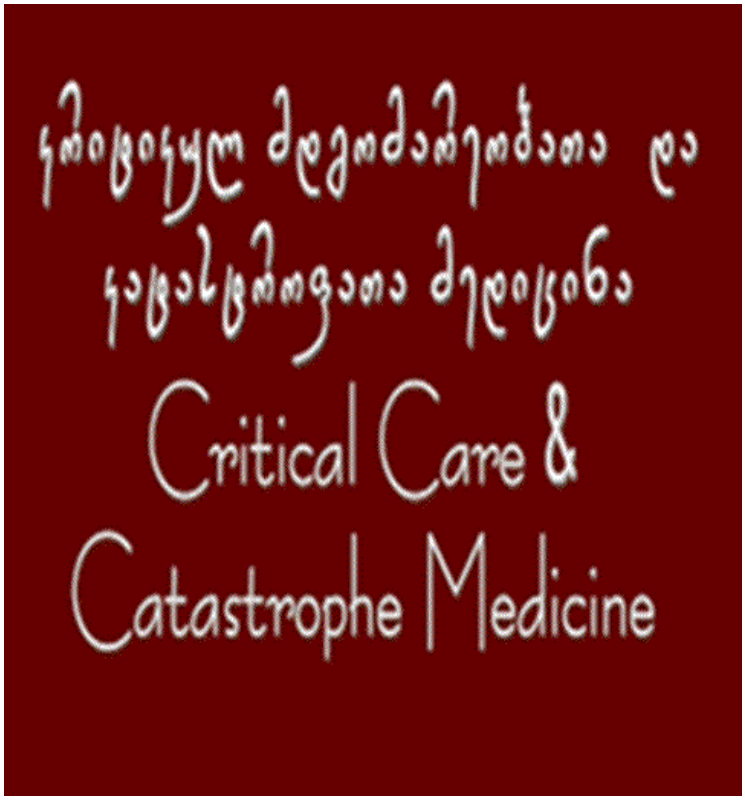
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OXITREL™ – A NEW GENERATION OF ANTIOXIDANTS IN CRITICAL CARE

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THEORY OF FREE RADICALS

Atomic nuclei are surrounded by electron orbits, which contain a maximum of two electrons, each having opposite spin. Hydrogen has one (1) outer orbit, but nitrogen, carbon and oxygen have four (4) outer orbits - with a capacity for eight (8) electrons. Atoms are most stable when they have filled orbits. Free radicals are highly reactive molecules or atoms that have an unpaired electron in outer orbits that is not contributing to molecular bonding. Atoms or small molecules that are free radicals tend to be the most unstable, because larger molecules can have the capacity to form resonance structures.

Antioxidants are often large molecules that accept an electron from a smaller free-radical. Molecules with even numbers of paired electrons are diamagnetic (slightly repelled by a magnet), in contrast to free radicals, which are paramagnetic (attracted by a magnet because of the spin of the odd electron).

Oxygen is two electrons short of a filled outer-shell octet. Molecular oxygen (O^2) is literally a free radical insofar as it contains two unpaired electrons in two separate orbits - but these so-called "triplet-state electrons" are not particularly reactive. Molecular oxygen can, however, be energized such that both electrons occupy a single orbital, resulting in singlet ($^1O_2$). Although singlet oxygen is not a free-radical, the electrons are in an excited state and can thus cause damaging reactions similar to those caused by oxygen free-radicals. The most effective singlet oxygen quenchers are carotenoids and phytochemicals, which plants protect them from singlet oxygen, produced by ultraviolet light. The most powerful carotenoid is Lycopene, which has 100-times the singlet-oxygen quenching action of Vitamin E, which has 125-times the quenching action of glutathione. But Lycopene and Vitamin E are only effective in lipid-containing areas, whereas glutathione can be found in the "watery" areas.

Free radicals can damage nucleic acids, proteins and lipids. For biological systems, oxygen free radicals are the most important, in particular superoxide **($O_2^{\cdot-}$)**, nitric oxide **(•NO)** and the hydroxyl radical **(•OH)**. Nitric oxide is a relatively un-reactive free-radical, which has a half-life of a few seconds, normally reacting quickly with oxygen **(O_2)**. But if nitric oxide encounters a superoxide **($O_2^{\cdot-}$)**, it forms peroxynitrite **($ONOO^-$)** which can decompose to form a hydroxyl radical **(•OH)**.

