ALPSTEINACADEMY

Continuous Professional Development

Seminars & Webinars

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ALPSTEINCLINIC

Grüezi / Welcome


The Alpstein Mountains in Appenzell


Market Place in Gais near Appenzell


Alpstein Clinic in Gais

Free Radicals, oxidative Stress
Treatment with Antioxidants

Ralf Oettmeier MD, Alpstein Clinic Gais / AR, Switzerland

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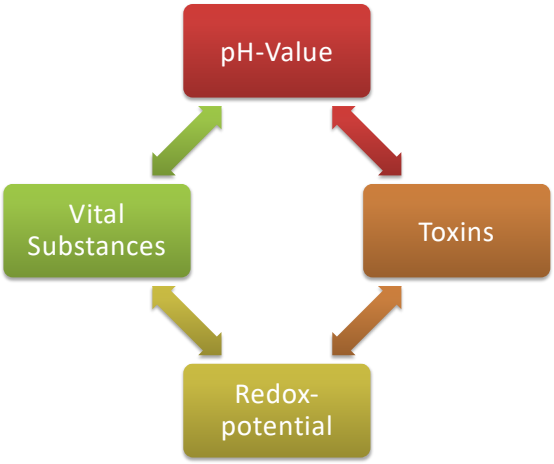
Terrain factors (chemical)
The square of life



1. **Acid-Base Household** (pH-value, base excess, minerals, ammonia)
2. **Oxidative Stress** (free radicals, superoxide radical anion, perhydroxyl radicals, hydroxyl radicals, H_2O_2, nitrosative stress)
3. **Vital substances** (vitamins, minerals, trace elements, fatty acids, amino acids)
4. **Toxins** (toxic metals, organic toxins, endotoxins incl. emotionals)

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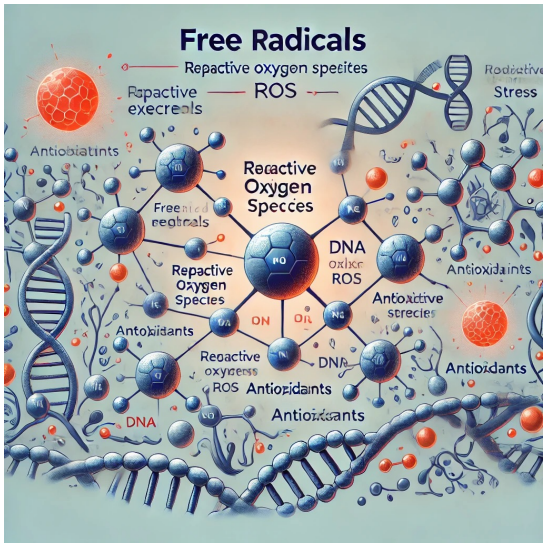
One of the most important causes of cancer …

Free Radicals - oxidative Stress



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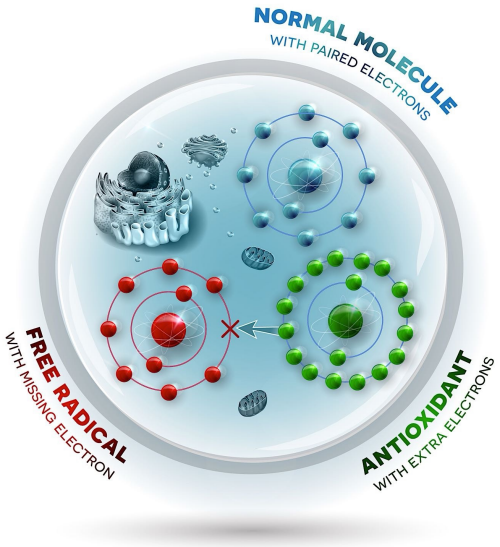
What are free Radicals?

- Highly reactive chemical compounds lacking an electron in their outer electron shell.
- Due to this electron deficiency, they strive to stabilize by bonding with other molecules.
- In the process, they attack neighboring molecules, snatch electrons from them, and thus trigger chain reactions that can damage cells and tissues.



Source: https://naehrstoffkosmetik.com/themen/freie-radikale-machen-alt-und-krank

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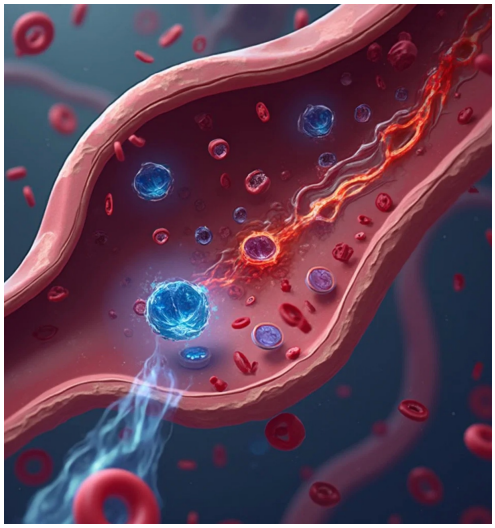
Origin of free Radicals?

- Oxygen-dependent redox reactions lead to the formation of so-called reactive oxygen species, which, due to their reactivity, are harmful to the body.
  Key Compounds:
  - **Oxygen radicals** – especially superoxide anion (O_2^-)
  - **Hydroxyl radicals** (•OH)
  - **Singlet oxygen** ($^1O_2$)
  - **Sulfite radicals** ($SO_3^{\bullet-}$, $SO_4^{\bullet-}$, $SO_5^{\bullet-}$)
  - **Nitric oxides** (from NO_2)
- The •OH radical is one of the most reactive chemical substances.



