RÉGIME ÉQUILIBRÉ POUR PRÉVENIR LES INFECTIONS ET CONTAGIEUSES, AU SUJET DE LA PATHOLOGIE DU COVID-19

Titre: Régime équilibré pour prévenir les infections et contagieuses, au sujet de la pathologie du COVID-19.

En tant que biochimiste, je propose quelques données sur la biochimie moléculaire pour prévenir les infections, contagieuses et d'autres comme les pathologies du COVID-19 produites par le virus SARS-coV-2 st ses différents mutants.

La solidarité du point de vue biochimique envers l'enseignement et la formation nous fait écrire cet article en défense de l'harmonie du corps humain, pour avoir un corps sain, fort et robuste, dont les défenses éliminent les virus, les bactéries et les toxines. Ces données fussent déjà exposés oralement dans un panel de la World Academy Art & Science, d'autres institutions académiques et Congrès.

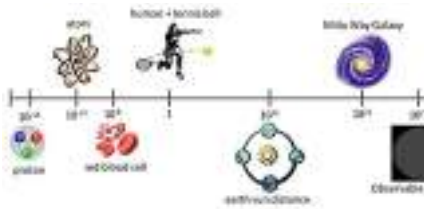
Comme pour le corps humain, l'harmonie est cruciale dans l'Univers, le système solaire, l'atome, la musique, qui sont basés sur la physique, les mathématiques et les réactions chimiques entre atomes et molécules figure 1.

Prof. **Bartolomé Ribas Ozonas**
Vice-Président, Secrétaire Général,
Académie Royale Nationale de Pharmacie,
Madrid, Espagne

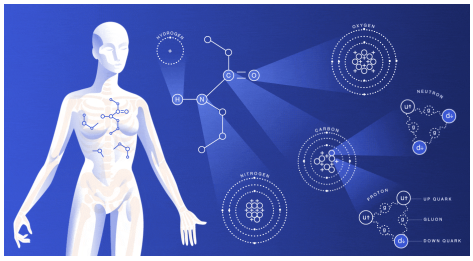
Harmony is crucial in the Universe, solar system, atom, music as also in the human body, until deseases emerge

UNIVERSE

SOLAR SYSTEM



FROM ATOM MOLECULES TO HUMAN BODY



HUMAN BODY

Tout cela jusqu'à l'apparition des maladies génétiques ou non et dans la vieillesse.

Fig.3. À partir du haut: les éléments minéraux sont les atomes formant des molécules, celles-ci dans les cellules en tant que protéines, les enzymes catalyseurs du métabolisme dans les mitochondries, les noyaux et autres organites, formant les cellules spécialisées dans chaque organe et tissus systémiques en tant que systèmes nerveux et cardiovasculaire, et enfin forment le corps humain. Organes systémiques dans le corps humain en harmonie, comme mentionné précédemment la musique et l'Univers.

Fig.4. Montrez les éléments essentiels à la vie humaine en couleur et aucun élément essentiel en gris, selon l'Organisation mondiale de la santé et des experts scientifiques.

Fig.5. Human body needs a **balanced diet** paying attention to **fruits** and **vegetables** in order to obtain vitamins and essential mineral elements as catalysators of metabolism in cytoplasma (glycolysis) and mitochondria (Krebs cycle and electron transport chain), for the necessary **energy** and to defend any type of infection from bacteria or viruses such as SARS-coV-2 and mutants.

