

## Free Radicals, Oxidative Stress And Antioxidant Systems

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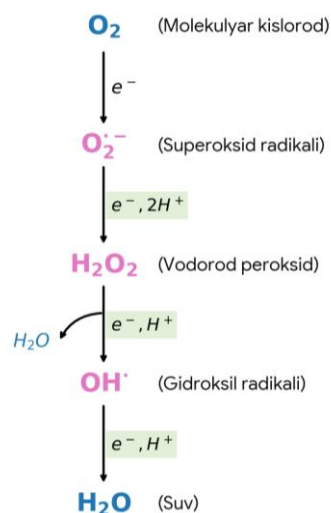
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Article History	Abstract
Received: 20 <sup>th</sup> April, 2026  Accepted: 14 <sup>th</sup> May, 2026	Free radicals and of oxygen reactive forms ( KRS <sub>h</sub> ) and nitrogen reactive forms ( ARS ) aerobic in organisms mitochondrial breath to take , enzymatic processes , immune system protection reactions and exogenous environmental stressors of the impact natural product as permanent accordingly harvest become The outer atom or molecular in orbitals one or one how many unpaired electrons existence with characterized this substances short biological half decay to the period and extreme high chemical to activity As a result , they cell vital important macromolecules , including lipids , proteins , carbohydrates and nuclein acids with dynamic accordingly mutual to the effect enters [1.2]. Physiological normative in concentrations free radicals cell signal transduction within genes expression , veins tone management and immune protection coordinator important homeostatic regulators task However , this prooxidants too much outside many working release , endogenous antioxidant systems shortage or end with together when it is over , it leads to oxidative stress take It comes . This is cancer , dermatitis , cataracts , stroke and asthma such as to diseases take comes [3.4].
<b>Keywords:</b>	

**Free radicals types** . Oxygen many metabolic in reactions , especially energy separated output These processes are required for during molecular O<sub>2</sub>

complete will be returned and to the water However , if  $O_2$  return complete if not , one row reactive radicals harvest will be [Figure-1].



**Picture-1.** Kislpod's free radicals harvest to be and his/her types .

From the above except ( $O_2^{\bullet -}$ ,  $H_2O_2$ ,  $OH^{\bullet}$ ), biological importance has other free radicals and reactive oxygen species include singlet oxygen ( $^1O_2$ ), hydroperoxy radical ( $HOO^{\bullet}$ ), lipid peroxide radical ( $ROO^{\bullet}$ ), nitrogen oxide ( $NO^{\bullet}$ ) and peroxynitrite ( $ONOO^{\bullet}$ ) . Free radicals general characteristic Features : 1. High reactive 2. Very short half decay Period 3. Chain reaction through new radicals harvest to do possible 4. Biomolecules , cells and to the tissues damage delivers .

**Endogenous reagent of forms systematic classification .** Human organism permanent accordingly oxygen and nitrogen one how many reactive forms working releases , their every one to oneself typical chemical characteristics , biological half decay to the period and in the cell target molecules has .

Superoxide anion ( $O_2^{\bullet -}$ )	Molecular $O_2$ one electronic reduction ; NADPH oxidase , xanthine oxidase , SOG and LOG . Produced in the mitochondrial ETZ will be .	SOD enzyme It is converted to $H_2O_2$ through .
Hydroxyl radical ( $OH^{\bullet}$ )	Via Fenton reaction ( $Fe^{2+} + H_2O_2$ ) or Haber-Weiss reaction ( $O_2^{\bullet -} + H_2O_2$ ) harvest will be .	Without choosing , extremely high activity . Membrane content unsaturated fatty acids attack makes proteins

