



NeuroScience, Inc.
The Leader in Neuro-Endo-Immune Solutions

MELISA[®] Testing

MELISA[®]

What exactly is MELISA[®]?

MEemory **L**ymphocyte
Immuno**S**timulation **A**ssay

MELISA[®] is the world's leading test for allergy to metals and other foreign materials.



MELISA

- The MELISA[®] test is the *only* scientifically-proven and validated blood test that diagnoses metal allergy. It was originally developed by Dr. Stejskal for the diagnosis of occupational allergies in employees working at Astra Pharmaceuticals (now AstraZeneca).

(Astra's validation was performed using 930 patient samples including patients with known metal hypersensitivities). The assay has excellent sensitivity and specificity.



Prof. Vera Stejskal



Prof. Vera Stejskal

Prof. Stejskal is the inventor of the MELISA[®] test and holder of its patent and trademark. She was formerly head of Immunotoxicology at Astra, where she played a key role developing Losec, Astra's multi-billion-dollar stomach ulcer drug. She left Astra in 1996 to concentrate full-time on MELISA[®] and is now Associate Professor of Immunology at University of Stockholm and First Medical Faculty, Charles University, Prague. She is the founder of the MELISA[®] MEDICA Foundation.





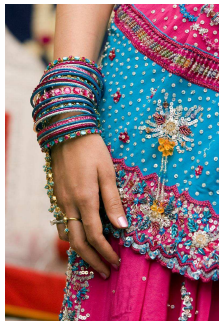
About the Foundation

- The MELISA[®] MEDICA Foundation is dedicated to the science of metal allergy and its diagnosis when treating so-called "incurable" diseases such as Chronic Fatigue Syndrome (CFS), Multiple Sclerosis (MS), and other allergic and autoimmune disorders.



Why MELISA?

- Chronic exposure to foreign materials, metals in jewelry, dental implants and restorations, cosmetics, joint prostheses or even coins can lead to health problems in sensitive individuals as they may be causing an allergic reaction.



Why MELISA?

- MELISA[®] is a simple blood test which can separate those individuals which may suffer side-effects from metal exposure and those that will not.



MELISA® test procedure:

- White blood cells (lymphocytes/PBMCs) from whole blood are isolated and tested against allergen profiles chosen according to the patient's
 - Symptoms
 - History.
 - Dental, occupational, household exposure.



MELISA[®] test procedure:

- The level of reactivity is measured as a Stimulation Index (SI). A value over 3 indicates a positive reaction to a given allergen.



What will the MELISA[®] test indicate?

- **Prior exposure to an antigen**
- **Hypersensitivity to an antigen**
- **Presence of an antigen**



Metals you will see included in our initial testing profiles:

| |
|-------------------------------------|
| Aluminium (Al) |
| Arsenic Acid (As(OH) ₃) |
| Beryllium (Be) |
| Cadmium (Cd) |
| Chromium (Cr) |
| Cobalt (Co) |
| Copper (Cu) |
| Ethylmercury (EtHg) |
| Gallium (Ga) |
| Gold (Au) |
| Indium (In) |
| Inorganic Mercury (Hg) |
| Iridium (Ir) |
| Lead (Pb) |

| |
|---|
| Manganese (Mn) |
| Methylmercury (MeHg) |
| Molybdenum (Mo) |
| Nickel (Ni) |
| Palladium (Pd) |
| Phenylmercury (PhHg) |
| Platinum (Pt) |
| Ruthenium (Ru) |
| Silver (Ag) |
| Thimerosal (C ₉ H ₉ HgNaO ₂ S) |
| Tin (Sn) |
| Titanium (Ti) |
| Titanium Calcium (CaTiO ₃) |
| Titanium Dioxide (TiO ₂) |
| Vanadium (V) |



Allergy Vs. Toxicity

- It is important to differentiate between metal allergy and metal toxicity. MELISA[®] *does not measure the levels of metals in the body; it measures whether the patient is hypersensitive to metals, or has been previously exposed.* MELISA[®] also tells us if there is a presence of the metal in the body.
- For example, hair samples may show levels of mercury or other substances which are below the official “safe limit” – but the patient can still be allergic. *For allergic individuals, there is no such thing as a “safe limit”.* Even trace amounts of a substance pose danger if the substance triggers an allergic reaction.