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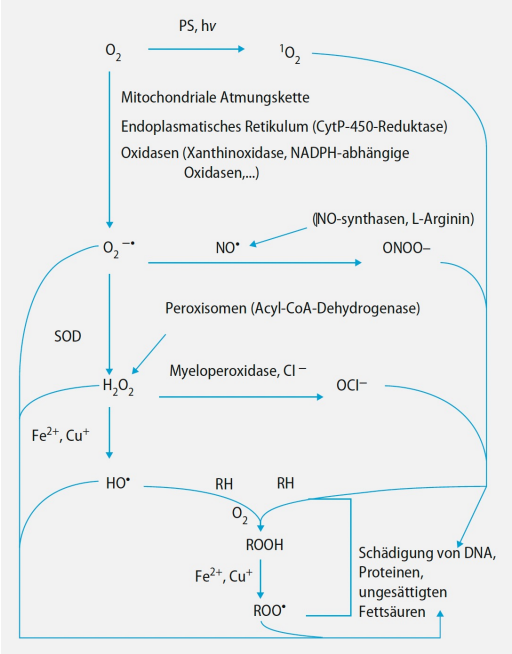
Oxidative Stress and Science

Schematic representation of the formation and networking of reactive oxygen and nitrogen species in biological systems.

Legend:

- $^1O_2$ → Singlet oxygen
- O_2^- → Superoxide anion radical
- NO° → Nitric oxide
- $ONOO^-$ → Peroxynitrite
- HO° → Hydroxyl radical
- H_2O_2 → Hydrogen peroxide
- ROO° → Lipid peroxyl radical
- ROOH → Lipid hydroperoxide
- PS – endogenous or exogenous photosensitizers
- hv Light → (e.g., sunlight, UVB, UVA, visible light)
- RH → Unsaturated fatty acids
- SOD → Superoxide dismutase



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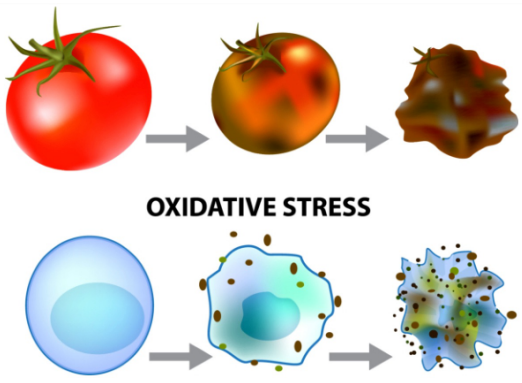
Causes of free Radicals and oxidative Stress

Endogenous

- Immune defense,
- respiratory chain,
- stress,
- inflammation,
- blood alkalosis,
- excessive physic exercise



Source: https://vitalmed-heilpraktiker.de/oxidativer_stress.htm

Exogenous

- Heavy metals,
- medications,
- ozone exposure,
- alcohol consumption,
- fungal toxins,
- pesticides,
- smoking,
- ionizing radiation

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Causes of free Radicals and oxidative Stress

Environmental toxins and pollutants:

- Air pollution, such as fine dust and ozone
- Pesticides, heavy metals (e.g., lead, mercury)
- Cigarette smoke – one of the most significant factors
- Alcohol consumption – leads to the formation of free radicals in the liver

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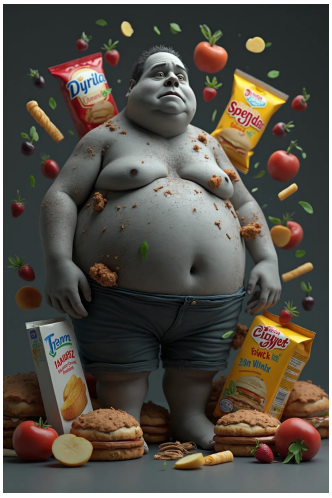
Causes of free Radicals and oxidative Stress

Unhealthy diet:

- Heavily processed foods with trans fats, sugar, and additives
- Lack of natural antioxidants, e.g., from fresh fruits and vegetables
- Overnutrition – especially excess animal protein or refined grains



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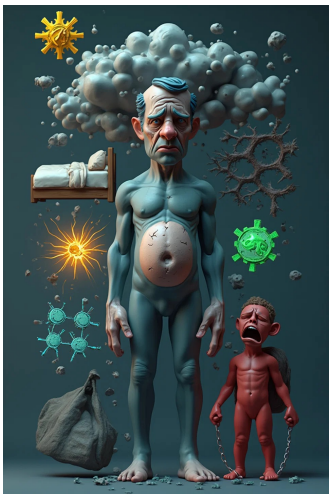
Causes of free Radicals and oxidative Stress

Physical and emotional overload:

- **Chronic stress** increases cortisol production, promoting free radical formation
- **Sleep deprivation**, which impairs natural regeneration
- **Intense physical exertion** without sufficient recovery or antioxidant intake



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Causes of free Radicals and oxidative Stress

Diseases and inflammations:

- **Chronic inflammations** (e.g., in rheumatism, atherosclerosis)
- **Infections** that elicit a flood of reactive oxygen species
- **Metabolic diseases** like diabetes mellitus

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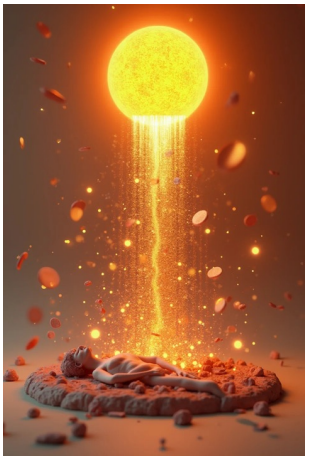
Causes of free Radicals and oxidative Stress