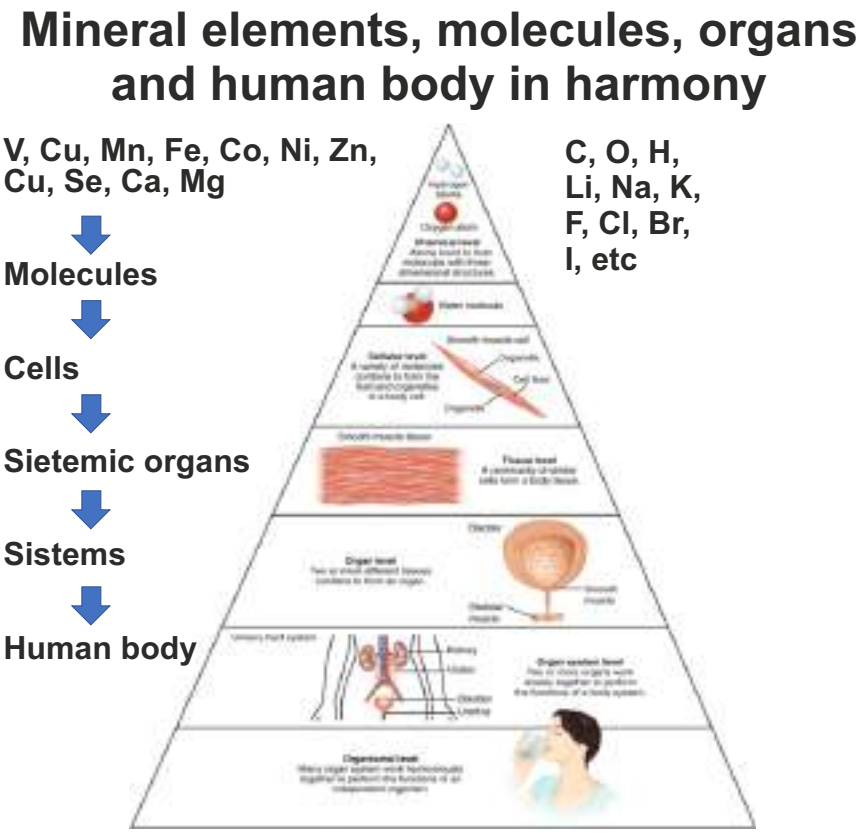


Fig.3.

