

## CONTENTS

1. Free radical theory of aging and disease

*Denham Harman*

2. The effects of long-term administration of tamoxifen on oxidative stress indices in rat liver

*Șoimița Suci, Lavinia Sabau, Adriana Muresan*

3. Erythropoietin and magnesium in the oxidative stress induced of physical effort

*Irina Chiș, Ramona Stanciu, Adriana Mureșan*

4. Hypothermia during extracorporeal circulation does reduce both oxygen consumption and delivery

*M Crîsnic, Daniela Crîsnic, D Tripon*

5. The effects of alprazolam on experimental acute and chronic inflammation and on central and peripheral algesia

*Mihaela Țiglea, Rita Kiss, B Cuparencu*

6. Heart rate variability in patients with acute myocardial infarction treated with intravenous thrombolysis

*Mihaela Muntean, Anca Kigyosi, Dan Burghina, Constantin Tudor*

7. Lung lobation variants and/or abnormalities? Anatomico-physiological considerations

*Ana Nadia Schmidt, Adriana Mureșan, Antonia Popescu, D Gheban, Narcisa Botos, O Bota, M Bran*

8. In memoriam Ion Baci

*M Sabau*

### 1. FREE RADICAL THEORY OF AGING AND DISEASE

*Denham Harman*

University of Nebraska College of Medicine, Department of Medicine, Nebraska Medical Center, U.S.A.

Address for correspondence: Prof. Denham Harman, University of Nebraska College of Medicine, Department of Medicine, Nebraska Medical Center, Omaha, Nebraska, 68198-4653 U.S.A.

#### ABSTRACT

Aging is a progressive process which involves several changes in cells and tissues, so that the chance of death rises with age. The average life expectancy at birth (ALE-B) depends on two major factors: general living conditions (GLC) and the inborn aging process (IAP). Actually, IAP involves the formation of superoxide radicals (SO) by the mitochondria and their level increases with age, SO becoming the major determinant of life span. SO determine the level of free radicals in the body. Thus, the free radicals theory of aging and disease (FRTAD-1954) brings in the equation of aging process another factor: free radicals. After many studies, the conclusion is that the aging and disease problems depend on both the level of free radicals which damage the body in suboptimal living conditions, and the endogenous free radical reactions (FRR), initiated by SO in the course of normal metabolism.

**Key words:** aging, mitochondria, mutation, free radicals, longevity, origin of life, evolution

### 2. THE EFFECTS OF LONG-TERM ADMINISTRATION OF TAMOXIFEN ON OXIDATIVE STRESS INDICES IN RAT LIVER

*Șoimița Suci, Lavinia Sabau, Adriana Muresan*

Physiology Department, University of Medicine and Pharmacy "Iuliu Hatieganu", Cluj-Napoca

Address for correspondence: Dr. Șoimița Suci, Department of Physiology; University of Medicine and Pharmacy Iuliu Hatieganu, Str. Clinicilor nr. 1, 400006, Cluj-Napoca .

#### ABSTRACT

In this study we determined the plasma levels and the liver content of malonaldehyde and carbonyl groups of proteins, as markers of oxidative stress, in 10 adult male Wistar rats which were given 10

mg/kg body weight tamoxifen for 6 weeks comparative to controls. We found that both serum and the liver malonaldehyde and protein carbonyls were significantly higher in our study group than in controls, suggesting that the chronic administration of tamoxifen leads to oxidative stress in liver.

**Key words:** tamoxifen, liver, oxidative stress

### **3. ERYTHROPOIETIN AND MAGNESIUM IN THE OXIDATIVE STRESS INDUCED OF PHYSICAL EFFORT**

*Irina Chiș, Ramona Stanciu, Adriana Mureșan*

Physiology Department of Pharmacy and Medicine University „Iuliu Hatieganu" Cluj Napoca

Address for correspondence: Dr. Irina Chiș, Department of Physiology; University of Medicine and Pharmacy “Iuliu Hatieganu”, Clinicilor Street no. 1, 400006 Cluj-Napoca

#### **ABSTRACT**

Erythropoietin (Epo) is an alpha 1-glicoprotein with a major role in regulation of eritropoiesis. Epo has multiple roles: antiapoptotic, mitogenetic, chemotactic, angiogenetic, mobilizer of intracellular calcium, neurotrophic, neuroprotector. Later studies showed that Epo has role in diminishing the oxidative stress and inflammation.