Radiation:

- **UV radiation** from the sun – natural but hazardous with excessive exposure
- **Ionizing radiation** – from medical imaging (X-rays, CT scans), air travel, or radiation accidents



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Causes of free Radicals and oxidative Stress

Medication intake:

- Certain medications, e.g., cytostatics, paracetamol, or antibiotics, can promote oxidative stress, especially with prolonged use

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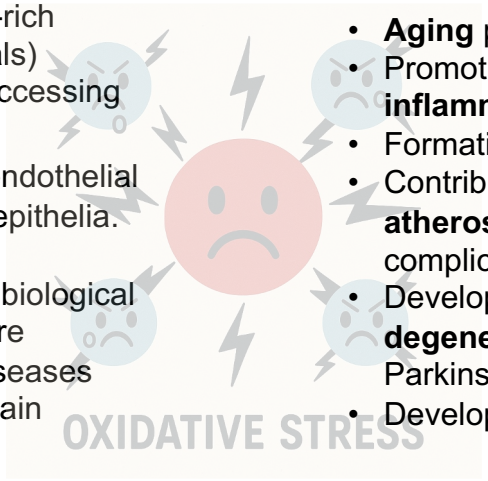
Consequences of Oxidative Stress

- Highly reactive, energy-rich compounds (free radicals) circulate in the blood, accessing all organs and tissues.
- Particularly at risk are endothelial cells, neural cells, and epithelia.
- They cause damage to biological cell processes, which are implicated in various diseases and can accelerate certain conditions:



- **Aging** processes
- Promotion of **systemic inflammatory processes**
- Formation of **thromboses**
- Contribution to **atherosclerosis** and its complications
- Development of **neuro-degenerative diseases** like Parkinson's and Alzheimer's
- Development of **cancer**

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Conse-quences of oxidative Stress (Summary)

Affected System	Consequences
Neurological	Neurodegenerative diseases (e.g., Alzheimer's, Parkinson's) due to oxidative damage to neurons and accumulation of harmful proteins.
Cardiovascular	Atherosclerosis and heart diseases stemming from oxidative modification of low-density lipoproteins (LDL) and endothelial dysfunction.
Renal	Chronic kidney diseases linked to oxidative stress-induced fibrosis and inflammation.
Respiratory	Conditions like asthma and chronic obstructive pulmonary disease (COPD) exacerbated by oxidative damage to lung tissues.
Reproductive	Male infertility associated with oxidative damage to sperm DNA.
Gastrointestinal	impaired motility and inflammatory conditions due to oxidative stress affecting smooth muscle function.
Psychiatric	Mood disorders, including depression and anxiety, linked to oxidative imbalances in the brain.
Aging	Accelerated aging processes due to cumulative oxidative damage to DNA, proteins, and lipids.

Source: Oxidative Stress: Harms and Benefits for Human Health Pizzino et al. Oxid Med Cell Longev . 2017 Jul 27;2017:8416763. doi: 10.1155/2017/8416763

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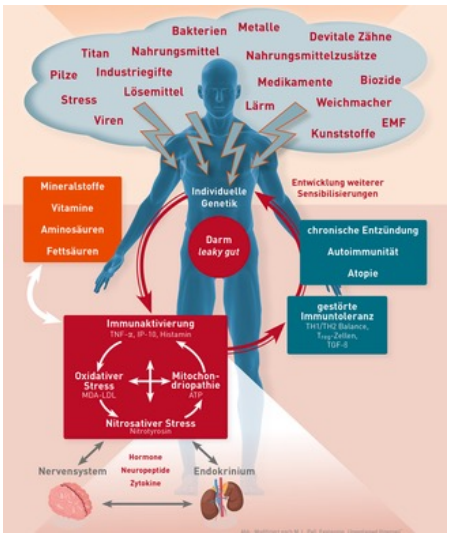
Diagnostics of oxidative Stress

- **Vital Blood Microscopy**
- **Laboratory**
  - malondialdehyde-modified LDL (MDA-LDL),
  - nitrotyrosine, thiol status,
  - glutathione peroxidase (GPx),
  - intracellular glutathione (GSH),
  - antioxidants (vitamin C, E, selenium, zinc, Q10)
- **FRAS**
- **Global Diagnostics**
- **Epigenetic testing**



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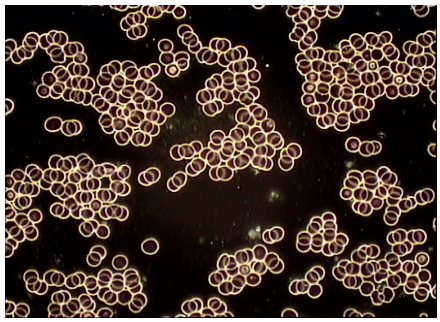
Phenomena of Lagoon
in dark field microscopy



x 200

Meaning:
Oxidative stress / exposure to free radicals / signs of inflammation

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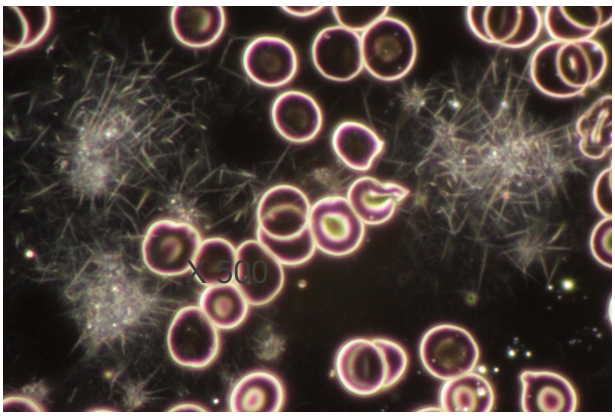
Plasma:
Fibrine nest (Spiderweb)