Peroxynitrite, like the hydroxyl radical, can react directly with proteins and other macromolecules to produce carbonyls (aldehydes & ketones) and lipid peroxidation. Although hydrogen peroxide **(H_2O_2)** and hypochlorite are not themselves free radicals, these oxygen-containing molecules can facilitate free-radical formation. All of these highly reactive oxygen-containing molecules (including singlet oxygen) are described as Reactive Oxygen Species **(ROS)**. ROS attacks bases in nucleic acids and amino acids side chains in proteins as well as double-bonds in unsaturated fatty acids. The strongest attacker is a hydroxyl radical. ROS attack of macromolecules is often called oxidative stress.

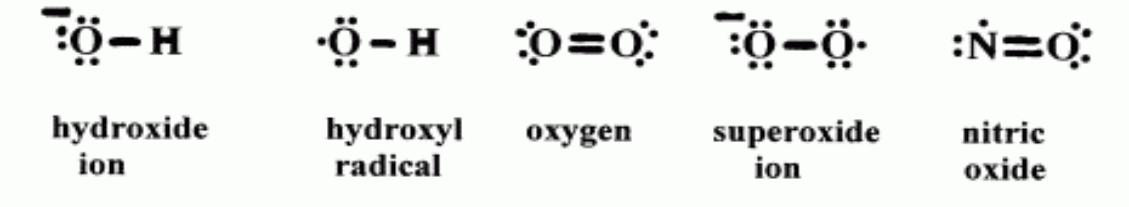
In neutral water solution about one per 10-7 water molecules will dissociate into two ions, a reaction that can be represented as:

H : O : H⟶ :OH- + H^+

However, a water molecule subjected to ionizing radiation might dissociate into two free radicals: (a) hydroxyl radical (b) hydrogen atom. The reaction can be represented as:

H : O : H⟶ . •OH + •H

A superoxide ion **(O2-)** would result from the addition of an electron to a normal oxygen molecule **(O2)**. A more complete Lewis structure of oxygen-containing free-radical molecules showing all outer shell electrons would be:



Superoxide **(O2.-)** ions are generated in large numbers in the mitochondria and are enzymatically converted to hydrogen peroxide (H2O2). The hydroxyl radical (.OH) is typically formed by oxidation of a reduced heavy metal ion (usually Fe++ or Cu+ ions) by the hydrogen peroxide:

Fe^{++} + H2O2⟶ Fe^{+++} + •OH + :OH-

The last reaction, known as the Fenton Reaction, may be the most dangerous because it can occur in the cell nucleus and lead to DNA damage. Bacteria are rich in iron that is why hydrogen peroxide from macrophages is such an effective bacterial killer. Wherever it is produced, the hydroxyl radical is highly reactive and can cause covalent cross-linking or free-radical propagation in a wide variety of biological molecules. A cell's superoxide ions tend to be concentrated in the mitochondria because they are too reactive to travel very far in an unaltered state - and much less frequently found in the nucleus than in the cytoplasm. Similarly, hydroxyl radicals (which have a billionth-of-a-second half-life) do not drift far from their site of formation. But hydrogen peroxide molecules are more stable and can drift across the nuclear membrane into the nucleus or near cell membranes where hydroxyl radicals can be generated when heavy metal ions are encountered. Hydrogen peroxide can damage proteins directly by the oxidation of -SH groups.