Even if aerobic metabolism provides advantages to different forms of life, oxygen, as is both an indispensable element for life and a source for very active detrimental and destructive potential known under the name of reactive oxygen species (ROS). Its destructive effects on stimulated when ever it is an overproduction of ROS or when antioxidative defense systems on overtaken leading to oxidative stress.

Nowadays, implication of ROS in a high number of physiological and pathological processes is well-known, some of them having a special importance in clinical practice, as a causal factor, leading or accompanying or aggravating primary lesions. In conclusion, the attempt to use biological with antioxidant effect in diseases with ROS is perfectly justified.

Minerals and oligoelements are necessary for the body to maintain the health and the best level of physiological functions. It is necessary for the athletes, a suitable quantity of minerals and oligoelements to cope with physical training (effort) and to get the sport performances.

We have studied in this work, the influence of magnesium addition and the magnesium association with erythropoietin about the oxidants and antioxidants balance in the animals who are trained for the effort.

The results show that magnesium addition establishes the increase of physical performances to animals who are trained for swimming. This magnesium addition is in interdependence with increase of all antioxidative capacity and with the diminution of oxidative stress too. The effects are much stronger in case of magnesium association with the erythropoietin.

**Key words:** erythropoietin, reactive oxygen species, carbonylated proteins, capacity of hydrogen donors, ceruloplasmine, and lipid peroxides levels.

### **4. HYPOTHERMIA DURING EXTRACORPOREAL CIRCULATION DOES REDUCE BOTH OXYGEN CONSUMPTION AND DELIVERY**

*M Crîșnic<sup>1</sup>, Daniela Crîșnic<sup>2</sup>, D Tripon<sup>2</sup>*

<sup>1</sup>Department of Anesthesia and Critical Care, Institute of Cardiovascular Diseases, Timișoara

<sup>2</sup>Department of Physiology, University of Medicine and Pharmacy ”Victor Babeș” Timișoara

Address for correspondence: Dr. Mircea Crisnic, Department of Anesthesia and Critical Care, Institute of Cardiovascular Diseases, str. Gh. Adam, nr.13A, 300310, Timișoara

#### **ABSTRACT**

**Introduction.** The temperature-dependence of metabolic rate is expressed as  $Q_{10}$ . A  $Q_{10}$  greater than 1.9 during systemic cooling suggests decrease of both tissular oxygen consumption and delivery.

This study tries to verify the hypothesis that hypothermia during extracorporeal circulation (EC) decreases tissular oxygen delivery, creating a tissular oxygen debt.

**Material and method.** We included in our study 20 consecutive patients with aortocoronary bypass surgery performed with hypothermic EC (28-30°C), keeping the systemic blood flow constant, regardless the temperature. We studied three moments of the EC: (1) normothermia, at least after 10 minutes of temperature equilibration at 37°C, (2) hypothermia, at least after 10 minutes of temperature equilibration at 28-30°C and (3) rewarming, at least 10 minutes after the patients' temperature reached again 37°C. For every moment we measured systemic oxygen delivery, systemic oxygen consumption and oxygen extraction rate.  $Q_{10}$  was calculated for the cooling and rewarming period.

**Results.** The systemic oxygen delivery was similar in the three moments. The systemic oxygen consumption was significantly smaller in (2), compared with (1) ( $p < 0.001$ ); oxygen consumption in (3) was significantly greater, compared with both (2) ( $p < 0.001$ ), and (1) ( $p < 0.01$ ).  $Q_{10}$  calculated for cooling was  $3.05 \pm 1.9$ , suggesting decreased tissular oxygen consumption and delivery, and for rewarming was  $5.04 \pm 3.65$ , suggesting that the tissues are getting rid of their oxygen debt.

