



# CERULEAN

ADVANCED FITNESS AND WELLNESS™

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*Included are the full-length peer reviewed medical research papers. For your convenience, we have also included short summaries of each article with quotes taken directly from the corresponding research study.*

## HYPOBARIC ADAPTIVE CONDITIONING THERAPY MAY HELP WITH VARIOUS MEDICAL CONDITIONS:

### **Improvement of Myocardial Perfusion in Coronary Patients After Intermittent Hypobaric Hypoxia:**

*Maria del Pilar Valle, MD,<sup>a</sup> Félix García-Godos, MD, Orison O. Woolcott, MD,<sup>b</sup> José M. Marticorena, MD,<sup>a</sup> Víctor Rodríguez, MD,<sup>a</sup> Isabel Gutiérrez, MD,<sup>c</sup> Luis Fernández-Dávila, MD,<sup>a</sup> Abel Contreras, MD,<sup>c</sup> Luis Valdivia, MD,<sup>c</sup> Juan Robles, MD,<sup>c</sup> and Emilio A. Marticorena, MD<sup>b,c</sup>*

Summary: “Intermittent hypobaric hypoxia improved myocardial perfusion in patients with severe coronary heart disease. Though preliminary, our results suggest that exposure to intermittent hypobaric hypoxia could be an alternative for the management of patients with chronic coronary heart disease.”

### **Cyclic Hypobaric Hypoxia Improves Markers of Glucose Metabolism in Middle-Aged Men**

*Juan L Marquez, Scott Rubinstein, Jill A. Fattor, Omer Shah, Andrew R. Hoffman, and Anne L. Friedlander*

Summary: “Ten weeks of cyclic hypobaric hypoxia (CHH) exposure improves markers of glucose metabolism in middle-aged men at risk for metabolic syndrome. CHH may emerge as a useful tool for studying the clinical elements of glucose metabolism and, with supporting data from future investigations, it could emerge as an interesting option to improve glucose tolerance in people at risk for developing type 2 diabetes.”

## HYPOBARIC ADAPTIVE CONDITIONING THERAPY HELPS PRE-ACCLIMATE TO HIGH ALTITUDE EXPOSURE AND DECREASES THE PREVALENCE OF ACUTE MOUNTAIN SICKNESS:

### **Intermittent Hypobaric Hypoxia Induces Altitude Acclimation and Improves the Lactate Threshold**

*Mierla Casa, Hector Casas, Teresa Pages, Ramon Rama, Antoni Ricart, Josep Ventura, Jordi Ibanez, Ferran Rodriguez, Gines Viscor*

Summary: “We conclude that 17 days of intermittent exposure to moderate hypoxia in a hypobaric chamber, in combination with low intensity exercise, elicit the acclimation response to high altitude. The exposure program also improves the aerobic capacity in healthy mountaineers, facilitating the adaptation to high altitude and becoming a suitable alternative to acclimatization “in situ”. This kind of pre-acclimation program is of great interest for the preparation of high-altitude expeditions.”

### **The Effect of Dynamic Intermittent Hypoxic Conditioning on Arterial Oxygen Saturation**

*Ronald Hetzler, Christopher Stickley, Iris Kumura, Michelle Labotz, Andrew Nichols, Kenneth Nakasone, Ryan Sargent, Lawrence Burgess*

Summary: “The dynamic intermittent hypoxic conditioning protocol used for this study resulted in an acclimation response, such that SpO<sub>2</sub> was significantly increased at all altitudes testing, with shorter exposure times than generally reported.

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## HYPOBARIC ADAPTIVE CONDITIONING THERAPY MAY HELP IMPROVE PAIN ASSOCIATED WITH MEDICAL CONDITIONS:

### **Pilot Study: Rapidly Cycling Hypobaric Pressure Improves Pain After 5 Days in Adipositas Dolorosa**

*Karen Herbst, Thomas Rutledge*

Summary: “These data present a potential, new, noninvasive means of treating pain in AD by whole body pneumatic compression as part of the CVAC process. Although randomized, controlled trials are needed to confirm these data, the CVAC process could potentially help in treated AD pain and other chronic pain disorders.”

## HYPOBARIC ADAPTIVE CONDITIONING THERAPY CAN IMPROVE ATHLETIC PERFORMANCE AND INCREASES EPO:

### **Intermittent Hypobaric Hypoxia Induces Altitude Acclimation and Improves the Lactate Threshold**

*Mierla Casa, Hector Casas, Teresa Pages, Ramon Rama, Antoni Ricart, Josep Ventura, Jordi Ibanez, Ferran Rodriguez, Gines Viscor*

Summary: “We conclude that 17 days of intermittent exposure to moderate hypoxia in a hypobaric chamber, in combination with low intensity exercise, elicit the acclimation response to high altitude. The exposure program also improves the aerobic capacity in healthy mountaineers, facilitating the adaptation to high altitude and becoming a suitable alternative to acclimatization “in situ”. This kind of pre-acclimation program is of great interest for the preparation of high-altitude expeditions.”

### **Training-Induced Increases in Sea-Level Performance Are Enhanced by Acute Intermittent Hypobaric Hypoxia**

*Ted Meeuwse, Ingrid Henriksen, Michael Holewijn*

Summary: “Nine days after training in hypoxia, significant increases were seen in all important parameters of the maximal aerobic as well as the anaerobic test. A significant increase of 7.0% was seen in mean maximal oxygen uptake per kilogram body weight (VO<sub>2</sub> max), and the mean maximal power output per kilogram body weight (W<sub>max</sub>) increased significantly by 7.4%... The results of this study indicate that intermittent hypobaric training can improve both the aerobic and the anaerobic energy-supply systems.”

### **Intermittent Hypobaric Hypoxia Stimulates Erythropoiesis and Improves Aerobic Capacity**

*Ferran Rodriguez, Hector Casas, Mireia Casas, Teresa Pages, Ramon Rama, Antoni Ricart, Josep Ventura, Jordi Ibanez, Gines Viscor*

Summary: “It was concluded that short-term (9 days) hypobaric hypoxia can activate the erythropoietic response and improve the aerobic performance capacity in healthy subjects.”

### **Erythropoietin Acute Reaction and Haematological Adaptations to Short, Intermittent Hypobaric Hypoxia**

*Ferran Rodriguez, Josep Ventura, Mireia Casas, Hector Casas, Teresa Pages, Ramon Rama, Antoni Ricart, Luis Palacios, Gines Viscor*

Summary: “Our most relevant finding is the ability to effectively stimulate erythropoiesis through brief intermittent hypoxic stimuli (90 min), in a short period of time (3 weeks), leading to a lower arterial blood desaturation in hypoxia. The proposed mechanism for these haematological and functional adaptations is the repeated triggering effect of EPO production caused by the intermittent hypoxic stimuli.”

## NON-SCIENTIFIC ARTICLES:

**The New Altitude Training: Sit Back and Relax (Lava Magazine, December 2010)**

**Altitude Conditioning System (Medical Developments, June 2009)**

**Building the New Super Athlete (Men's Journal, August 2013)**