The hydroxyl radical can react with lipid molecules (LH) in membranes to produce lipid molecule radicals (**.L**):

$$\mathbf{. \bullet OH + LH \longrightarrow \ \bullet L + H_2O}$$

These lipid radicals can then react with oxygen in a self-propagating chain reaction forming lipid peroxides (molecules containing paired-oxygen groups --OO--):

$$\mathbf{\bullet L + O_2 \longrightarrow \ LOO\bullet}$$

$$\mathbf{LOO\bullet + LH \longrightarrow \ LOOH\bullet + \bullet L}$$

The lipid hydroperoxides (LOOH) can promote a Fenton reaction:

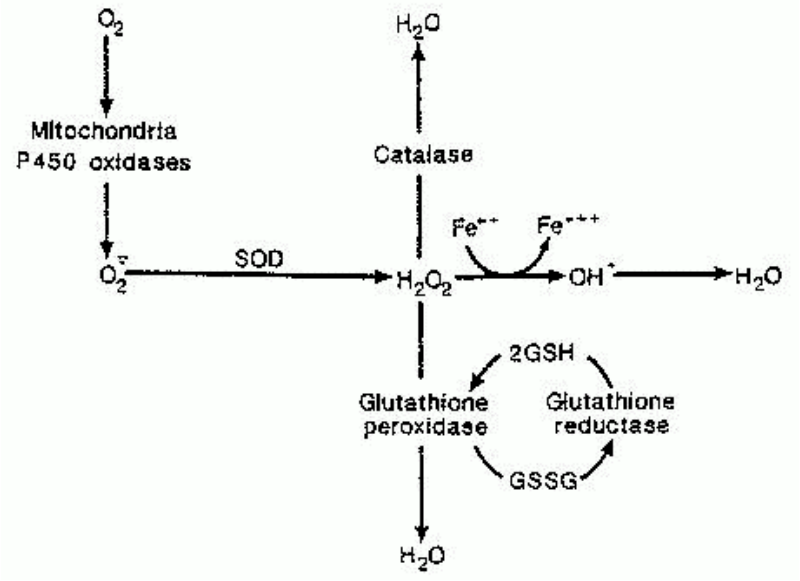
$$\mathbf{Fe^{++} + LOOH + H^{+} \longrightarrow \ Fe^{+++} + \bullet OL + H_2O}$$

The lipid peroxide radical (peroxy, LOO•) and the lipid alkoxyl radical (**•OL**) are both very reactive and damaging. If two lipid radical molecules collide they will nullify each other, but at the cost of creating a cross-link (covalent bond) between the two lipids.

Outside of the mitochondria, superoxide and hydrogen peroxide can be generated on the endoplasmic reticulum through oxidation processes involving cytochrome P-450 and NADPH-cytochrome C reductase. Abnormal accumulation of normal metabolites such as lactate, piruvate, acetoacetyl-CoA and glyceraldehyde-3-phosphate can abnormally increase levels of NADH oxidase and reduced flavoenzymes such as xanthine oxidase. In the absence of sufficient electron acceptor substrates these enzymes can directly transfer electrons to $\mathbf{O_2}$ or $\mathbf{Fe^{+++}}$ to form superoxide or $\mathbf{Fe^{++}}$. Ascorbate forms $\mathbf{H_2O_2}$ on autoxidation (direct combination with oxygen). Both ascorbate and mercaptans (thioalcohols, i.e, compounds having "-SH" groups, where sulfur is substituted for the oxygen of alcohol) are capable of reducing $\mathbf{Fe^{+++}}$ & $\mathbf{Cu^{++}}$ to $\mathbf{Fe^{++}}$ & $\mathbf{Cu^{+}}$, thereby promoting Fenton reactions.

Lipid peroxidation of polyunsaturated fatty acids exposed to oxygen leads to rancidity in foods. In living animal cells peroxidized membranes lose their permeability, becoming rigid, reactive and nonfunctional. Lipid peroxidation can produce singlet oxygen, hydroperoxides and lipid epoxides.

Polyunsaturated fatty acids are more vulnerable to free radical oxidation than any other macromolecules in the body - and the sensitivity to free radical damage increases exponentially with the number of double bonds. Studies of the liver lipids of mammals show an inverse relationship between maximum lifespan and number of double bonds.