How is the MELISA[®] test different from other tests currently sold in the USA?

- **Foreign materials can modify proteins. These modified proteins may be considered “foreign” and can activate the immune system, which can lead to chronic inflammation if the presence of the material is not addressed.**
- **Current methods of analysis detect only excreted levels of foreign materials in hair, fingernails, urine, or serum. They do not detect the hidden stores within cells, nor if the patient is hypersensitive to the foreign materials.**



Who Should Be Tested?



Looking for a Root Cause

- NEI Testing Protocol
- Previous test results, direct to MELISA®
- MELISA® may identify the ROOT CAUSE in many conditions and diseases



Who should be tested?

- **What is an immune response and why does it cause symptoms?**
 - Metals induce inflammation in hypersensitive people.
 - When metal particles enter the body they bind with proteins.
 - With hypersensitive people, the new structure is falsely identified by the immune system as a foreign invader.
 - The white blood cells, or lymphocytes, go into attack mode.
 - The activated immune system will up-regulate the activity of certain brain structures (hypothalamus) and adrenal glands.
 - The brain perceives a warning about danger and prepares for defense against the invader. This stress mode will last as long as the inflammation process is fueled by metals.
 - This will result in fatigue while the attack is being carried out by the lymphocytes.
 - When antibodies are produced to attack the protein, the condition becomes far more serious - possibly leading to neuropsychiatric disorders.



Who should be tested?

- **Why do some react and other do not?**
 - There is a genetic predisposition for hypersensitivity to metals and other foreign materials
 - If you or a family member test positive for hypersensitivity to a metal or foreign material, other family members should be tested to assess if they are also hypersensitive to the same materials.



Who should be tested?

- **Genetic predisposition**

- If you or a family member test positive for hypersensitivity to a metal or foreign material, other family members should be tested to assess if they are also hypersensitive to the same materials.



Who should be tested?

- Patients with symptoms of metal allergies
- The most common symptoms of metal sensitivity include:

Contact dermatitis
Dermal lesions
Oral lesions
Headache
Migraine
Neuralgia

Depression
Insomnia
Arthralgia
Paresthesia
Fatigue
Immune Dysfunctions



Who should be tested?

- There are many chronic disease conditions where metal allergy and immune response to chronic exposure could be the root cause:
 - Neuropsychiatric conditions
 - Multiple Sclerosis (MS)
 - Chronic Fatigue Syndrome (CFS)
 - Autism
 - Autoimmune Disorders
 - Allergic Disorders



Who should be tested?

- **Neuropsychiatric disorders:**

- Activated immune system will up-regulate the activity of certain brain structures (hypothalamus) and adrenal glands.
- The brain perceives a warning about danger and prepares for defense against the invader.
- Long-term activation of the immune system can cause neuropsychiatric disorders.



Who should be tested?

- **Chronic Fatigue Syndrome:** The MELISA® Medica Foundation has conducted extensive search on CFS patients. A study involving 930 fatigued patients saw more than half (62 percent) test positive for metal allergy. **The majority of those who removed and avoided the offending metal(s) reported substantial health improvements.**
- **Autoimmunity:** Metal particles can bind to the myelin slightly changing its protein structure. In hypersensitive people, the new structure is falsely identified as a foreign invader and is attacked. This, the body attacking itself, is known as autoimmunity.
 - (Myelin is a substance which helps the brain send messages to the body),



Who should be tested?

- **Multiple Sclerosis (MS).** MS is caused by the erosion of myelin, a substance which helps the brain send messages to the body. The progression of MS may be halted by stopping exposure to the metal.
- **Autism:** The MELISA[®] test is also being used in research to investigate a possible link between childhood vaccines and autism.
 - In 2001, the Institute of Medicine stated it is "biologically plausible" that ethyl mercury thimerosal in vaccines caused neurodevelopmental disorders such as autism.