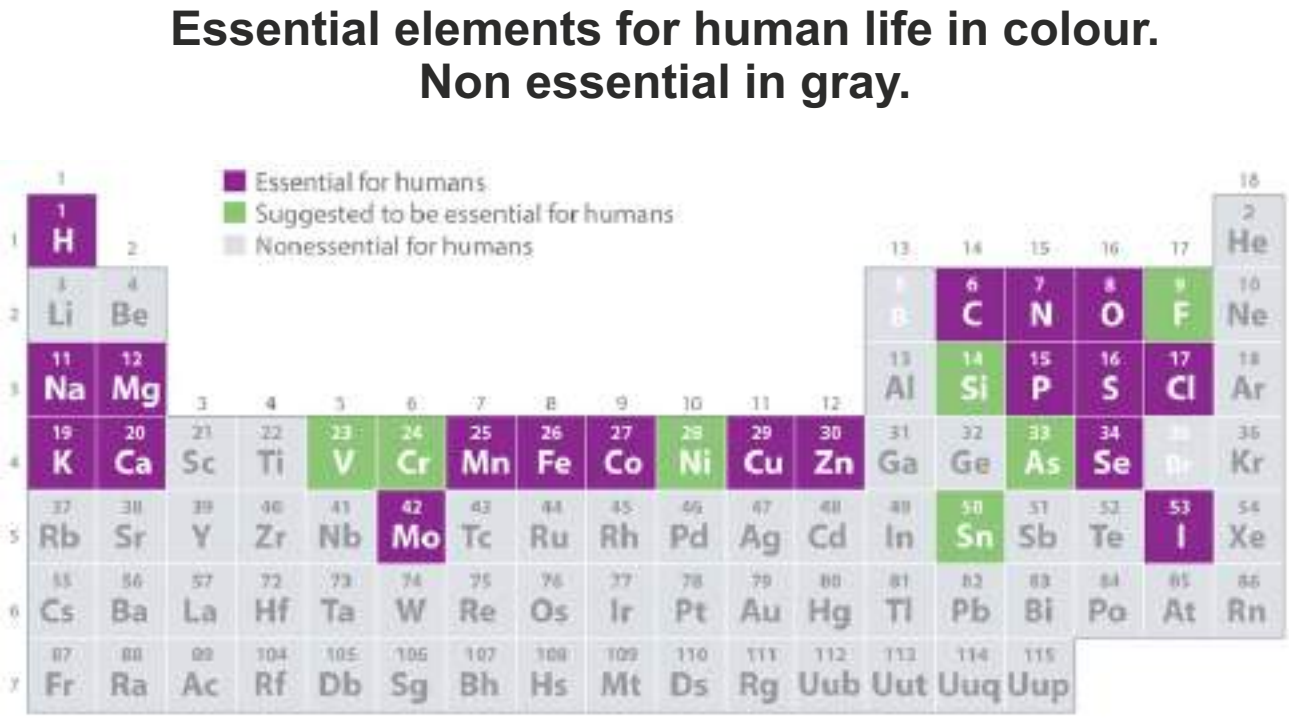


Fig.4.

Vitamins and **trace elements** there were already proposed by recognized authors as Vohora and Dobrowolski in 1990. **In the same way** and regarding the actual COVID-19 pandemic, the authors Rahman and Idid in 2021 published: On the signification of **zinc** as being a possible critical element in COVID-19 treatment?., in the: journal: Biological Trace Element Research.

Fig.6. represent the molecular structure of several essential vitamins, and (**Fig.7.**) show fruits and nuts necessary for a supplemented diet in case of pandemic as COVID-19 containing vitamins, essential mineral elements and fiber as also (**Fig.8.**) **Vegetables rich in** vit. C, folate, carotenoids, etc. **Malnutrition** and immunosuppression are very important risk factors.

Fig.9. Essential elements and vitamins are links of enzymes and increased substrate concentration and this one the next enzymatic chemical reaction. On the right it is represented the speed of an enzymatic reaction as a function of 6 different substrate concentrations.

Fig.10. show mitochondria **left in** healthy in **youth age**, and **right** in the **elderly or in old age** more vulnerable to malnutrition, obesity and to drugs alcoh0ol, tabac, etc. Mitochondria's are essential to have a healthy body with enough energy to avoid contagion, and reflexes the health and safety of our body. Mitochondria are the primary source of energy, and there are considered the **metabolic turbine** in energy production in our body. Cells are rich in mitochondria, in **muscle: 800** per cell, and in heart muscle tissue of contractile cells **myocytes: 3000** per cell generating movement thanks to the contractile proteins: actin and myosin.

Fig.11. Food is converted in energy by glycolysis and Krebs cycle. **After viruses** contagion as coronavirus SARS CoV-2 and mutants the human body and immune system induce a paradigmatic defense metabolic activity in the organism, with a plethora of **cells and molecules**, the so called **cytokines storm**.

Fig.12. including cytokine, interleukines, numerous proteins, antibodies, immunoglobulins and immune defensive cells, lymphocytes, and many others. This avalanche called "**storm**" of cells and proteins simultaneously requires a huge amount of **energy** that comes from the cytoplasmic **glycolysis** and the mitochondrial **Krebs cycle**, and in (**Fig.13.**)

Need for a balanced diet.
Activation of defenses against infections and COVID-19.

Vitamins C, D, A, E, K, B6
Essential mineral elements: Zn, Se, Mg, Fe, Cu, Mn
Aminoacids
Carbohydrates
Proteins
Lipids

New Horizons of Elements and Health,
Edited by S.B.Vohora and J.W.
Dobrowolski, New Delhi, 1990.

Rahman, M. T., & Idid, S. Z. (2021). Can Zn Be a Critical Element in COVID-19 Treatment?
Biological Trace Element Research, 199(2). https://doi.org/10.1007/s12011-020-02194-9
- **Review. Published: 26 May 2020.**

PubMed. https://pubmed.ncbi.nlm.nih.gov › ...