		oxidizes the DNA chain extends .
Peroxyl radical (ROO• / HOO•)	Peroxyl radicals (ROO• and HOO• — hydroperoxyl radical ( basically ) organic of compounds free radical in the process of oxidation ( autooxidation ) carbon radical molecular oxygen with very fast as a result of the addition ( reaction ) harvest will be	Cell membranes along lipids peroxide oxidation chain extends ; mutGOMn and tumor growth their ways stimulates .
Hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> )	By SOD catalyzed superoxide dismutation or directly peroxisomal fatty acids oxidases through synthesized .	Stable radical not been compound ; membranes through free diffuses . Variable valent in the presence of metals (Fe <sup>2+</sup> , Cu <sup>+</sup> , Mn <sup>2+</sup> ) gives secondary OH• .
Nitrite oxide (NO•)	Nitrate oxide synthase ( nNOS , eNOS , iNOS ) enzymes using L- arginine from amino acid synthesized .	In the water and in lipids high soluble gas. Guanylate cyclase and protein kinases through blood veins smooth muscles tone manages .
Peroxynitrite (ONOO-)	Between O <sub>2</sub> •- and NO• rapid diffusion with controllable radical-radical merger reaction as a result .	In lipid solubility and chemical activity hypochlorite similar to acid ( HClO ) . Decomposes and becomes very toxic nitrosoperoxo-carboxylates harvest does .

**Radical instability** . Aerobic of life continue fundamental biological paradox presented becomes : molecular oxygen (O<sub>2</sub>) in mitochondria oxidative phosphorylation ATF is effective through harvest to be for final electronic acceptor as absolutely necessary although oxygen high partial pressure or

intermediate returned cases cells for extreme is toxic . This cellular damage from oxygen harvest was free radicals and they with related chemical in terms of unstable reactive compounds because of to the surface comes . Precise biochemical to the definition according to , free radical is his/her own external atom or molecular in orbitals one or from it more than unpaired to electrons has was and independent there is to be to the ability atomic , molecular particle or molecule Odd , unpaired electron existence orbitals unstable status brought This situation electrons balance restoration for radical neighbor neutral from molecules electron pull to take ( oxidize ) or to them electronic to give forced does .

**Free radicals of oxygen reactive Distinguishing from (KRSH) forms .** Scientific in literature free radical and of oxygen reactive forms (KRSH) terms often synonym as wrong Although they are used between the difference biochemical in terms of clear designation necessary :

**Real free radicals :** In their valence orbitals of course one or from it more than unpaired to the electron has to be condition . Biological importance has was main representatives : superoxide anion radical ( $O_2^{\bullet-}$ ), hydroxyl radical ( $OH^{\bullet}$ ) and lipid peroxidn radical ( $ROO^{\bullet}$ ).

**Non- radical reactive compounds :** In valence orbitals unpaired electrons not , a little stable , but oxidation in the processes and of tissues in modification active participation enough strong chemical are oxidizers . Prominent biological examples : hydrogen peroxide ( $H_2O_2$ ) and singlet oxygen ( $^1O_2$ ). Thus so , KRSH ( intracellular of oxygen reactive forms ) biological in systems real oxygen free radicals , and their high reactive radical not been also have their own analogues inside recipient wide comprehensive chemical is a concept . in parallel with , nitrogen reactive forms ( ARSh ) also included nitrogen keeper reactive prooxidants important class is calculated , its main representatives nitrogen monoxide ( nitrate oxide ,  $NO^{\bullet}$ ) and extreme shredder peroxy nitrite is an anion ( $ONOO^-$ ).

**Free radicals chained reactions kinetics .** Free radicals with the participation of chemical processes consecutively and self provider three kinetic in stages develops :

**1. Initiation ( beginning ):** Neutral from the molecule free radical harvest This process often covalent of the garden homolytic rupture on account of happened This is a crack . metabolic energy , ultraviolet (UV) rays , thermal stress or