Who should be tested?

Occupations and industries where metal sensitivity testing may be effective:

- **Dentistry**
- **Surgical**
- **Hairdressing**
- **Cosmetology**
- **Painting**
- **Construction work**
- **Mining**
- **Electrical work**
- **Rubber industry**
- **Wood industry**
- **Paper industry**
- **Textiles**



Who should be tested?

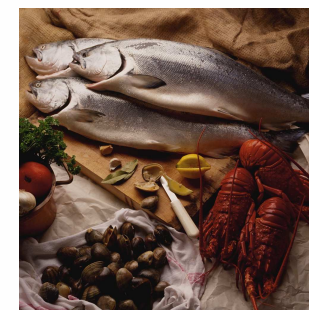
- **Anyone with exposure to metals and would like to know if they have an allergic response should be tested.**

Up to 30 million Americans population has been estimated to have metal allergies

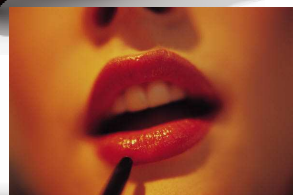
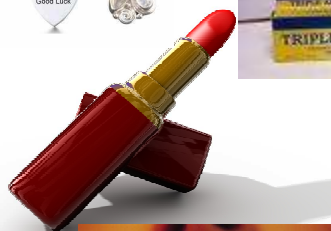
3-8% of the total U.S. population
10% of adults



Sources of Metal Exposure



Sources of Metal Exposure



Sources of metal exposure:

- Orthopedic implants: Implants such as hip replacements, screws, nails, and clips, are usually made from titanium or stainless steel, and often contain nickel and other metals.
- Medical Devices: Including pacemakers, defibrillators, stents, braces, Intra-uterine (IU) devices, and breast implants.
- Dentistry and Dental implants: Dental authorities estimate that 1 in 30 people are hypersensitive to one or more metals used in dental fillings or implants. Mercury is used in dentistry in dental amalgam (fillings).



Sources of metal exposure:

- It is estimated that 1 in 30 people are hypersensitive to one or more metals used in dental restorations, implants, and braces.