Fig.5.

Molecular structures of important vitamins

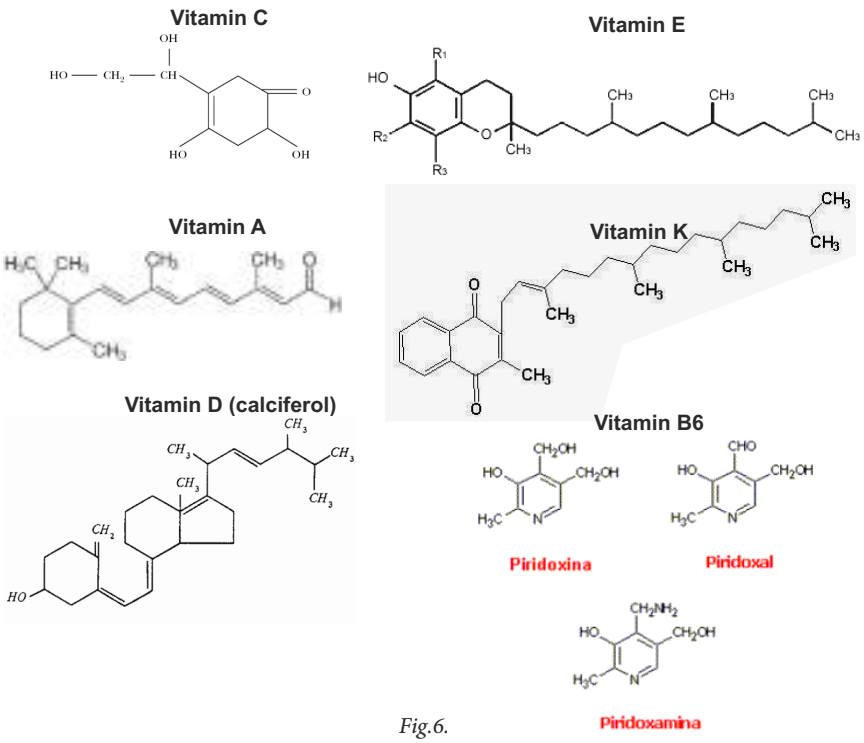


Fig.6.

FRUITS AND NUTS
Rich in vitamins, minerals and fiber

FRUITS

NUTS

Fig.7.

the oxidative phosphorylation with the electron transport chain, and (**Fig.14.**) the cycle of free radicals reduction proposed by Krengel and Hörsefield, to water with transhydrolase and different glutathione-dependent redox enzymes and proteins.

Fig.15. the synthesis of **ATP** by ATP-synthase.

In conclusion: Education, teaching and training is the best way to prevent and fight the spread of the COVID-19 pandemic, both in rich and populations with limited resources. Physical activity and balanced diet are necessary and in the case of grave virus pandemic helping with fruit and vegetables and diet supplements in order to maintain the mitochondria as a metabolic turbine preventing infections and contagious. **And also** it is important to pay attention and application the guidelines proposed by decision makers, medical, biochemical and government experts on an interregional scale. It is a matter of individual responsibility.

Vegetables: Green beans, lima beans, peas, black beans, chickpeas, lentils.
Rich in vit. C, folate, carotenoids, etc.

Fig.8.