Animal cells contain three important enzymes to deal with the superoxide and hydrogen peroxide: Superoxide Dismutase (SOD), Glutathione Peroxidase and Catalase (CAT):

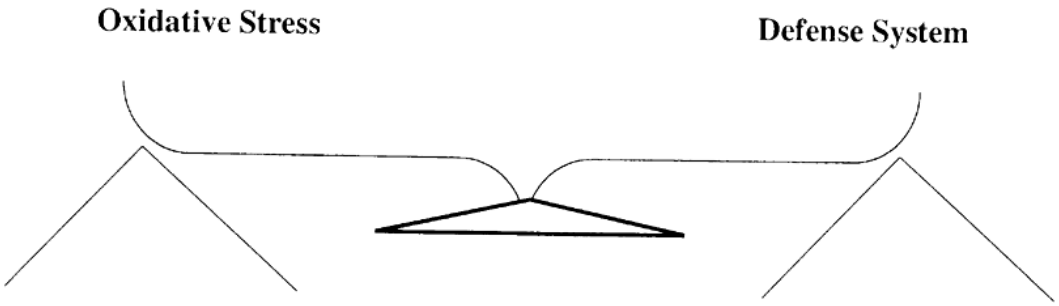
- Catalase catalyzes the formation of water and free oxygen from hydrogen peroxide. Catalase is present in membrane-limited organelles known as peroxisomes. Peroxisomes contain enzymes that degrade amino acids and fatty acids - producing hydrogen peroxide as a byproduct.
- Glutathione is a tripeptide composed of the amino acids cysteine, glycine and glutamic acid. Glutathione is the major antioxidant in the non-lipid portion of cells (most of the cytoplasm). Glutathione exists in a reduced form (GSH) and an oxidized form (GSSG). Glutathione peroxidase neutralizes hydrogen peroxide by taking hydrogens from two GSH molecules - resulting in two H_2O and one GSSG. The selenium-containing enzyme glutathione reductase then regenerates GSH from GSSG with NADPH as a source of hydrogen (which is probably why selenium has anti-cancer properties. The elimination of hydrogen peroxide by glutathione can be written as the reaction:

  $$\mathbf{2\ GSH + H_2O_2 \longrightarrow\ GSSG + 2\ H_2O}$$

- Superoxide Dismutase (SOD) is the most abundant anti-oxidant enzyme in animals. The liver, in particular, is very high in SOD. Cellular concentration of SOD relative to metabolic activity is a very good lifespan predictor of animal species. Most mammals experience a lifetime energy expenditure of 200,000 calories per gram, but humans have an amazing 800,000 calories per gram. Humans have the highest levels of SOD - relative to metabolic rate - of all species studied. Oxidative damage to DNA is ten times greater in rats than in humans. But in absolute terms maximum lifespan correlates negatively with antioxidant enzyme levels and correlates positively with lower rate of free-radical production and higher rate of DNA repair. The SOD molecule in the cytoplasm contains Copper and Zinc atoms (Cu/Zn-SOD), whereas the SOD in mitochondria contains Manganese (Mn-SOD). Superoxide Dismutase without glutathione peroxidase or Catalase (CAT) to remove hydrogen peroxide is of little value. Insects lack glutathione peroxidase, but experiments have been performed on fruit flies made transgenic by having extra genes for SOD, CAT or both.

In recent years there has been an increased interest in the application of antioxidants to medical treatment as information is constantly gathered linking the development of human diseases to oxidative stress. Generally accepted hypothesis is that in any biological system an important balance must be maintained between the formation of reactive oxygen and nitrogen species (ROS and RNS, respectively) and their removal. ROS and RNS are formed regularly as a result of normal organ functions, or as a result of excess oxidative stress. The reactive species superoxide ($\mathbf{O^{2-}}$), hydrogen peroxide ($\mathbf{H_2O_2}$), hydroxyl radical (**HO•**), nitrogen oxide (**NO•**), peroxynitrite (**ONOO-**) and hypochlorous acid (**HOCl**), are all products of normal metabolic pathways of the human organs, but

under certain conditions, when in excess they can exert an harmful compounds. Superoxide, the most important source of initiating radicals in vivo is produced in mitochondria during electron chain transfer and it regularly leaks outside of the mitochondria. To maintain an oxido/redox balance, organs protect themselves from the toxicity of excess ROS/RNS in different ways, including the use of endogenous and exogenous antioxidants.