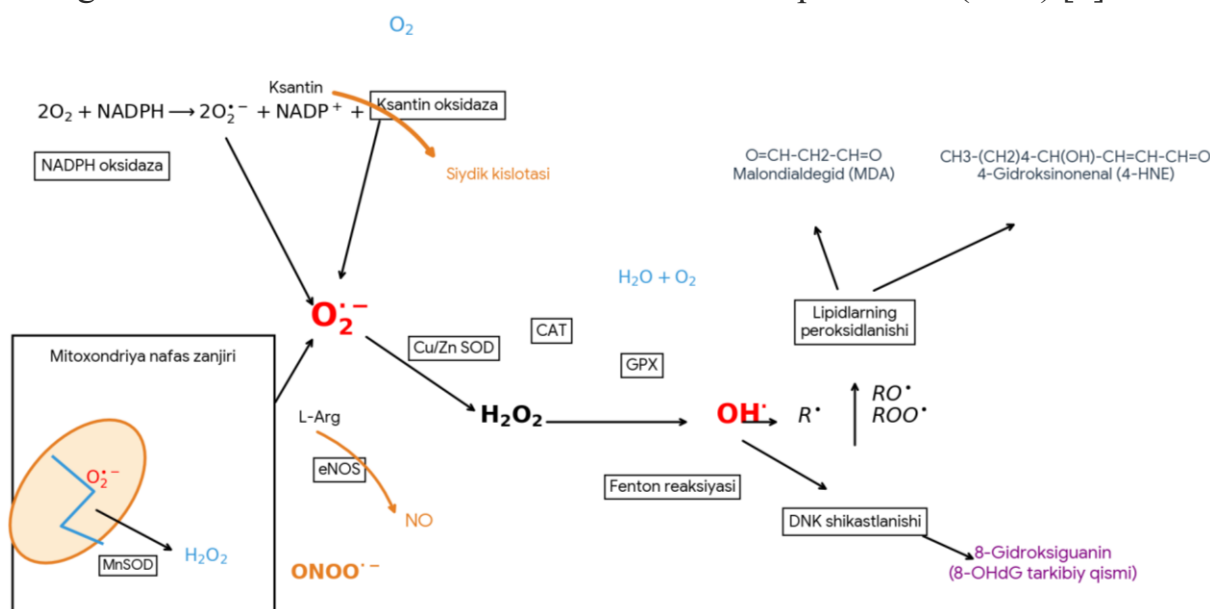
specialized initiator molecules under the influence to the surface come , general electronic couple two active radical intermediate compounds separates .

2. **Propagation ( chain) elongation )** : High reactive radical neighbor stable to the molecule attack to do cascade or chained reaction . This process unpaired electronic status to the effect encountered to the structure conducts and him/her new , secondary free to the radical converts , resulting in molecular decomposition chain continuous continue will reach .

3. **Termination ( of the chain) interruption )**: Two types radical intermediate of compounds collision and their unpaired of electrons mutual connection as a result happened to be final stage become , stable , radical not been covalent chemical bond formation does .

### MECHANISMS OF FREE RADICAL FORMATION.

Free radicals different kind mechanisms , both endogenous and exogenous mechanisms through harvest will be and this processes understanding their health and in diseases role determination for very important [ **Figure-2** ]. These mechanisms KRSh and THE KING harvest doer one row biochemical reactions and environment mutual effects own inside Free radicals from the main endogenous sources one mitochondrial electron transport chain (ETC) [5].



**Figure 2.** Free radical sources and their impact about information [6]

Cell breath to take in the process electrons internal mitochondrial membrane one row complexes through will be held and as a result oxygen to the water However , this process complete effective not ; a small fraction of electrons from the

deadline before flowing departure and molecular oxygen with to react superoxide radicals ( $O_2^{\bullet-}$ ) are formed to do This is possible . to be usually in complexes I and III of the ETZ happened Superoxide radical SOD enzyme conversion to  $H_2O_2$  by possible [7].  $H_2O_2$ , free radical himself/herself although not , like iron and copper transition metals Fenton reactions in the presence of through high reactive hydroxyl radicals ( $\bullet OH$ ) are formed to do This is possible . reactions series normal cells breath to take by chance oxidizing to stress how contribution add emphasizes .

Another one important endogenous mechanism different oxidase enzymes activity . For example , neutrophils and macrophages such as phagocytic cells in membranes there is NADPH oxidase immune in response important role When activated , NADPH oxidase electrons from NADPH to oxygen conducts and superoxide radicals harvest [ 8] This breath to take explosion pathogens no to do for very important . Just like that's right , purine in metabolism participation enzyme that can xanthine oxidase , especially oxidative stress or of tissues injury under the circumstances additional products as superoxide and hydrogen peroxide harvest to do possible [9].