**Conclusions.** Hypothermia during EC decreases both tissular oxygen consumption and delivery, creating a tissular oxygen debt.

**Key words:** hypothermia, extracorporeal circulation, oxygen delivery.

## 5. THE EFFECTS OF ALPRAZOLAM ON EXPERIMENTAL ACUTE AND CHRONIC INFLAMMATION AND ON CENTRAL AND PERIPHERAL ALGESIA

*Mihaela Țiglea, Rita Kiss, B Cuparencu*

Department of Pharmacology, Faculty of Medicine and Pharmacy, University of Oradea

Address for correspondence: Prof. Dr. B. Cuparencu, Department of Pharmacology, Faculty of Medicine and Pharmacy, University of Oradea, 10, Independentei Square, 410073 Oradea

### ABSTRACT

Alprazolam, a benzodiazepine has a proinflammatory effect in doses of 0.25; 0.5 and 1 mg/kg in experimental acute inflammation and an analgesic effect on experimental central algnesia induced in rats. It has no effect on chronic experimental inflammation and on experimental peripheral algnesia. Chronic inflammation under the administration of Alprazolam has a peripheral analgesic action. Central algnesia was not influenced by chronic inflammation. The mechanisms of these effects are still unknown.

**Keywords:** alprazolam, rats, inflammation, algnesia.

## 6. HEART RATE VARIABILITY IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION TREATED WITH INTRAVENOUS THROMBOLYSIS

*Mihaela Muntean<sup>1</sup>, Anca Kigyosi<sup>2</sup>, Dan Burghina<sup>1</sup>, Constantin Tudor<sup>1</sup>*

<sup>1</sup>Department of Internal Medicine, City Hospital of Timisoara, University of Medicine and Pharmacy "Victor Babes" Timisoara

<sup>2</sup>Department of Medical Informatics, University of Medicine and Pharmacy "Victor Babes" Timisoara

Address for correspondence: Mihaela Muntean, Clinica Medicala I, Spitalul Clinic Municipal Timisoara, Gh. Dima Street, 300079 Timisoara, E-mail: [michaelamuntean@yahoo.com](mailto:michaelamuntean@yahoo.com)

### ABSTRACT

The study assesses the efficacy of the heart rate variability parameters in the risk stratification for malignant ventricular arrhythmia in patients with myocardial infarction treated with intravenous thrombolysis versus classic medical treatment.

30 patients with acute myocardial infarction, included in our study, received a Holter-ECG recording using a three-channel device from heart Tec with flashcard.

We demonstrated a significant difference for the SDNN Index (HRV parameter) between the patients with myocardial infarction treated with thrombolysis and those who received a conservative treatment. In all patients with conservative scheme several time domain parameters were diminished as compared to those in the thrombolysis group.

Heart rate variability, a reliable method in distinguishing patients with a propensity to develop malignant ventricular arrhythmia is also able to assess the efficacy of the thrombolytic treatment in acute myocardial infarction.

**Key words:** heart rate variability, Holter-ECG, acute myocardial infarction, malignant ventricular arrhythmia.

## 7. LUNG LOBATION VARIANTS AND/OR ABNORMALITIES? ANATOMO-PHYSIOLOGICAL CONSIDERATIONS

*Ana Nadia Schmidt<sup>1</sup>, Adriana Mureșan<sup>2</sup>, Antonia Popescu<sup>3</sup>, D Gheban<sup>4</sup>, Narcisa Botos<sup>5</sup>, O Bota<sup>5</sup>, M Bran<sup>5</sup>*