Endogenous sources of ROS/RNS	Exogenous sources of ROS/RNS	Enzymatic	Nonenzymatic
Mitochondria	Radiation	Superoxide dismutase (SOD).	Vitamin E
Peroxisomes	Ozone	Catalase (CAT)	Vitamin C
Inflammatory cells	Xenobiotics	Glutathione peroxidase	Glutathione
		Paraoxonase (PON)	Flavonoids

RADICAL PARTICIPATION IN DESEASE FORMATION

Some free radicals are beneficial in the body, such as nitric oxide, which acts as a neurotransmitter when the immune system is functioning properly. Unfortunately, the excessive production of nitric oxide can also be blamed for throwing the brain-immune systems off kilter and causing some of the brain's worst free radical damage. Over the past decade, scientists have shown that the production of nitric oxide through a combination of immune and nervous system activity - often sparked by an infection, exposure to a toxin, or as part of the aging process - plays a key role in the development of neurological diseases.

Immune System: When the body fights off an infection, the immune system's cytokines activating, causing white blood cells mobilization. The more white blood cells activates, the more free radicals they produce, like pellets of poison, that go to work to destroy invaders by breaking down the genetic material of bacteria, toxins, and viruses.

When functioning properly, the immune system is capable of identifying foreign invaders such as viruses and bacteria and our immune components do not turn against our own body's cells. Unfortunately, however, free radicals can interfere with the biological components of our healthy cells in the same way they destroy invaders, literally dismantling the body's essential cellular proteins, fatty cell membranes, and DNA.

Neurological Diseases: The most important natural defenses we have against free radical damage are our body's natural "antioxidants," a broad range of chemical substances that all have one thing in common: they ward off free radical damage to cells. However, in many neurological diseases -

including Parkinson's, Alzheimer's, Chronic Fatigue Syndrome, and Multiple Sclerosis - the brain's specialized antioxidant mechanisms fail. The cause of the failure might be genetic, environmental, or even dietary, but the consequences are the same - unchecked free radical activity on the brain.

Cardiovascular System Dysfunctions: Free radicals are involved in the progression of heart disease in several different ways. Heart disease begins with the oxidation of LDL (low-density lipoproteins), which leads to the formation of plaque in the arteries. If an artery becomes clogged with plaque, the result can be a heart attack or a stroke. Much of the damage that occurs in both heart attacks and strokes is caused by reperfusion injury - the burst of superoxide free radicals that flow in as the blood flow resumes.

Scientific studies have established another way in which free radicals can promote atherosclerosis, and how one free radical in particular (nitric oxide) may play a central role. Nitric oxide is essential for normal blood circulation as it controls the muscular tone of blood vessels and regulates circulation and blood flow. But excessive amounts of nitric oxide can be very destructive as it can restrict blood flow and promote production of more free radicals, contributing to heart disease and stroke. Thus, in order to have good circulatory health, the body must maintain the right balance of nitric oxide—and that's the role of the antioxidants and their boosters.

Chronic Inflammation: Inflammation is caused by the overproduction of free radicals in a specific area of the body. The inflammatory response is a factor in arthritis, an umbrella term for more than 100 different diseases that produce either inflammation of the connective tissue (joints and tendons) or degeneration of the articular cartilage. When joints become arthritic, they become inflamed and enlarged, interfering with the normal flow of blood. For example, bending an arthritic knee restricts blood flow to the area.

The proliferation of free radicals causes a one-two punch as the area to become even more inflamed, contributing to the degeneration of the joint, which becomes more swollen and worn down.

nanotechnological approach in new generation of antioxidants

Antioxidants: An antioxidant refers to a substance that prevents or retards the oxidation of sensitive molecules found in the body or in foods. Antioxidants occur in many foods as nutrients or non-nutrients, or as synthetic additives. Antioxidants help prevent widespread cellular destruction by willingly donating components to stabilize free radicals. More importantly, antioxidants return to the surface of the cell to stabilize rather than damage other cellular components.

Antioxidants typically block oxidation by preventing damage caused by free radicals, extremely reactive forms of oxygen and other molecules that lack an electron and tear electrons from molecules they meet. In the body likely targets include DNA, proteins, and lipids (unsaturated fatty acids).