Meaning:

- Premature fibrin fiber formation, oxidative stress, enzymatic processes, increased risk of thrombosis, signs of degeneration (e.g., osteoarthritis)
- Higher form of endobiontic development, signs of Mucor racemosus and Aspergillus niger (according to Prof. ENDERLEIN)



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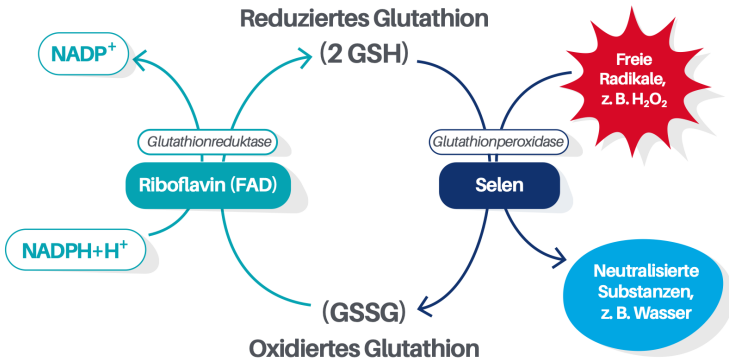
Laboratory diagnostics of oxidative Stress and Glutathion



Laboratory Biovis

Oxidativer Stress			
Lipidperoxidation	378,00	µmol/l	< 200
Profil Glutathionstoffwechsel (GSH und GSSG)			
Glutathion (reduziert)	613	µmol/l	500 - 1500
Glutathion (gesamt)	831	µmol/l	500 - 1500
Glutathion (oxidiert)	217,69	µmol/l	100 - 500

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Laboratory diagnostics of oxidative Stress and Glutathion

IMD Labor Berlin

Ärztlicher Befundbericht

Untersuchung	Ergebnis	Einheit	Referenz-bereich
Glutathion GSH-intrazellulär			
Lymphozyten CD3	18900	mfi	> 21600
Monozyten CD14	76200	mfi	> 66600
NK-Zellen CD16/56	31400	mfi	> 30500

Interpretation
Erniedrigtes intrazelluläres Glutathion in Lymphozyten bei normalen Werten in Monozyten und NK-Zellen. Dieser Befund spricht für einen gesteigerten Glutathionverbrauch in den persistierend zirkulierenden Lymphozyten.

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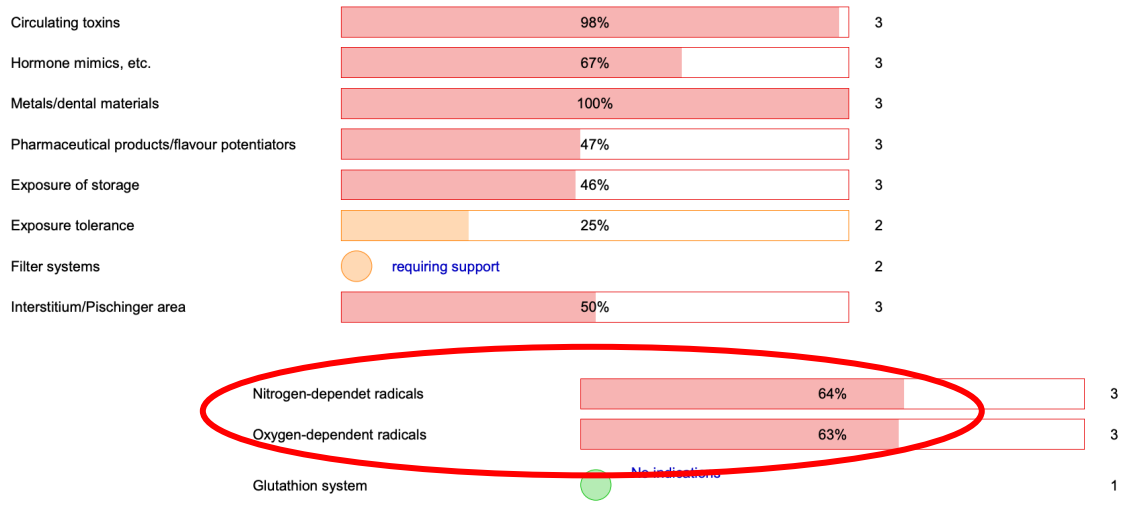
oxidative Stress in energetic Testing Global Diagnostics (VitaTec®)



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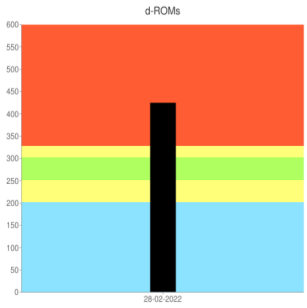
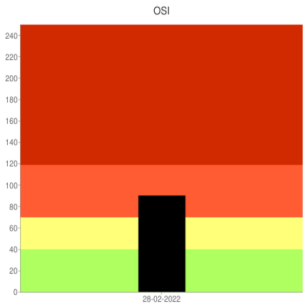
Terrain factor oxidative Stress
Measuring with the device FRAS

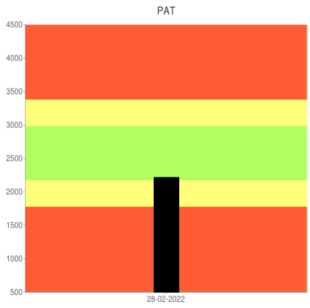
Parameter	Result		U.M.	Reference interval
OSI REDOX	90	H		0-40
d-ROMs	424	H	UCARR	250-300
PAT	2227		UCor	2200-2800

