necessary, since when there is not enough oxygen, a series of pathologies are triggered by hypoxia. The lack of oxygen is not only related to hypoxia, but to the difficulties that cells have to take advantage of oxygen. Factors such as pollution and smoking, among others, intervene in these difficulties. The adaptation of cells to the lack of oxygen causes diseases such as neurodegenerative ones to be generated. For example, Parkinson's and Alzheimer's are associated with a higher rate of pollution as a risk factor.

Otto Heinrich Warburg, winner of the Nobel Prize, had already made reference in his research to the fact that most cancer cells produce energy mainly in the cytosol and through a process of anaerobic glycolysis. That is, thanks to high rates of glycolysis followed by a lactic fermentation process. Most normal cells produce energy through the aerobic oxidation pathway of pyruvate in the mitochondria.

This last process uses oxygen as the final electron acceptor in the respiratory chain. Malignant cells typically have glucose uptake rates about 200 times greater than the normal cells that gave rise to them. This occurs even with a full supply of oxygen. Otto Warburg postulated that this change in metabolism is the root cause of cancer.

How does hyperbaric chamber therapy work in the absence of oxygen?

Hyperbaric oxygen therapy manages to recover the affected cells and thus the physiological processes can be triggered to regenerate tissues, heal and reverse pain and inflammation in complex wounds, chronic inflammatory diseases and intoxication. It also promotes the reduction of the hypoxic microenvironment and therefore reduces the conditions conducive to tumor growth.

The main objective of this treatment is to generate hyperoxia, increasing the availability of oxygen and restoring the functionality of the cell.

About Hyperbaric Oxygen Therapy

Hyperbaric Oxygen Therapy (HBOT) is a non-invasive method that consists of supplying high concentrations of oxygen in a pressurized hyperbaric chamber at a minimum of 1.4 atmospheres. Under normal environmental conditions, 21% oxygen is breathed at 1 atmospheres. Thus, inside the chamber, the patient breathes greater amounts of oxygen, which are transported through the blood and reach all the tissues of the body, even those that are damaged.

References

Murdoch C, Muthana M, Lewis CE. Hypoxia regulates macrophage functions in inflammation. *J Immunol.* 2005; fifteen; 175 (10): 6257-63.

Orru H1,2, Ebi KL3, Forsberg B4. The Interplay of Climate Change and A