Nanotechnology: BIONOVA, Inc., a New York based biotechnological company is the pioneer in Medical Nanotechnology, has created methods to activate self-healing processes that naturally exist in the body, in essence jump-starting self-healing by supplying the body with multiple biological active ingredients needed for repairing malfunction. The bioactive ingredients are delivered to the targeted place in 'Nano' quantities (one billionth of a gram) molecules to effectively absorb.

The ingredients in the BIONOVA products are called Nano-Complexes™, and are replicas of bioactive ingredients existing in the human body that are vital for reestablishing cellular communication. These Nano-Complexes™ are 100% indigenous

to the human body and can therefore be easily absorbed and metabolized. Usually, Nano-Complexes™ are delivered into the cells with BIONOVA's NuCell-Direct™ delivery system, the most powerful delivery system, which is a trademarked imitation of a human cell membrane.

Antioxidant NANO-COMPLEX™: BIONOVA's Antioxidant NANO-COMPLEX™ is represents a new generation of health care products developed on the bases of BIONOVA's proprietary technology oriented to activate self-healing processes that naturally exists in the living organism. This technology (Opti-Path™) is based on the correction of biological information transfer in organisms where various metabolic disruptions have occurred.

OXITREL™ represents a new technology that markedly increases efficiency of the functional ingredients on a cellular level because all the ingredients act simultaneously. This technology allows the combination of various types of water-soluble and oil-soluble antioxidants to act synergistically in a single complex.

BIONOVA's Antioxidant NANO-COMPLEX™ composed from active substances, which are absolutely indigenous to the human organism and are essential for normal cell metabolism to support natural defense mechanisms against the adverse effects of free radicals. It is a complex of biologically active substances functioning synergistically and composed of multiple substances:

a) NANO-COMPLEX™ OF ANTI-FREE RADICAL SCAVENGERS PERFORMING ON:

- Extra-Cellular Level - first level of defense
- Cellular Level - second line of defense

b) NANO-COMPLEX™ OF ANTIOXIDANTS:

- Specific Bioflavonoids
- Peptide Antioxidants
- Caratenoids
- Trace Elements

c) NANO-COMPLEX™ OF NUCLEOSIDES

d) INTEGRATED SYSTEM: IMITATION OF NuCell Direct™ DELIVERY SYSTEM

- Substances in OXITREL™ integrated into an imitation of BIONOVA's proprietary NuCell-Direct™ Delivery System. The composition and structure of the NuCell-Direct™ approximates the structure of a natural cell membrane. The NuCell-Direct™ is composed of highly specialized proteins, carbohydrates, and lipids; the very same ones that comprise the human cell membrane. The NuCell-Direct™ is capable of delivering both, water-soluble as well as oil-soluble actives.

OXITREL™ IN CRITICAL CARE PATIENTS

Numerous scientific studies have concluded that by consuming antioxidants, the incidence of diseases associated with the consequences of Free Radical oxidization can be reduced. This does not mean that these diseases can be cured, treated or prevented. Rather, it means that people who consumed significant levels of antioxidants had lower incidences of the following diseases: Prostate Cancer, Skin Cancer, Colon/Rectal Cancer, Heart Disease, Congestive Heart Failure, Stroke, Alcohol Induced Apoptosis or (literally, cell death common in alcoholics), Advanced Macular Degeneration (AMD), Multiple Dysfunctions, like Chronic Stress.

Oxitrel™ antioxidant complex is capable to improve metabolism in critical conditions, fights against oxidative stress, alleviates symptoms of chronic dysfunctions, boost immune system, and enhance self-healing processes.