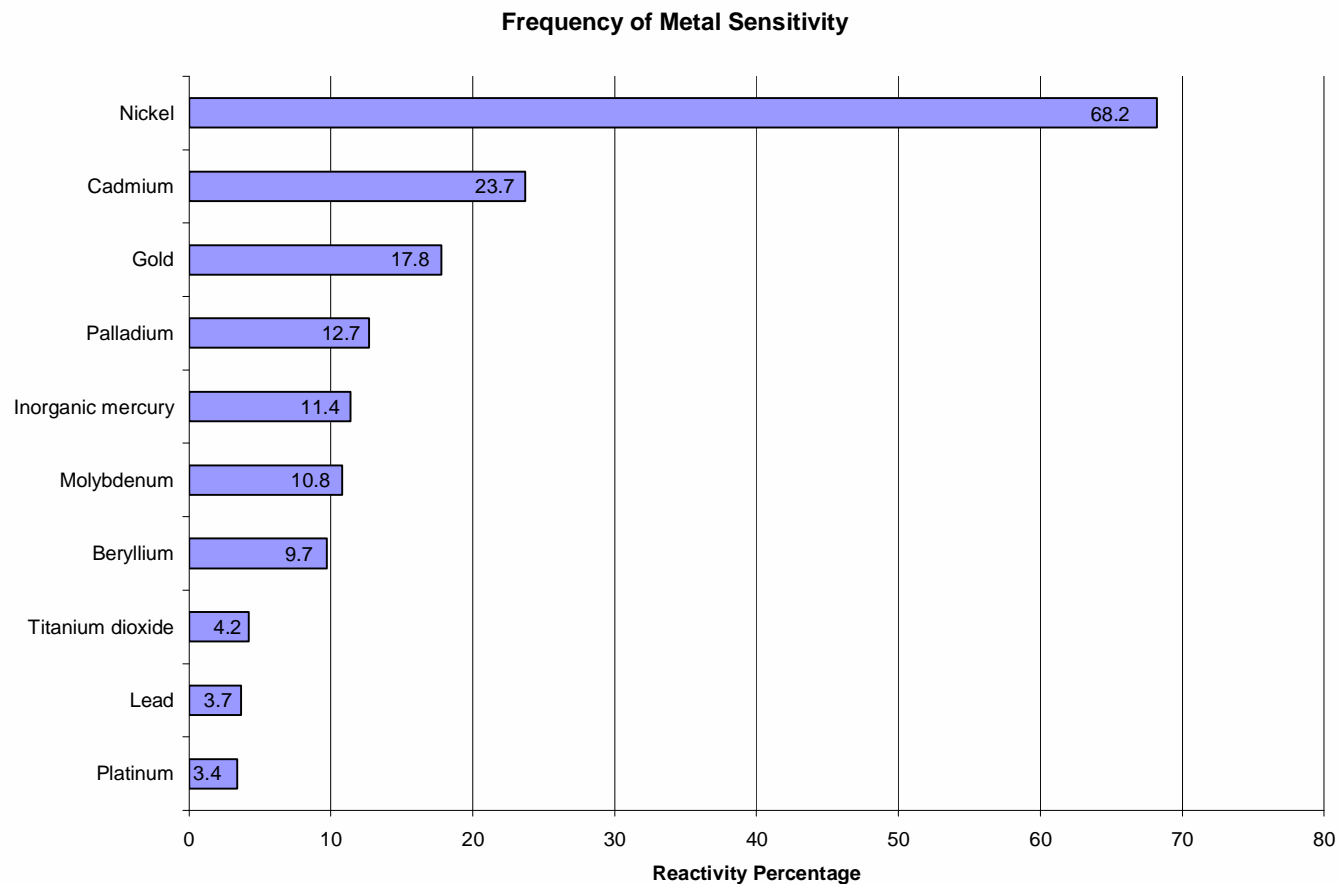
Percentage of people allergic to more than one metal

To understand the frequency and distribution of metal sensitization, blood from 700 consecutive symptomatic, metal exposed patients was tested utilizing the MELISA[®] assay. Reactivity to the varying metals varied, with nickel, cadmium, and gold showing the most frequent responses.



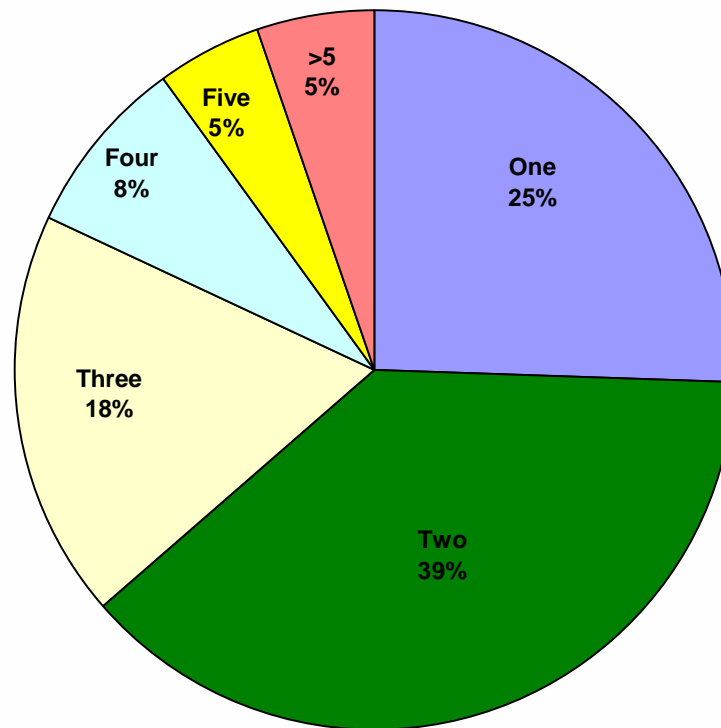
Percentage of People allergic to more than one metal

The results of the frequency and distribution study can be seen in the graph below.



