

**11<sup>th</sup> Tinnitus Research Initiative (TRI) Meeting and TINNET Conference 2018**

Regensburg, Germany · March 14 - 16, 2018

**Impact of oxidative stress metabolism and imbalance of Ca/Mg, Ca/P, K/Na index ratios in perception of tinnitus and other inner ear disorders.**

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## INTRODUCTION and PURPOSE.

Since 2008, the TRI (Tinnitus Research Initiative) Organisation has developed the Tinnitus Flowchart for Patient Management and, to date, it has continued its review and updating.

It is well known to all that tinnitus in human beings is a symptom probably caused by a large range of pathologies, and that may also have high underlying comorbidity with other diseases.

Tinnitus as a symptom may arise in all kinds of people, by gender, by ages (children, youths, adults, the elderly) and with differing degrees of health, habits and social backgrounds.

Nobody argues and we believe that the TRI Tinnitus Flowchart provides a good tool for specialists in tinnitus, facilitating clinical practice in evaluation, diagnosis and treatment of patients to come to request help.

However, in spite of help from that methodology, we have always asked ourselves the following question:

**“What biological and/or metabolic parameters may patients with tinnitus have in common?”.**

The purpose of this paper is to present diagnostic aid by a new test, the "Mineral Metabolism Test" (MMT), as primordial proof in initial examination of the patient.

MMT allows us to ascertain deficient states in oligoelements, minerals, presence of toxic metals and metabolic imbalances, that the patient has on arrival at the doctor's surgery seeking HELP.

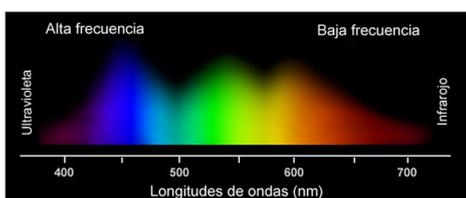
We have introduced a simple technique in our professional consultancies that is well known up to present, based on spectrophotometry (spectroscopy) technology, that may be used in intracelullar measurement of mineral and heavy metal reserves in a sample of any tissue, and in our case on the palm of the hand.

## METHODS

A retrospective chart review of more than 900 persons tested and 289 identified patients with a diagnosis of Tinnitus and 24 patients with Hyperacusis exclusively were evaluated by Mineral Metabolism Test (Oligoscan Test) before to be treated by any Therapy. (see photo 1).



A medical device, trade mark THE OLIGOSCAN\* make instant measurements of minerals, trace elements, oxidative stress and toxic metals. The technology is based on spectroscopy and measurement is taken directly by a portable spectrometer connected to a computer. Test is a non-invasive measurement taken in situ over the hand of patients. This is a medical device with a medical CE marking under European Directive 93/42 / EEC.



Spectrophotometry is a quantitative analytical method of measuring the absorption or the optical density of a chemical. It is based on the principle of absorption, transmission or reflection of light by the chemical compounds over a certain wavelength range.

Oligoscan Test or MMT provides a measurement of 20 minerals and oligoelements and poisoning by up to 14 toxic metals as well other valuated index of mineral ratios and oxidative stress levels. (see diagrams in next page)

In our study of patients with Tinnitus and/or Hyperacusis, we focus our attention on the indexes and ratios of the following minerals: Calcium (Ca), Magnesium (Mg), Phosphorus (P), Potassium (K), Sodium (Na), Copper (Cu) and Zinc (Zn). Ca/Mg, Ca/P, K/Na, Cu/Zn ratios were evaluated as data in their metabolism to understand and improve the patient diagnosis before commencing treatment.

These ratios are values the patients had at the moment of coming to their first consultation for help. Diagrams show the respective mineral-graphs of a typical case of patients with Tinnitus.