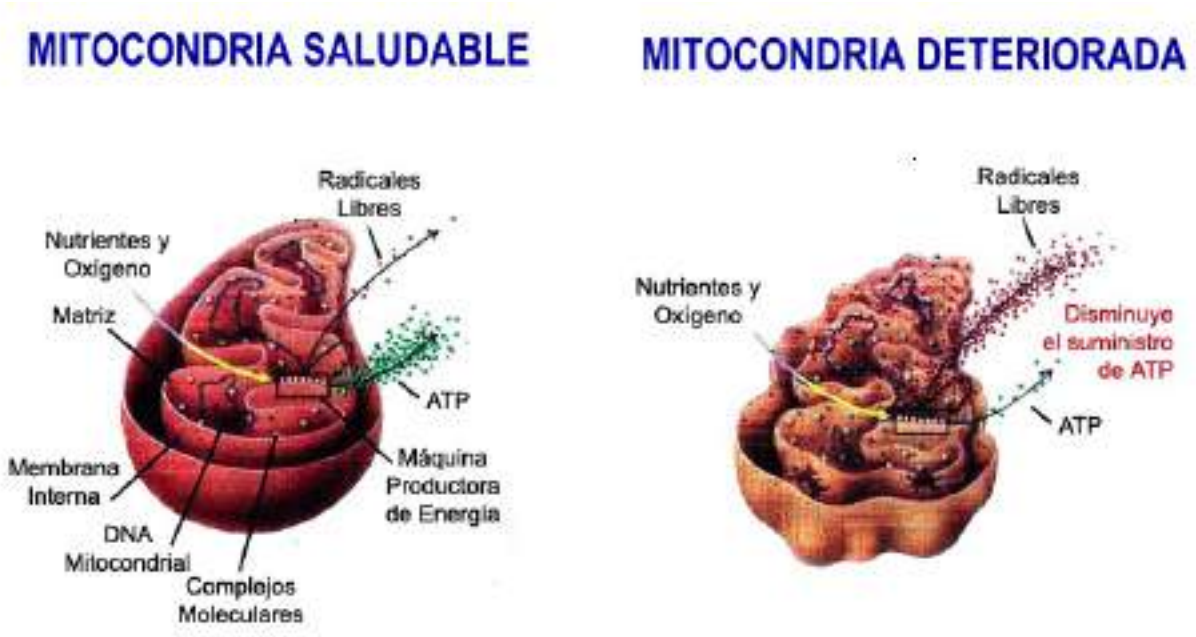
Essential elements and vitamins links of enzymes.
Enzymatic activity induced by substrate

•The rate of an enzymatic reaction depends of the concentration of the substrate. The figure on the right represents the speed of an enzymatic reaction as a function of 6 different substrate concentrations.

Image modified from "Enzymes: Figure 3", by OpenStax College, Biology (CC BY 3.0).

Fig.9.

MITOCHONDRIA ARE THE PRIMARY SOURCE OF ENERGY, THE METABOLIC TURBINE AND REFLEXES THE HEALTH AND SAFETY OF THE BODY.



YOUTH **AGING AND TOXICITY**

Fig.10.

Food converts in energy (ATP) by glycolysis and Krebs Cycle

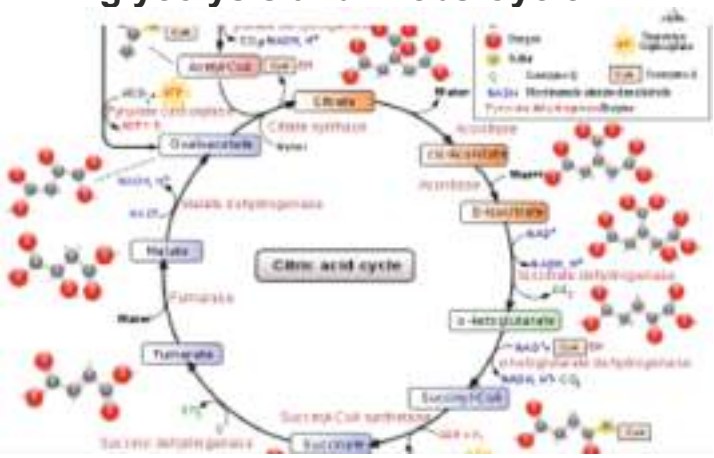


Fig.11.

Citokines storm

Cytokines low molecular weight proteins about 5 to 20 Kdaltos. Zinc regulation of cytokines.
Included numerous types of peptides and proteins: chimiokines, interleukins, lymphokines, and tumor necrosis factors,.