<sup>1</sup>Department of Anatomy and Embryology

<sup>2</sup>Department of Physiology

<sup>3</sup>Department of Neonatology, Clinic of Gynecology I Cluj-Napoca

<sup>4</sup>Department of Pathological Anatomy

<sup>5</sup>Students - UMF Cluj-Napoca

“Iuliu Hațieganu” University of Medicine and Pharmacy Cluj-Napoca

### ABSTRACT

During ontogenesis, the lung lobes appear as a result of the fitting of the visceral (mesenchymal) pleura on the (endodermal and mesenchymal) derivatives of the main bronchi. Lung lobation variants are the result of the deviation of the normal development of fissures. Lung lobation variants (absence of horizontal fissure, incomplete fissures and abnormal fissure pattern) were present in a number of 23 fetal subjects, with gestational ages between 13 and 37 weeks – abortions of maternal cause. The same particular lung lobation forms were found in the case of hypoplastic lungs (hypoplasia being secondary to congenital diaphragmatic hernia – 2 cases, and to some neural tube defects: anencephaly and dorsal rachischisis – 2 cases). All the lungs mentioned before were weighed, photographed and studied macro- and microscopically. The macroscopic study (by dissection) revealed an abnormal branching of the bronchial tree (reduction in the number of divisions) only in hypoplasia cases, and the microscopic study demonstrated a lung histodifferentiation under the level of gestational age. Since: the mechanism underlying lung development is the epithelium-mesenchyme interaction; the development of the diaphragm is based on mesenchymal primordia; anencephaly could be the consequence of the abnormal formation of (mesenchymal) skull; and vertebral arch defects are also of mesenchymal nature, the presence of an initial mesenchymal defect is probable, and lobation patterns associated with pulmonary hypoplasia are definitely abnormalities, not variants.

**Key words:** lung ontogenesis, prenatal diagnosis, pulmonary hypoplasia, neural tube defects, congenital diaphragmatic hernia.

## 8. IN MEMORIAM ION BACIU

*M Sabau*

### IN MEMORIAM ION BACIU

Professor Ion Baciu, one of the most prominent Romanian Physiologists, member of the Romanian Academy, distinguished personality of the medical scientific community, passed away.

I had the privilege to be his student, and then I had the honor to be among the few colleagues, members of the Romanian Society of Physiological Sciences, that he cherished and considered friends.

Sixty years ago, when the young doctor Ion Baciú graduated the Faculty of Medicine in Cluj and presented his PhD thesis “The role of the central nervous system in phagocytosis”, just a few were able to see the pathway opened by him.

This was the moment for the beginning of a long and brilliant educational and scientific career, confirming his outstanding value.

It is very difficult to describe in a few words the lifetime truth of a man who had an essential vocation of researcher and educator. More than 300 papers published in national and international journals, 60 reviews and major communications presented at meetings in Romania and abroad, numerous books and treaties, as well as several awards and prizes are proofs of his outstanding activity.

Oxygen homeostasis, macromolecules transport, the role of reticulín M, neuro-endocrine modulation of the immune response, were some of the research topics in which Professor Ion Baciú had an important scientific contribution.

In 1977, when an international working group for neuroimmune-modulation research was gathered, his entrance was considered natural, due to the fact he was a well-known scientist, recognized for his pioneering studies in this field.

He was member of the Romanian Academy of Medical Sciences, member of the Romanian Academy, president of the Medical Sciences Committee and president of the Cluj Branch of the Romanian Academy, vice-president and later, honorary president of the Romanian Society of Physiological Sciences. He was also member of prestigious international scientific societies and member in the scientific board of several journals.

Ion Baciú, the scientist, was doubled by an exceptional educator, always interested in the development of his students. Educated in the spirit of old University traditions, close to his great masters of medicine in Cluj, he became the young head of the Pathophysiology Department, and then of the Physiology Department. For his PhD students, he was a closed and loved teacher, working hard and passionate to form new generations of doctors with a modern thinking, and elite scientists with a true team spirit.

The medical school in Cluj owes a lot to Professor Ion Baciú, *Professor emeritus*, secretary of the Scientific Council and Dean, Vice-Rector and Rector of the Institute of Medicine and Pharmacy in Cluj, for all the efforts to develop the faculty in order to maintain its reputation and honor its predecessors.

Even though the last years brought to him lot of pain, he never lost his faith in his force to overcome all barriers and he continued his devoted activity. The initiator of a medical school, the man and the honor citizen of Cluj is no longer among us, but he will always remain in our memory. His words “Physiology is the fundamental science of life, but life is more than that” synthesize his lifetime belief.

Professor Marius Sabău  
President of the Romanian Society of Physiological Sciences