H - high values; L - low values

OSI und d-ROMS
= Menge freier Radikale
PAT
= antioxidatives Potential







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Variants in FRAS Testing

High oxidative stress is balanced by antioxidants

Excessive consumption of antioxidants can be reduced

Antioxidants too low, oxidative stress not compensated

Normal finding

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Terrainfactor oxidative Stress

Epigenetic Analysis of relevant Enzym Activities

dnah

optimal he

Oxidative stress

Free radicals are a normal by-product of the body's energy-generating biochemical processes. They are highly reactive with other molecules, and can damage DNA, proteins and cellular membranes. Anti-oxidants are free radical scavengers that interact with the free radical to ensure it is no longer a reactive molecule. Anti-oxidants are found naturally in the body in the form of enzymes, but can also be consumed in a wide variety of foods, especially from vegetables and fruit. However, the major role in anti-oxidant defense is fulfilled by the body's own anti-oxidant enzymes.

Gene Name	Genetic Variation	Your Result	Gene Impact
eNOS	894 G>T	TT	●●●
MnSOD/SOD2	47 T>C (Val16Ala)	TC	○
CAT	-262 C>T	CC	✓
GPX1	Pro198Leu	CT	●●

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Terrainfactor oxidative Stress

Epigenetic Analysis of relevant Enzym Activities

eNOS 894 G>T

The endothelium-derived nitric oxide (NO) plays a key role in the regulation of vascular tone and peripheral resistance. It also has vasoprotective effects by suppressing platelet aggregation, leukocyte adhesion and smooth muscle cell proliferation.

YOUR RESULT: **TT** ●●●

The T allele affects proteolytic cleavage of the enzyme thereby reducing nitric oxide bio-availability in the blood vessel wall and promoting atherosclerosis, as a result it is associated with atherosclerosis, essential hypertension, end-stage renal disease and pre-eclampsia. Ensure adequate anti-oxidant and n-3 fatty acids intake.

MnSod/SOD2 47 T>C (Val16Ala)

The SOD2 enzyme destroys the free radicals which are normally produced within cells and which are damaging to biological systems. The enzyme thus has important anti-oxidant activity within the cell, especially within the mitochondria.

YOUR RESULT: **TC** ○

The TC genotype has not been significantly related to higher oxidative stress burden. Consider variants in all genes tested in the oxidative stress panel to create a holistic action plan to improve antioxidant status.

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Terrainfactor oxidative Stress

Epigenetic Analysis of relevant Enzym Activities

GPX1 Pro198Leu

Glutathione peroxidase 1 (GPx1) is the most abundant of the selenoperoxidase enzymes, and is expressed in almost all tissues in the body. It is responsible for catalysing the coonversion of hydrogen peroxide into water, as well as reducing fatty acid hydroperoxides and peroxynitrite using glutathione as a substrate, and thus helps to maintain redox balance.

YOUR RESULT: **CT**

The CT genotype has been linked to a disturbed anti-oxidative balance and has been associated with increased risk for chronic diseases, including certain cancers and coronary artery disease, especially when fruit and vegetable intake is low. Ensure a polyphenol-rich diet, with a high intake of vegetables, and include good food sources of selenium (brazil nuts). Avoid toxin exposure from heavy metals and pesticides, and cessation of smoking should be strongly encouraged.

CAT -262 C>T

CAT encodes the antioxidant enzyme, catalase, which is most highly expressed in the liver, kidney and erythrocytes. The enzyme is responsible for the rapid conversion of hydrogen peroxide to water and oxygen, where one molecule of this enzyme can catalyse more than 1 million hydrogen peroxide molecules per second. Decreased CAT activity leads to increased concentrations of hydrogen peroxide, hence leading to increased oxidative stress.

YOUR RESULT: **CC**

Individuals carrying the C allele, especially those with the CC genotype, have been associated with a decreased risk of cancer and better anti-oxidative balance. The protection offered by the C allele is further pronounced in individuals who have a high dietary intake of anti-oxidant and polyphenol rich foods.

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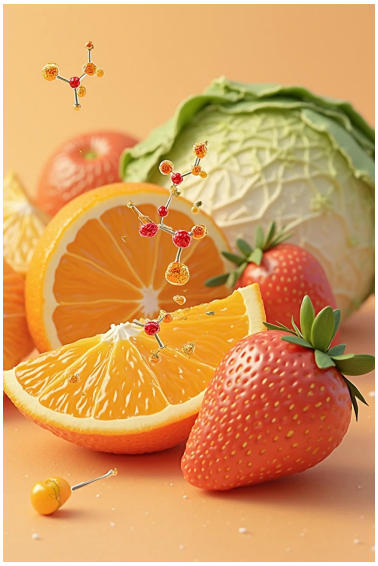
Therapy with Antioxidants

Vitamin C (ascorbic acid)

- **Sources:** Citrus fruits, rose hips, bell peppers, sauerkraut.
- **Effect:** Protects cells from free radicals, supports the immune system, enhances iron absorption.
- **Traditional note:** In folk medicine, vitamin C-rich fruits were recommended against colds.