Nitrogen oxide synthase (NOS) enzyme reactive nitrogen type was nitrogen oxide ( $NO\bullet$  ) working release for is responsible for the NOS. three isoform available : neuronal ( nNOS ), endothelial ( eNOS ) and inducible NOS ( iNOS ). These enzymes catalyze the conversion of L- arginine to L- citrulline . rotation catalyzes and  $NO\bullet$  in the process [ 10]. Nitrogen oxide different physiological functions performs , including vasodilation and neurotransmission [11]. However , pathological in cases excess  $NO\bullet$  superoxide with to react enters , forming ONOO – to do it is possible , this strong oxidizing is , in proteins tyrosine the remains nitration and lipids and To DNA damage to deliver possible [12].

Lipid peroxidation free radicals to the formation contribution adding again is an endogenous pathway . It is hydrogen atom free radical by many unsaturated from fatty acid separate from taking begins and form a lipid radical ( $L\bullet$ ) [ 9 ]. This lipid radical molecular oxygen with to react entering , lipid peroxy form the radical ( $LOO\bullet$ ) does this and neighbor from lipids hydrogen atoms separate to take through chain reaction increase it is possible , this and more lipid radicals and peroxide radicals appearance to be take [ 13 ]. Lipid peroxidation products such as malondialdehyde (MDA) and 4-hydroxynonenal (4-HNE) last products themselves reactive is an oxidizing agent the damage further increase possible [14].

Exogenous The sources are also free. radicals appearance to be noticeable at the level contribution Addictive . From the sun . coming ultraviolet (UV) radiation cell molecules straight away ionization take arrival it is possible , this and free radicals appearance to be take UV radiation skin cells incitement possible , resulting in singlet oxygen ( $^1O_2$ ) and superoxide radicals such as KRS<sub>h</sub> harvest [15]. X -ray and gamma rays such as ionizer radiation from atoms tight connected electrons take throw for enough to energy yes , this and ions and free radicals harvest This is high . energetic particles chemical connections straight away cut off , KRS<sub>h</sub> harvest to do it is possible , this and of cells wide to injury take comes [16].

Environment pollutant substances and toxins free radicals noticeable exogenous sources For example , cigarettes smoke in the composition free radicals and prooxidants complicated mixture available . Cigarette smoke resin in phase far life seeing radicals , gas in phase and nitrogen oxide and superoxide such as short life seeing radicals These radicals are to the tissues spread , lipid peroxidation chained reactions and other oxidizing processes to start possible [17]. Just as so , lead , cadmium and mercury such as heavy to metals impact to do To Fenton similar reactions through KRS<sub>h</sub> working to release catalysis or cell antioxidants reduce through oxidation-reduction balance to break possible [18].

#### **DISEASES RELATED TO FREE RADICALS.**

Free radicals , various physiological in processes important to the roles despite their level right order when not installed serious damage to deliver possible [19]. Free radicals working release and organism antioxidant protection between imbalance oxidizing to stress take it comes , this and many of diseases pathogenesis participation It will be too much . free radicals lipids , proteins and like DNA cell structural into parts damage to deliver it is possible , this and heart and blood vein diseases , neurodegenerative diseases , cancer and inflammation diseases such as chronic to the circumstances take [20] On the contrary , free radical activity enough not being immunity reaction weakening and cell alarm to break possible [21].

**Heart- blood vein diseases :** Free radicals in arterial blood of the veins subendothelial on the floor around low- density pedestrian oxidizes lipoproteins (ZPLP) [22]. Oxidized ZPLP molecules endothelial cells damage , macrophages migration and foamy cells harvest to be stimulates , this and atherosclerosis and of the heart ischemic disease brought releases .

**Atherosclerosis.** Atherosclerosis is arterial blood veins on the walls cholesterol chips accumulation with described chronic inflammation disease . This process endothelial from dysfunction begins , this atherosclerosis pathogenesis important is [23]. Blood of the veins internal wall was endothelium vasodilation , blood flow and platelets aggregation order to plant through blood vein homeostasis in storage important role [24] . Endothelial cells nitrogen oxide (NO• ) working releases , this free radical is a vasodilator task will do and platelets aggregation and adhesion prevent takes [25].