Nutrients. 2012 Jul; 4(7): 676–694. Published online 2012 Ju. 4.
4. doi: 10.3390/nu4070676.
CID: PMC3407988PMID: 22852057
Zinc and Regulation of Inflammatory Cytokines: Implications for Cardiometabolic Disease
Meika Foster and Samir Samman

Lackie J (2010). "cytokines". A Dictionary of Biomedicine. Oxford University Press. "Cytokine". Stedman's Medical Dictionary (28th ed.). Wolters Kluwer Health, Lippincott
Williams & Wilkins. 2006.
ISBN 978-0-7817-6450-6.

Oxidative phosphorilation system and free radical production (Reactive Oxygen Species, ROS)

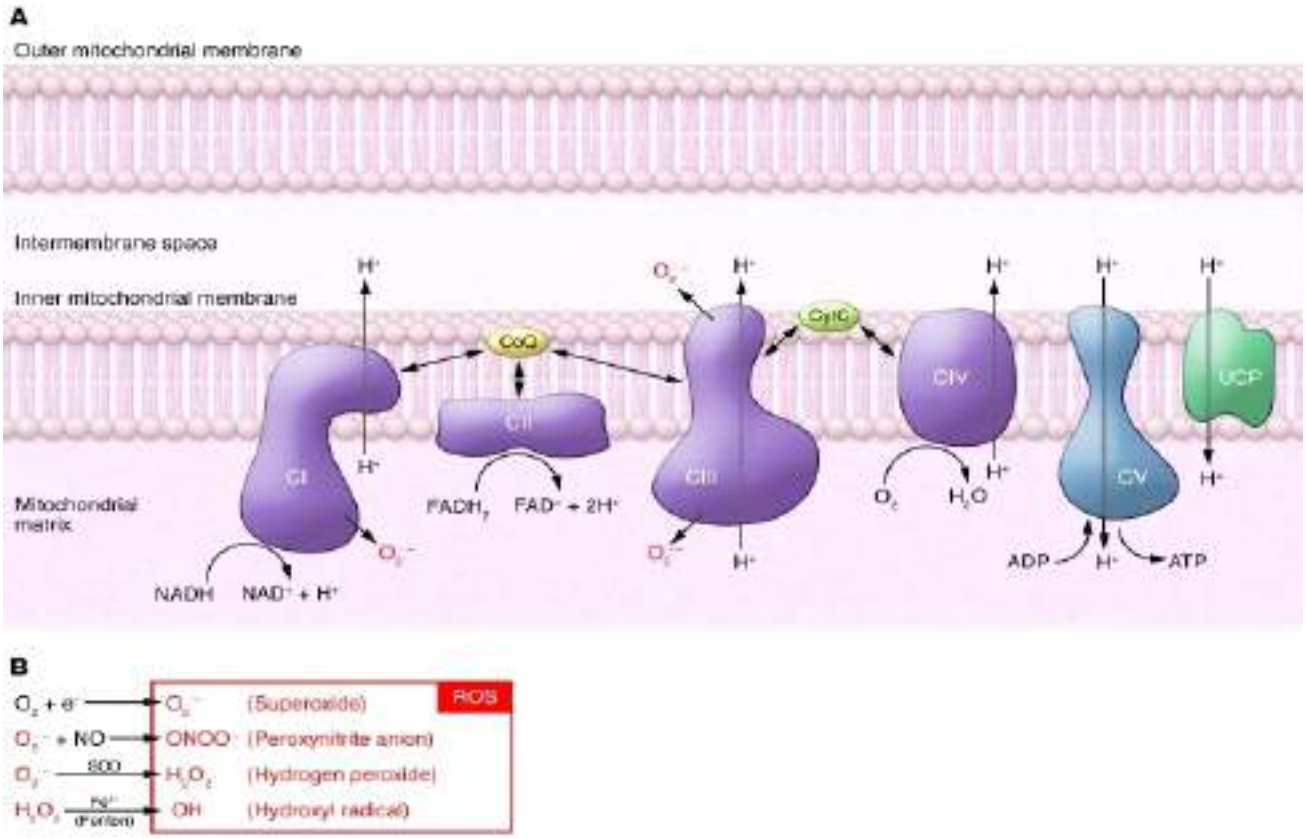
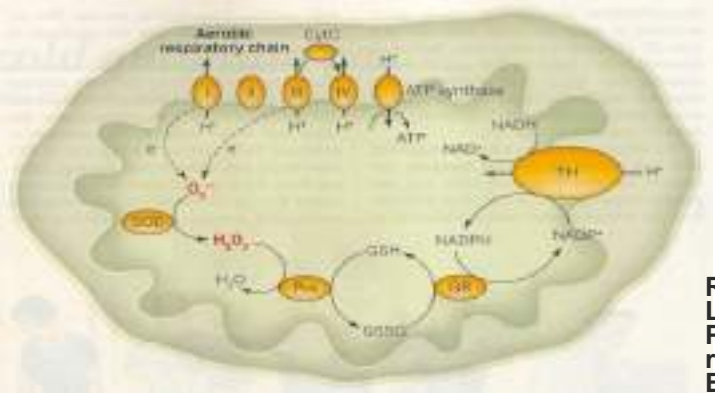