Oxitrel™ is rapidly absorbed and quickly distributed throughout the body. Oxitrel™ protective effects are multiplied in the body - while it provides its own, powerful antioxidant protection, it also supports the dynamic interplay between other antioxidants in the body. Oxitrel™ ability to "recycle," or regenerate body's natural antioxidants after they have quenched free radicals vastly extends their unique powers, helping the body to maintain its synergistic antioxidant balance. It reduces the potential for free radical damage and the ravages of aging and permits reactivity with both positively and negatively charged free radical species. Highly reactive as an antioxidant in both lipid and aqueous phases, Oxitrel™ neutralizes oxygen free radicals and is a valuable protector of healthy cells in a variety of internal conditions. Oxitrel™ helps to modulate the effects of nitric oxide, an important free radical produced by the body. Some nitric oxide is essential for the body, but too much can damage and even kill the cells. Oxitrel™ can help to maintain the optimal level of this free radical by helping the body produce adequate levels and neutralize nitric oxide where it does harm. Oxitrel™ can quench superoxide and the hydroxyl radical. This is extremely important. Of all the free radicals formed in the body, the hydroxyl radical is the most dangerous because it can directly attack DNA.

Clinical Data: Georgian Critical Care Medical Institute and Clinic of Anesthesiology, Critical Care & Dizaster Medicine of Tbilisi State Medical University already has some non-extensive experience in using of Oxitrel™ in different cases of critical care patients. The product was given by double blind method in two randomizer groups of patients:

- Main Group is composed of 14 patients in various critical conditions: four patients with Poli-Trauma Shock; four patient with Hemorrhagic Stroke three patients with Sepses; and three patients Post-Resuscitation Condition.
- The control group was composed of 12 patients in critical condition, treated by Vit "E" (2,0 ml three times a day during 5-30 days) and vit "C" (5 ml three times a day during 5-30 days).

Oxitrel™ had been provided to patients by nazo-gastral tube – one (1) capsule three times a day during 5 - 30 days.

During the treatment with Oxitrel™ no side effects has been registered.

In the main group patients in the critical condition became softer, and recovery time was faster than in control group The lethality in main group (treated with Oxitrel™) was reduced to 21% against the control group (35,7%).

It also important to emphasize that expensive treatment cost of patients in critical condition in main group has been reduced in control group.

Oxitrel™ acts as very potent antioxidant and a free radical scavenger complex with non-specific to a critical condition protection against harmful effects of oxidative stress. It is effective against multiple dysfunctions of the organism, where a non-specific adaptation mechanism becomes involved as a primary survival mechanism for patients in critical condition.

The preliminary data of Oxitrel™ demonstrates its helpfulness in patients in various critical conditions and requires further clinical study.

SUMMARY

At the present time Antioxidants became an integral part of many medical treatments, especially in cardiovascular diseases, cancer, critical conditions, age-associated disorders etc. In this regards it is important to understand correctly damaging mechanisms of free radicals and preventive ways.

In this article we would like to discuss free radicals connection with multiple disease formation, as well as a completely new nanotechnological approach developed by BIONOVA, Inc. scientists.

OXITRELTM antioxidant complex represents a new generation of health care products developed on the bases of BIONOVA's proprietary technology oriented to activate self-healing processes that naturally exist in living organisms. All ingredients in OXITRELTM act simultaneously to increase anti-oxidative effects. OXITRELTM is composed of active substances, which are indigenous to the human organism and are essential for normal cell metabolism.

Georgian Critical Care Medical Institute and Clinic of Anesthesiology, Critical Care & Dizaster Medicine of Tbilisi State Medical University already has some non-extensive experience in using of Oxitrel™ in different cases of critical care patients. The product was given by double blind method in two randomizer groups of patients:

- Main Group is composed of 14 patients in various critical conditions: four patients with Poli-Trauma Shock; four patient with Hemorrhagic Stroke three patients with Sepses; and three patients Post-Resuscitation Condition.
- The control group was composed of 14 patients in critical condition, "treated" by Placebo

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It also important to emphasize that expensive treatment cost of patients in critical condition in main group has been reduced in control group.