**Myocardium infarction .** Myocardium myocardial infarction (MI), usually heart known as a heart attack muscle one to the part blood flow when stopped to the surface it comes , this and ischemia and of tissues to injury take Oxidative stress in the pathogenesis of MI and from it next blood flow when restored to the surface coming reperfusion in the event of injury solution doer role plays [26]. Ischemia during oxygen and feed of the substances shortage ATF to decrease and metabolic waste of products to gather take it comes , this and heart cells for very stressful environment creates . Reperfusion during of oxygen suddenly enter arrival KRSh working of release sharp to increase take comes and cell damage Reperfusion injury known as this event cell structural parts oxidation , mitochondrial dysfunction and inflammation of the roads activation own inside [ 27 ]. Reperfusion injury oxidizing stress increase with described , this and cardiomyocytes , endothelial cells and from the cell outside to the matrix damage [ 28]. Reperfusion during KRSh's too much outside many working release mitochondrial membrane conductivity to increase take arrival it is possible , this and mitochondrial swelling , membrane potential the disappearance and cell to death take comes [29].

**Sugary diabetes :** Sugary diabetes is insulin resistance in the output defects , insulin effects or both as a result come outgoing chronic hyperglycemia with described complicated metabolic disease . This condition different organs and to systems noticeable at the level impact doer wide extensive to complications take This is coming . complications main from factors one oxidative stress , which is mainly KRSh and ARREST such as free radicals by Hyperglycemia and between oxidative stress mutual impact diabetic complications pathogenesis , including neuropathy , nephropathy , retinopathy and heart and blood vein to diseases take [ 30 ]. Hyperglycemia brought releasing oxidative stress glucose level increase because of KRSh of too much outside many working release with begins . Glucose to autooxidation occurs that is aldose reductase enzyme using to sorbitol

In this reaction KRSh those neutralization for necessary NADPHs are consumed goes . As a result KRSh additional products as working It produces . From this outside , above glucose level reducing carbohydrates and cell proteins , lipids or nuclein acids between fermentative not been reaction through developed glycosylation last products (GOM ) harvest to be increases . GOMs , their in turn , metal catalyzed oxidation reactions such as different mechanisms through KRSh harvest Oxidizing agent stress this cascade cell dysfunction and to injury take arrival it is possible , this and different tissues and to the organs noticeable impact shows [31].

**Radiation brought releasing lungs Early pneumonitis** and from it then fibrosis often lungs and esophagus cancer for side effects of radiotherapy as to the surface [ 32 ]. Cells radiation to the effect when encountered ,  $H_2O$  homolytic decomposition direct  $\bullet OH$  formation then it makes macromolecules oxidizes and inflammation reaction it provokes , this and inflammation of cells to the lungs infiltration ( pneumonitis ) and cells to death take comes . Farther time during cytokines continuous working release aberrant redox for alarm collagen and lungs fibrosis to gather take comes . From this except in rats radiation brought releasing lungs injury as a result in the lungs high lipid peroxidation and DNA oxidation (8-hydroxy-2-deoxyguanosine) was observed , which radiation from the influence then one How many months ? to be able possible [33].

**Cancer** . Cancer is uncontrolled cell growth , surrounding to the tissues invasion and often far to the organs metastasis with described complicated and many edged disease [ 34]. Free radicals , particularly ROS and The throne cancer of the disease beginning , development role good studied . This reagent species DNA, proteins and lipids damage to deliver possible , that's it with genomic instability and tumor to develop contribution Addictive . The body this reactive types neutralization for complicated antioxidant to systems has although although , freely radicals working release and antioxidant protection between imbalance oxidizing to stress take arrival it is possible , this cancer to develop help giving situation [ 35 ]. Free radicals to cancer contribution add main from mechanisms one this DNA straight away injury . CRSh and With ARSh DNA mutual impact to do it is possible , this and in DNA nitrogen basics modifications , one and two in a row interruptions and mutual to links take DNA oxidation wide widespread from injuries one this Guanine bases of the RNA with mutual impact as a result to the surface 8-hydroxydeoxyguanosine (8-OHdG) is produced . 8-OHdG DNA replication during adenine with suitable absence it is possible , this and from G to T to

transversions take Such mutations , if they oncogenes or tumor suppressor genes such as important in genes to the surface if it comes , normal cells tumor to cells to the cycle take arrival possible [36].