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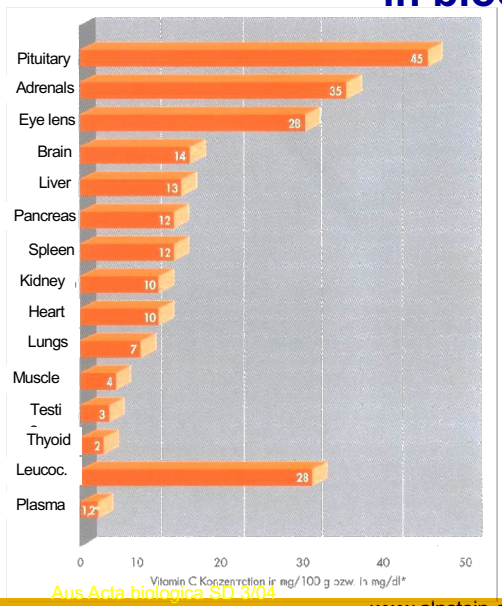
Vitamin C – the most important antioxidant in blood

- Free radicals occur more frequently in:
  - Acute and recurrent infections
  - Chronic diseases
  - Fatigue syndrome
  - Post-operative deficiencies
  - Convalescence
  - Inflammations
  - Stress
  - Nicotine abuse



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Vitamin C: features

Let increase the concentration of
- Interferon
- PG E2 and PG I2
- complement Clq C3
- IgM, IgA, IgG
- HDL-Cholesterol
- Cytochrome P450

Let decrease the concentration of
- histamine
- thromboxane
- heavy metals
- uric acid
- Total cholesterol
- LDL cholesterol
- Lipoprotein A

Promotes the
- Absorption of iron
- Heavy metal detoxification
- collagen synthesis
- Scavanger functions
- Mobility and chemotaxis of leukocytes
- phagocytosis

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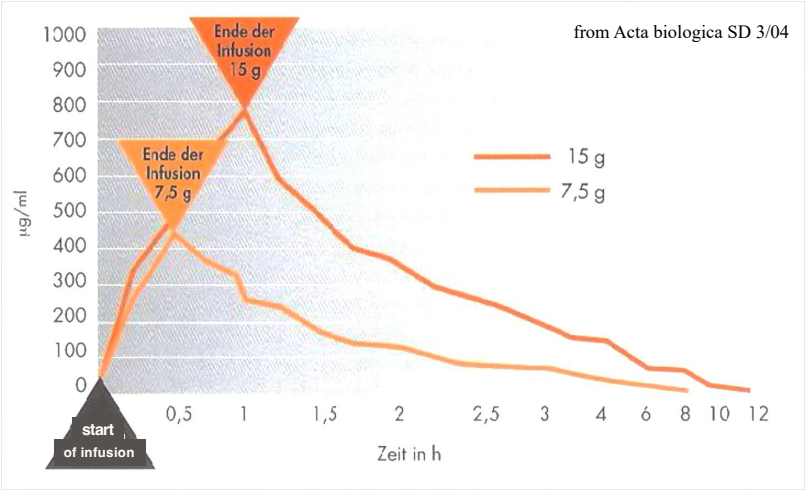
Vitamin C Infusion



The Alpstein high-dosed Vitamin C infusion by using 30 g Vials

Indication:

- acute and chronic infections,
- Oncology,
- mitochondriopathies,
- autoimmune diseases
- other chronic inflammatory diseases

Application:

Once or twice a week; a total of 5-10 infusions, infusion within 1 hour

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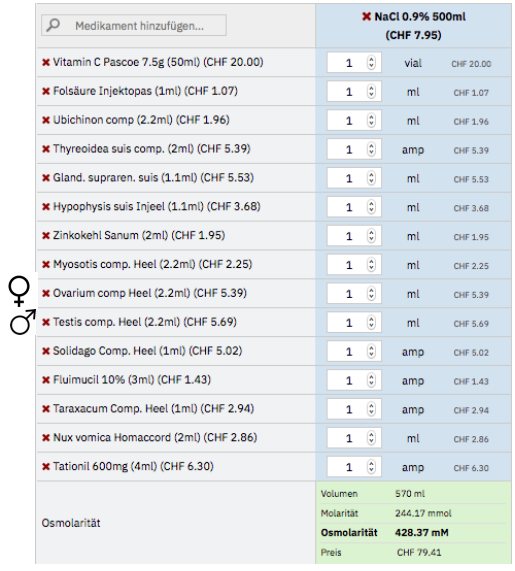
Alpstein cleansing (detox) infusion

- **Short description:**
  - Infusion to stimulate the excretory function
- **contains**:
  - vitamin C (7,5 g), B vitamins, folic acid
  - minerals and trace elements
  - homeopathic and homotoxicologic remedies
  - **USA**: use HEVERT *hepar comp, lymphaden comp.*
- **effect**:
  - stimulation of lymph system, liver and kidneys
- **application**:
  - 1 – 2 x weekly; all together 5-10 Infusions,
- **Combination**
  - useful with Ozone, Oxyven and after DMPS short infusion



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Therapy with Antioxidants

Vitamin E (Tocopherol)

- **Sources:** Plant oils (e.g., wheat germ oil), nuts, seeds
- **Effect:** Protects cell membranes from oxidative stress, supports skin health
- **Traditional use:** Use of nut oils in care and nutrition for strengthening

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Therapy with Antioxidants

Beta-Carotene (Provitamin A)

- **Sources:** Carrots, sweet potatoes, spinach, kale
- **Effect**: Converted in the body to vitamin A, protects eyes and skin
- **Traditional recommendation:** *“Carrots are good for the eyes.”*

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Therapy with Antioxidants

Selenium

- **Sources:** Brazil nuts, fish, eggs, whole grains
- **Effect:** Component of antioxidant enzymes, supports the immune system
- **Interesting fact:** In older soils, selenium was naturally richer, reflected in the nutrient density of older foods