რეზიუმე

თავისუფალი რადიკალები – სუპეროქსიდი (O_2^-), აზოტის ოქსიდი (• NO), ჰიდროქსილის რადიკალი (• OH) და სხვები წარმოიქმნებიან ატომის მიერ ბირთვის ირგვლივ ორბიტებზე მბრუნავი ელექტრონების დაკარგვისას. ისინი ფრიად არასტაბილური ნაერთებია. ამასთან სიცოცხლისთვის აუცილებელ კომპონენტებს წარმოადგენენ. ხშირ შემთხვევაში მათი მეშვეობით ხდება გენეტიკურად უცხო სუბსტრატების – ბაქტერიების, ვირუსების და სოკოების განადგურება, ნეიროტრანსმისიული ფუნქციების განხორციელება, სისხლძარღვთა ტონუსის შენარჩუნება, აპოპტოზის პროცესების წარმართვა და სხვა. საკმაოდ ხშირად ისინი აგრესიულნი ხდებიან ორგანიზმის მიმართ და იწვევენ საკუთარი უჯრედებისა და ქსოვილების სუბსტრატების დაშლას. ამასთან მათ შეუძლიათ გამოიწვიონ ცილების, ლიპიდების, დნმ-ის და სხვა მაკრომოლეკულების სტრუქტურების რღვევა და ა.შ. ამგვარი მექანიზმებით თავისუფალი რადიკალები ხელს უწყობენ მრავალი მწვავე თუ ქრონიკული დაავადებისა და პათოლოგიური მდგომარეობის ჩამოყალიბებას (ათეროსკლეროზი, გულის იშემიური დაავადება, ართრიტები, გაფანტული სკლეროზი, პარკინსონის დაავადება, ალცჰეიმერის დაავდება, ქრონიკული დაღლილობის სინდრომი და სხვა). ამ თვალსაზრისით დიდია თავისუფალი რადიკალების როლი კრიტიკულ მდგომარეობათა დროს აღმოცენებულ პოლიორგანული უკმარისობის სურათის და სხვა გართულებების ჩამოყალიბებაში, რომელთა მკურნალობისთვის გარკვეული ეფექტურობით იყენებენ სხვადასხვა სახის ანტიოქსიდანტებს. "ბიონოვას" მიერ მოწოდებულია ახალი თაობის ანტიოქსიდანტი "ოქსიტრილი™", რომლის კონსტრუირების საფუძველი ნანოტექნოლოგიური პროცესებია. ოქსიტრილი™ შეიცავს თავისუფალი რადიკალების პათოლოგიური ეფექტის გამანეიტრალებელ ექსტრაცელულურ და ინტრაცელულურ კომპონენტებს. აგრეთვე ანტიოქსიდანტურ ნანო-კომპლექსს™, ნუკლეოზიდურ ნანო-კომპლექსს™ და NuCell-Direct გადამტან სისტემას. ეს უკანასკნელი უჯრედის მემბრანის იდენტურია და მის ერთგვარ იმიტაციას წარმოადგენს.

ოქსიტრილის™ ეფექტურობა შემოწმებული იყო სხვადასხვა გენეზის კრიტიკულ მდგომარეობაში მყოფ ავადმყოფთა რანდომიზირებულ ჯგუფებში ორმაგი ბრმა მეთოდით. ავადმყოფები მკურნალობას გადიოდნენ კრიტიკული მედიცინის ინსტიტუტსა და სახელმწიფო სამედიცინო უნივერსიტეტის ანესთეზიოლოგიის, კრიტიკულ მდგომარეობათა და კატასტროფათა მედიცინის კლინიკაში; ძირითად ჯგუფში შედიოდა 14 ავადმყოფი, მათ ჩაუტარდათ 5-30 დღიანი მკურნალობა ოქსიტრილით™ საკონტროლო ჯგუფის სხვა 14 ავადმყოფი ღებულობდა პლაცებოს. კვლევისას ოქსიტრილის™ უარყოფითი მოქმედების შედეგები არ გამოვლენილა. ძირითად ჯგუფში კრიტიკული

მდგომარეობა შედარებით უფრო ხანმოკლედ მიმდინარეობდა და მკურნალობის ხარჯებიც უფრო იაფი იყო ვიდრე საკონტროლო ჯგუფში. ლეტალობა ძირითად ჯგუფში იყო 28,5%, ხოლო საკონტროლოში 35,7%. აღნიშნული შედეგები მიუთითებენ კრიტიკულ მედიცინაში ახალი თაობის ანტიოქსიდანტების გამოყენების პერსპექტიულობას და ამ მიმართულებით შემდგომი კვლევის გაგრძელების აუცილებლობას.