Fig.13.

Free radical reduction after U.Krengel and A.Törnroth-Horsefield

in the mitochondria through Transhydrogenase. SOD transforms the $\bullet O_2^-$ to H_2O_2 which is detoxified by glutathione-peroxidase to water. With the help of reduced glutathione (GSH) as substrate and Glutathione-reductase.

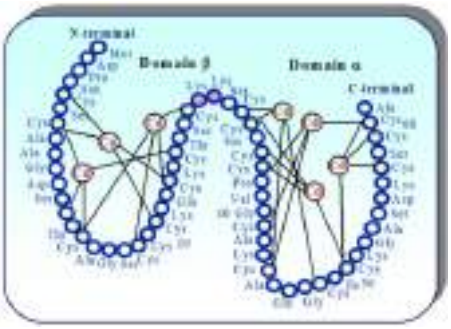


Krengel U. and Törnroth-Horsefield A. 2015; Coping with oxidative stress. Science vol 347, 125-126.

Fig.14.

Metallothionein

Structure after Otvos JD and Armitage IM. (1980) Proc Natl Acad Sci USA, 77, 7094-7098.



Ruttkay-Nedecky B y cols. (2013) The role of metallothionein in oxidative stress. Int J Mol Sci. 14 (3), 6044-6066.

Synthesis of ATP by ATP-synthase

ATP-synthase uses proton gradient to produce ATP, the energy (Kcal) from the diet.

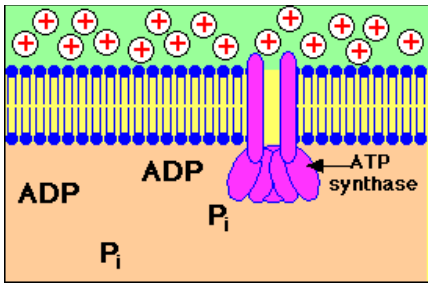


Fig.15.

Important protein not yet applied: Metallothionein (30 % cystein)

Margoshes B.B. and Vallee B.1958

Regulation of lipid accumulation.
Lower the oxidative lesion.
Prevention the stress of the endoplasmic reticulum.
Benefice of associated pathologies and also of the Metabolic Syndrome

Pathology in the adipocite → Regulation by metallothionein (by its absence) → hyperplasia → excess of lipid accumulation (hypertrophy) → Obesity

Sato M, y cols., (2013) Obesity and metallothionein. Curr Pharm Biotechnol. 14 (4), 432-440.

Metallothionein functions

Buttkay-Nedecky and cols. (2013) The Role of metallothionein in oxidative stress. Int J Mol Sci. 2013, 14(3), 6044-6066.