\* OLIGOSCAN is a trade mark of LUXOMETRIX-IPC.EU

## Mineral Metabolism Test.—OLIGOSCAN (Legend)

green - normal  
 Yellow - médium deficiency or excess minerals  
 Red - high / risk of deficiency-excess minerals &metals poisoning



LaserTherapy Salud SL  
 (Otológica) Test Oligoelementos  
 Intracelular  
 Centro Médico Nuñez Balboa,  
 107-3ªPta-308  
 Madrid, Zaragoza  
 Tel.:900101851

Apellido: I

Date: 23/03/2016

Hombre 61 años

Nacido(a) el: \*

G. sanguíneo: A

Peso: 98 Kg

Altura: 1m 71

Madrid

### Test de Minerales

	Resultado	Normas	Bajo-	Bajo	Norma-	OK	Norma+	Alto	Alto+
Calcio	638.5	279.0 598.0							
Magnesio	30.3	30.5 75.7							
Fósforo	101.8	144.0 199.0							
Silicio	16.0	15.0 31.0							
Sodio	42.8	21.0 89.0							
Potasio	10.2	9.0 39.0							
Cobre	18.6	11.0 28.0							
Zinc	144.0	125.0 155.0							
Hierro	8.3	5.0 15.0							
Manganeso	0.43	0.31 0.75							
Cromo	0.62	0.82 1.25							
Vanadio	0.020	0.009 0.083							
Boro	3.27	0.84 2.87							
Cobalto	0.026	0.025 0.045							
Molibdeno	0.040	0.035 0.085							
Yodo	0.28	0.32 0.59							
Litio	0.095	0.052 0.120							
Germanio	0.025	0.003 0.028							
Selenio	0.70	0.95 1.77							
Azufre	48.3	48.1 52.0							

### Test de Metales Pesados

	Resultado	Norma	Elevado -	Elevado +	Exceso
Aluminio	0.00992				
Antimonio	0.00270				
Plata	0.01081				
Arsénico	0.00539				
Bario	0.00998				
Berilio	0.00653				
Bismuto	0.01063				
Cadmio	0.01270				
Mercurio	0.01827				
Níquel	0.00295				
Platino	0.00163				
Plomo	0.00696				
Talio	0.00242				
Torio	0.00149				

### Proporciones

Proporciones	Normas	Bajo	OK	Haut	Carencia	Exceso
Ca/Mg	21.08 7.84 18.25					
Ca/P	6.27 1.84 4.15					
K/Na	0.24 0.45 0.75					
Cu/Zn	0.13 0.11 0.17					

### Estrés Oxidativo



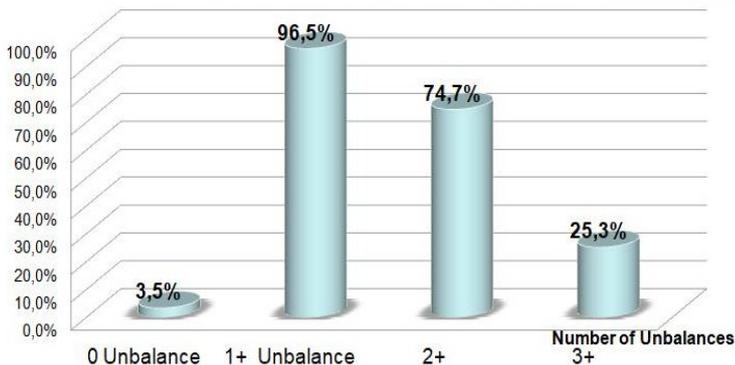
## DISCUSSION and RESULTS

The objective of our comparative study has been to check and ascertain the specific metabolic conditions that might exist and arise among all patients suffering from Tinnitus and/or Hyperacusis disorders.

Many of the disorders of the inner ear, sudden hearing loss, dizziness, hyperacusis, etc., are the result of a possible vascular alteration and/ or degradation of endocochlear homeostasis.

Multiple proteins and other molecules, connexins, fibrocytes and genes are involved in the vascularization of the “*stria vascularis*” and spiral ligament and all of them are fundamental in the ion homeostasis by the cochlear fluids and recycling the K<sup>+</sup>, Na<sup>+</sup>, as well as other ions for synapsis process of Ca, P, Cu and Zn. It is also recognised that neurotransmission levels are altered by imbalances of those minerals.

Mineral Index Unbalance of Ca/Mg, Ca/P, K/Na, Cu/Zn  
 Percentage of patients with Mineral Index Unbalance ■ 289 cases of Tinnitus



In our comparative study, we found that in a group of 289 people with Tinnitus, 96.5% had at least 1 imbalance on the Ca/Mg, Ca/P, K/Na, Cu/Zn indexes, and 74.7% had at least 2 or more unbalanced ratios.

Only 3.5% (10 patients) had indexes within the normal range.