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Alpstein Selenium infusion

- **Short description:**
  - Infusion with high-dosed Selenium (1-2 mg)
- **Indication**:
  - As part of the targeted treatment of immunodeficiency and tumor disease
  - Proven selenium deficiency
  - Weakness of antioxidant enzymes in genotyping laboratory analytics
  - Accompanying radiotherapy
- **Effect**:
  - Anti-oxidative, gland support, to activate mitochondrial enzymes, epigenetic effect
- **Application**:
  - Monthly, all together 2 - 3 Infusions
- **Combination**
  - Not together with vitamin C on the same day

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Therapy with Antioxidants

Zinc

- **Sources**: Meat, cheese, pumpkin seeds, lentils
- **Effect**: Supports antioxidant enzymes, important for skin, wound healing, and immune function
- **Traditionally known:** Meat broths were considered strengthening – also due to their trace elements

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Therapy with Antioxidants

Polyphenols (e.g. Flavonoids, Resveratrol)

- **Sources**: Red wine, green tea, berries, dark chocolate
- **Effect**: Neutralizes free radicals, anti-inflammatory
- **Old belief:** "*A glass of red wine in the evening keeps you healthy*" – in moderation, because of the polyphenols

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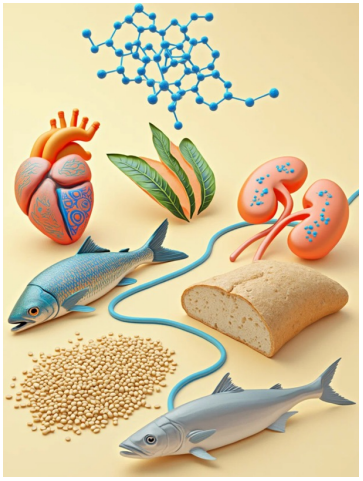
Therapy with Antioxidants

Coenzyme Q10

- **Sources**: Organ meats, fatty fish, whole grain products
- **Effect**: Important for cellular energy and protection against oxidative damage
- **Traditional relevance**: Especially present in strengthening foods like liver or heart



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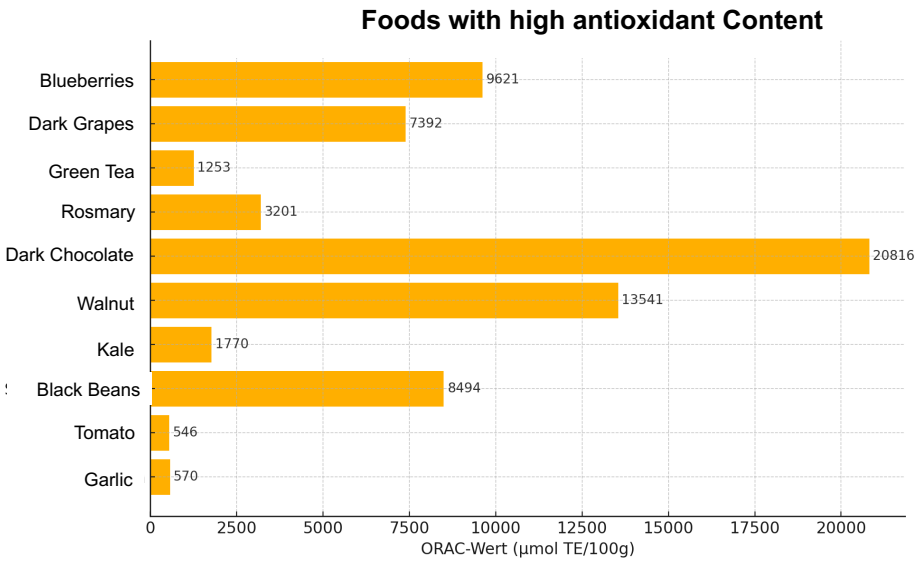
antioxidant Power of selected Foods



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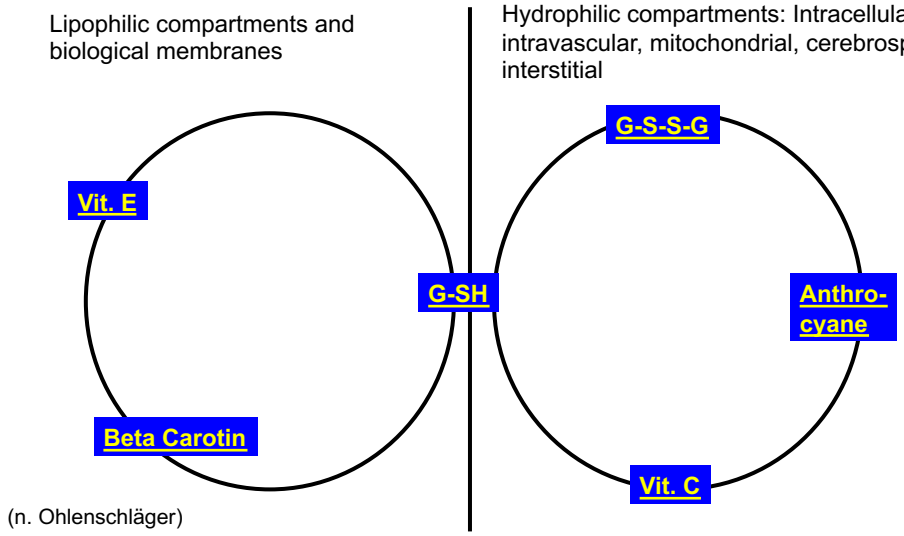
Powerful Synergy of Antioxidants