**Autoimmune diseases** . Autoimmune diseases organism immune system own to the tissues error with attack so that they when considered a stranger to the surface Free radicals , especially KRS<sub>h</sub> and ARS , autoimmune diseases pathogenesis important role [37]. Free radicals working release and organism antioxidant protection between imbalance with described oxidizing stress appearance to be autoimmune reactions activation and continue to reach take arrival [ 38 ] Oxidizing injury autoimmune reactions one how many mechanisms through to start and increase possible . Free radicals autoimmune to diseases contribution add main from mechanisms one this self antigens modification [39]. Oxidation stress in proteins and other in molecules structural changes brought release it is possible , this and immune system by neo- antigens recognized as foreign harvest [40]. For example , KRS<sub>h</sub> in proteins carbonyl groups formation brought their output , structure and antigenicity change This is possible . Proteins present antigens provider cells by acceptance to be done , to be done again processing and T cells presented to be it is possible , this and autoreactive T cells to activate and autoantibodies working to be released take This mechanism rheumatoid such as arthritis (RA) in diseases participation it will , this on the ground synovial in liquid proteins oxidizing modifications autoimmune to the answer contribution addictive [41].

**Neurodegenerative disorders** . Neurodegenerative diseases , including Alzheimer 's disease (AD), Parkinson's disease (PD), Huntington's disease (CD) and amyotrophic lateral sclerosis (ALS), a disease of neurons structure and function progressive accordingly loss with described , this and cognitive and motor disorders take comes [42]. Increasingly going evidence KRS<sub>h</sub> and THE KINGDOM such as free radicals mediated oxidizing stress this of diseases pathogenesis important factor as The brain, especially the brain , is particularly sensitive to oxygen . high consumption , lipids abundance and antioxidants relatively low because of oxidizing to injury prone [43].

***Alzheimer's in the disease (AK)*** oxidative stress is the main feature disease pathogenesis important role plays a role in the formation of amyloid -beta (A $\beta$ ) plaques . and from hyperphosphorylated tau protein organization found neurofibrillary of confusion accumulation with [ 44 ] Oxidative stress is pathological features one how many mechanisms through strengthen possible .

KRSh cell macromolecules, including lipids, proteins and To DNA directly damage to deliver it is possible, this and neurons dysfunction and to death take comes [45]. From this In addition, oxidative stress A $\beta$  peptides aggregation strengthen possible. A $\beta$  itself KRShni harvest oxidative stress and A $\beta$  accumulation bad cycle create possible. Like A $\beta$  and iron and copper metals between mutual Fenton reactions through KRSh working release catalysis possible [46]. From this In addition, oxidative stress A $\beta$  clearance mechanisms, including autophagy and proteasomal to break up to break and his/her to gather contribution add possible [47].

**Parkinson's disease (PD)** oxidative stress in the substantia nigra dopaminergic neurons degeneration with closely depends on the PK. main pathological alpha-synuclein marker protein cell inside aggregates Lewy bodies Oxidative stress is involved in the pathogenesis of PK. mitochondrial dysfunction, protein wrong folding and neuroinflammation such as one how many mechanisms through contribution addictive [48]. Dopaminergic neurons, especially dopamine metabolism because of oxidizing to stress prone to. Dopamine fermentative oxidation KRSh and dopamine quinones harvest they do cell proteins, lipids and nucleic acids with to react entering, oxidizing to the detriment take arrival possible. From this in addition to dopamine monoamine by oxidase (MAO) metabolism hydrogen peroxide ( $H_2O_2$ ) harvest does this and transition metals Fenton reactions in the presence of through high reactive hydroxyl to radicals rotation possible [49].

**THE ROLE OF ANTIOXIDANTS.** Antioxidants free radicals in management and different kind diseases with related was oxidizing stress in mitigation important role Plays. Free radicals neutralization and oxidizing the damage reduce through antioxidants of cells integrity and function to keep help gives, as a result general health and of diseases prevent to take contribution Addictive [50]. The body oxidizing to stress against stand for many edged protection from the system uses, in which endogenous and exogenous antioxidants participation Endogenous antioxidants in the body working will be issued and fermentative and fermentative not been components own inside takes. Home fermentative antioxidants SOD, catalase and glutathione eroxidase [51]. SOD superoxide radicals hydrogen peroxide rotation catalyzes, then and catalase and glutathione peroxidase by detoxification These enzymes are harmful KRSh level reduction and oxidizing of injury prevent to take for together works. Like Glutathione (GSH) fermentative not been antioxidants KRShni detoxification in

doing important role plays . GSH is free radicals straight away neutralizing and other antioxidants again regenerative cells inside oxidative stress balance preserving tripeptide [52].