Many patients are allergic and respond to more than one metal

Frequency of Patients Responding to One or More Metals



Sources of metal exposure:

- Dental fillings (amalgams)
 - Dental amalgam is a direct filling material used in restoring teeth. It is made up of approximately 40-50% mercury, 25% silver and 25-35% a mixture of copper, zinc and tin.
 - In July of 2009, **the US Food and Drugs Administration issued a warning against dental amalgam in people with mercury allergy.** This landmark ruling highlighted the dangers of metal allergy. Although it found that the levels of mercury used in dental amalgam was “not high enough to cause harm in patients” but made a clear exception for those who are hypersensitive mercury used in amalgam. Further, it said: “If you are allergic to any of the metals in dental amalgam, you should not get amalgam fillings”.



Sources of metal exposure:

- The FDA's advice on amalgams makes clear the fact that anyone who suspects they may have an adverse reaction to their fillings should take a MELISA test which can test the patient's blood sample against all metals used in dental restorations.
 - www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm173992.htm
- Testing should also be performed before restorations are performed.



Sources of metal exposure:

- Medication:

- Nasal sprays
- Ophthalmic solutions
- Eye drops
- Vaccines utilizing thimerosal
- Fungizone creams
- Hemorrhoid ointments
- Adrenal cortex injections
- Antibiotic ear suspension
- Neomycin suspension
- Cortisone suspension

- Antacids (aluminum)

- Pills

- X-ray fluids

Mercury may be used as a preservative

Aluminum

Titanium dioxide

Barium



Sources of metal exposure:

- Smoking tobacco products:
 - Both active and passive
 - contains mercury, nickel, cadmium, manganese



Sources of metal exposure:

- Jewelry:

- The most common metal used in jewelry that causes allergies is nickel.

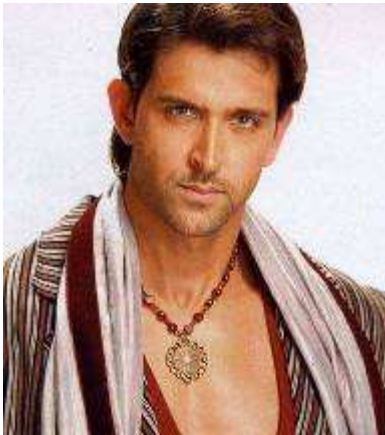


- Even eyeglasses can contain metals that cause allergies.
- Buttons and embellishments on clothing often contain nickel and other metals. Patients may show hypersensitivity from contact with these allergens.
- Mercury may still be used in certain regions of the world in artisanal jewelry and trinkets for tourist sales. Nickel is commonly used in jewelry, as is gold, silver, and other metals.



Sources of metal exposure:

- According to the Food and Drug Administration, the incidence of nickel contact allergies in the overall adult population is estimated at 10%, with a higher prevalence in women than men.



Sources of metal exposure:

- Cosmetics: Products used in the eye area, such as mascara, eyeliner, and eyeshadows are allowed to have mercury based preservatives in them. The U.S. Food and Drug Administration (FDA) still allows continued use of mercurial preservatives in eye-area cosmetics because mercury compounds are exceptionally effective in preventing *Pseudomonas* contamination of cosmetics and *Pseudomonas* infection of the eye can cause serious injury, including blindness.