Interaction of antioxidants in lipid and aqueous compartments



(n. Ohlenschläger)

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Enzymatic Antioxidants

Endogenous enzymatic Antioxidants in Plasma and Erythrocytes in Humans

	Plasma (U/ml)	Red Blood cells (U/1010 Zellen)
Katalase	1139	3800–5400
Superoxiddismutase	5–20	550–800
Glutathionperoxidase	0,4	7,8–10,6
Glutathiondisulfid-Reduktase	0,03	2,7–3,7
Glutathion-S-Transferase	0,005	1,5–2,5
Thiole (R-SH)	300–600 (µM)	2,2 (µmol/1010 Zellen)

Source: *Bundesgesundheitsbl - Gesundheitsforsch - Gesundheitsschutz 2008 . 51:1464–1482 DOI 10.1007/s00103-008-0720-5*

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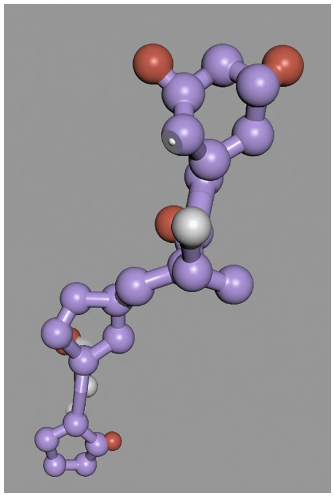
ALPSTEINCLINIC

GLUTATHION – the Super-Antioxidant

An endogenous antioxidant playing a central role in cellular protection. Although the body can produce it – mainly in the liver – sufficient intake of its building blocks through diet is essential to support its own production.

Natural food sources:

- **Sulfur-containing foods**: garlic, onions, leeks, cruciferous vegetables
- **Protein-rich foods** (for amino acids): glutathione consists of glycine, glutamic acid, and cysteine
- **Eggs, chicken, beef, dairy products** (such as raw milk, cheese)
- **Fish** (e.g., salmon, mackerel)
- **Liver-friendly herbs**: milk thistle, artichoke, dandelion root, bitter herbs in general
- **Fresh fruits and vegetables** (rich in vitamins C and E): citrus fruits, berries, bell peppers, spinach



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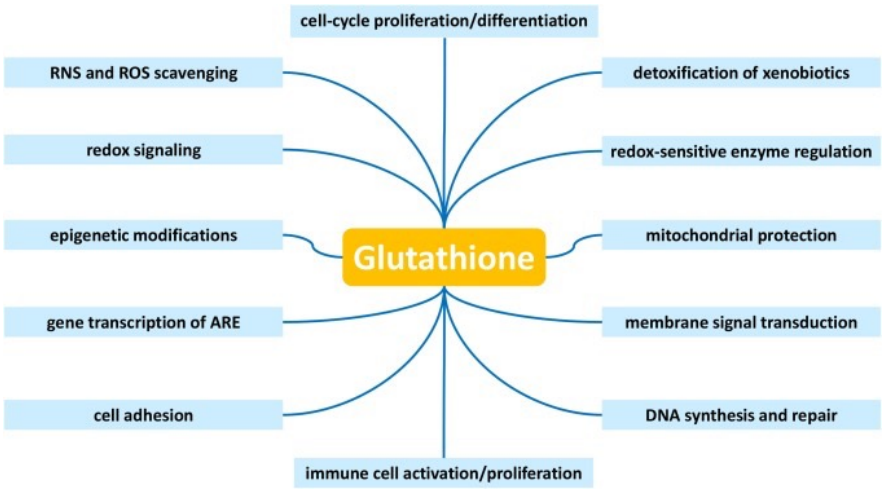
ALPSTEINCLINIC

Importance of Glutathion in Organism



Source: The glutathione system in Parkinson's disease and its progression. Bjorglund et al. Neuroscience & Biobehavioral Reviews, Volume 120, January 2021, Pages 470-478

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ALPSTEINCLINIC

GLUTATHION – Infusion

Artikelnummer	Infusionskonzentrate (apothekenpflichtig)	Inhalt
08165381	**EUMETABOL® Infusion SAG mono 1.000 mg** Bestandteile: S-Acetyl-Glutathion 1.000 mg, TRIS, NaCl 0,9 %	6,67 ml
08165382	**EUMETABOL® Infusion SAG mono 3.000 mg** Bestandteile: S-Acetyl-Glutathion 3.000 mg, TRIS, NaCl 0,9 %	20 ml

Artikelnummer	Infusionskonzentrate (apothekenpflichtig)	Inhalt
08165383	**EUMETABOL® Infusion SAG + GSH combi** S-Acetyl-Glutathion 1.000 mg, red. Glutathion 1.200 mg, TRIS, NaCl 0,9 %	20 ml

Artikelnummer	Infusionskonzentrate (apothekenpflichtig)	Inhalt
08165526	**Eumetabol® Fatigue Infusion** Bestandteile: L-Ascorbinsäure-Natriumsalz 5.000 mg, L-Lysin-HCl, L-Methionin jew. 1.000 mg, L-Phenylalanin 600 mg, L-Glutamin 500 mg, L-Threonin, Nicotinamid jew. 300 mg, D-Panthenol 180 mg, Riboflavin-5-Phosphat-Mononatriumsalz, Thiamin-HCl jew. 100 mg, Pyridoxin-HCl 40 mg, Adenosylcobalamin, Methylcobalamin jew. 1 mg, Wasser	100 ml
	Eumetabol® Infusion SAG mono 3.000 mg Bestandteile: S-Acetyl-Glutathion 3.000 mg, TRIS, NaCl 0,9 %	20 ml

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