**KRSH 's useful physiological and therapeutic effects .** His/her cytotoxic to the potential despite , reactive forms low physiological in concentrations when stored life for absolutely necessary are important signaling molecules become service does :

**1. Redox signaling Paths :** Hydrogen peroxide ( $H_2O_2$ ) and nitrogen monoxide ( $NO\bullet$ ) transcription factors ( e.g. NF- $\kappa$ B and Nrf2) activity modulation cell proliferation , differentiation and viability order eater secondary messengers as works .

**2. Radiation oncology :** Localized oxidative stress cytodestructive from the ability cancer in treatment wide Cobalt -60 sources or from targeted gamma rays used clinical light therapy ( radiotherapy ) tumor mass inside water molecules immediately radiolysis brought This tumor cells replication completely stopper covalent DNA chain interruptions to the surface bringer hydroxyl and organic free radicals local explosion harvest does .

**3. In industry food products storage :** Industry on a scale from targeted gamma radiation food products sterilization for This method is used . nutritional profile without modification , pathogenic viral and bacterial contaminations no doer localized KRSh working to release based on .

**Endogenous antioxidant protection system .** In an oxygen- rich environment to live for aerobic organisms vital important of substrates oxidative damage prevent recipient , deferrer or softening , mutual synergistic working many stepwise endogenous and exogenous antioxidants from the network uses .

**Fermentative antioxidant systems .**

1. Superoxide dismutase (SOD): This metalloenzymes class superoxide anion hydrogen peroxide and molecular to oxygen dismutation Manganese -SOD (Mn-SOD) catalyzes the mitochondrial internal in the matrix main defender become service if , (Cu/Zn-SOD) cytoplasm and extracellular the gap protection does .

2. Catalase : In peroxisomes high in concentration It is a tetrameric enzyme that contains a heme . It is highly high rotation to the speed has is the cell returner without requiring equivalents , two hydrogen peroxide molecule water and molecular to oxygen converts :  $2H_2O_2 > 2H_2O + O_2$  .

3. Glutathione peroxidase : Mandatory electronic donor as returned used glutathione (GSH) without hydrogen peroxide and organic hydroperoxides water or stable to alcohols returner selenium related enzymes family .

4. Secondary regenerative Enzymes : Glutathione reductase , thioredoxin reductase and glucose-6-phosphate dehydrogenase enzymes free radicals straight away does not neutralize . Instead , they cell redox buffering ability save stay for oxidized glutathione (GSSG) its active , protective returned in the form of (GSH) necessary NADPH, which is harvest doer metabolic the roads manages .

**Fermentative not been antioxidants .**

1. Endogenous thiol Buffers : Direct cell by synthesis to be done Glutathione (GSH) tripeptide main intracellular redox buffer is , proteins sulfhydryl groups their functional in the case of Coenzyme Q and urine acid additional endogenous enzymatic not been protection provides .

2. Vitamins : Vitamin C ( ascorbic acid) acid ) citrus fruits and in vegetables many in the water extreme It is soluble . It is dehydroascorbic acid . acid (DHA) is produced doer two electronic oxidation through superoxides and hydroxyl radicals neutralizes . And vitamin E ( $\alpha$ - tocopherol ) . cell membranes directly integrated , lipid extreme soluble bioactive vitamin , lipid peroxide by capturing radicals (LOO•) to take through radicals brought releasing chained reactions extends .

**Conclusion :** Free radicals and oxygen and nitrogen reactive forms normal metabolic rate in the body processes as a result harvest is a cell alarm and immune on defense important physiological tasks However , their excess harvest to be and antioxidant systems of activity weakening development of oxidative stress take comes . As a result cell membranes , proteins and DNA damage , cardiovascular vascular , neurodegenerative , autoimmune and oncological of diseases to develop reason The organism fermentative and fermentative not been antioxidant protection systems free radicals harmful the impact in restriction important importance has . Therefore free radicals and antioxidants between balance storage and with oxidative stress related diseases treatment and prevent in receiving the above to know important is considered .

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