Among patients with hyperacusis disorder alone, even though the sample is small (24 patients), one must point out that 100% have at least 1 imbalanced ratio, but in 99%, they all maintain a K/Na index outside the minimum range (under 0.45). 70.8% had at least 2 or more unbalanced ratios.

It is significantly notable that such imbalances are concurrent with the individual’s bio-nutritional profile.

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An original research method applied on the IoMET programme (registered brand of the NUTERGIA Lab.), was used to compare the qualitative measurement results (Oligoscan Test) and the qualitative results of diagnosis by the habit and symptoms questionnaire provided in the IoMET profile, as an overview of the risks of the person having an unbalanced metabolic state.

In general, in patients with Tinnitus and/or Hyperacusis alone, (that is, having rejected those who had Ménière's disease, sudden hearing loss and dizziness or other vestibular pathologies), maintained a coinciding profile and a characteristic prevailing territory is observed, unbalanced NEURODYSTONIC environment.

The Neurodystonic environment results from exacerbated emotional disorders and is maintained by stressful conditions

of multiple origins and incorrect diet. It therefore equates to the subject's abnormal sensitivity to such aggression and the inappropriateness of the body's response to the stressful situation.

Disrupted neurotransmitter production (deficiency or excess) can cause behavioural, cognitive and memory disorders. Furthermore, symptoms affecting various systems may emerge as the body, unable to respond to stress, will use compensatory mechanisms to the detriment of the functioning of various organs.

There are no less than 100 substances acknowledged to be neurotransmitters, all of which act in different ways.

These neurotransmitters emanate from the metabolism of certain amino acids. Then the conversion of amino acid into neurotransmitter depends on the

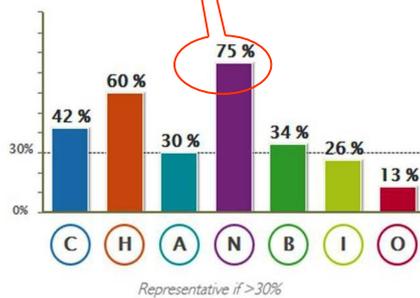


Your personalised  
Bionutritional Profile

Requested by  
Asociación AENORTA  
Diego de León, 47 - edif. MELIOR  
28006 MADRID

For

ASSESSMENT DATE 15.01.2018



Environment(s) to be treated: **B et N**  
IoMET® index **13.5**  
BMI **25.8**  
Birthdate [redacted] years old

various micronutrients such as trace elements and vitamins.

Neurotransmitters like Serotonin, GABA, Noradrenaline, Dopamine and Acetylcholine are in the synthesis pathway, using iron, copper, calcium, magnesium, etc. and some vitamins C and B.

Other important factor is the dissemination of the nerve impulse which it is a process combining electrical and chemical phenomena. It requires significant fluidity of the neuronal membrane for neurotransmitter exocytosis. The fluidity of the plasmic membranes is ensured by polyunsaturated fatty acid content (Omega 3- DHA).

In summary, the majority of the patients evaluated usually display 1 to 3 unbalanced ratios of minerals responsible for neurotransmitter synthesis. These imbalances cause different disorders linked to GABA, Serotonin and Dopamine deficit and others linked to excess Adrenaline and Cortisol.

From the clinical point of view, these disorders are always characteristic and common among the population affected by Tinnitus, matched by:

- Impulsiveness, irritability and even aggressiveness
- Impatience, intolerance towards constraints and disappointments
- Hyperinsomnia, difficulty getting to sleep
- Obsessive-compulsive disorder (OCD)
- Neuro-vegetative manifestations, palpitations, stomach-digestion disorders
- Feeling of insecurity, anticipated unspecified threat, exaggeration of the slightest worry, questions about the future.
- And other food compulsions and additive addictions.

## CONCLUSIONS.

This study and its analysis do not include people with vestibular type pathologies, and it also excluded those with risk of vascular pathologies.

The patients with Tinnitus and/or hyperacusis studied in the groups of normally hearing people, or those with auditory loss in keeping with their age (presbycusis) or due to a traumatic acoustic lesion, and who had high discomfort levels, with exacerbated perception of their tinnitus, showed that they may receive priority or complementary treatment in restructuring their metabolism before commencing other therapies.

A prior analysis of the metabolic state of the patients using the spectrophotometry technique or Mineral Metabolism Test orients the professional regarding the deficient, unbalanced state of their metabolism and lifestyle habits.