Sources of metal exposure:

- Cosmetics:

Metals and metal substances are used in many cosmetics and personal care products. Examples of these include:

| | Arsenic Acid | Cobalt | Copper | Lead | Manganese | Nickel | Tin | Titanium dioxide |
|---------------------------|--------------|--------|--------|------|-----------|--------|-----|------------------|
| Blush | | | | | X | | X | X |
| Lipstick | X | X | X | | X | X | X | X |
| Eyeshadow | | | X | | X | | X | X |
| Haircolor | X | X | X | X | | X | | |
| Shampoo/Soaps/Conditioner | | | X | X | | X | | |
| Sunscreens | | | | | | | X | |
| Eyeliners/Mascara | | | | | X | | X | X |
| Anti-perspirant | X | | | | | | | |
| Moisturizer | | | X | | X | | X | X |

Information provided by Environmental Working Group database of products - Skin Deep <http://www.cosmeticsdatabase.com/>



Sources of metal exposure:

- Food:

- Fish can contain high amounts of methyl mercury, which accumulates up in the food chains so that large predatory fish contain more mercury than smaller fish.
- Seafood may contain mercury and arsenic.
- Nickel is found in bananas, cocoa, oatmeal, green vegetables and a variety of other foods.
- Vegetables from polluted areas may contain cadmium, palladium, lead etc.
- Studies have shown that crops that are irrigated have substantially higher levels of metals than foods that are grown without the use of irrigation.
- Tinned food can contain tin and aluminum.
- Wine can contain molybdenum, nickel and lead.
- Food prepared with utensils, and cookware containing metals, can allow metals to enter the body through the foods that are ingested.



Sources of metal exposure:

- Occupational exposure: construction workers, miners, electricians, rubber/wood/paper/textile industry workers, dentists, hairdressers and painters are some occupations that will be more exposed to metals in their work than others.



Sources of metal exposure:

- Residence and work exposure: Living or working close to a highway, airport, crematory or factory may lead to increased exposure to metals such as palladium, cadmium, lead and mercury.
- Household exposure: Household objects: Mercury is used or present in many other items that may be less obvious such as fluorescent light tubes, switches and other electrical devices. It is also present as an unintended contaminant in a wide variety of commercial products such as animal bedding and bleach and may concentrate in plumbing.



What happens after the test results show a metal or foreign material allergy?

Avoid the metal – Avoid exposure
Remove the metal - Remove exposure



NeuroScience, Inc. Support

- Patient results report
 - Will include information about sources of exposure
 - Technical Support will have support information available
 - Assistance in finding information about sources of exposure
 - Website links to learn what cosmetics have metals in them, EPA site to learn about sources of exposure, and....



Visit our Website

www.neuroscienceinc.com/MELISA



www.NeuroScienceInc.com/MELISA

- Links to websites with information about sources and metals used in products
 - [Database of metals used in cosmetics](#)
 - [FDA government information on metals in drugs](#)
 - [U.S. EPA information on mercury in the environment](#)
 - [U.S. NIH information on sources of mercury](#)
- Links to websites with articles, abstracts, poster presentations and case studies
 - [U.S. Food and Drug Administration](#)
 - [MELISA[®] Medica Foundation](#)



References:

- 1: United States Environmental Protection Agency (EPA)
http://publicaccess.custhelp.com/cgi-bin/publicaccess.cfg/php/enduser/std_adp.php?p_faqid=1821
- 2: <http://www.epa.gov/mercury/exposure.htm#3>
- 3: United States Food and Drug Administration (FDA)
<http://www.fda.gov/RegulatoryInformation/Legislation/FederalFoodDrugandCosmeticActFDCAct/SignificantAmendmentsstotheFDCAct/FDAMA/ucm100218.htm>
- 3: United States Food and Drug Administration.
<http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?CFRPart=700&showFR=1&subpartNode=21:7.0.1.2.10.2>
- 4: United States National Institutes of Health Office of Research Facilities
<http://orf.od.nih.gov/Environmental+Protection/Mercury+Free/SourcesofMercury.htm>
- 5: United States Environmental Protection Agency (EPA)
<http://www.epa.gov/mercury/exposure.htm#3>
- Journal of the American Medical Association. Blood Mercury Levels in US Children and Women of Childbearing Age, 1999-2000.
- Cosmetic information provided by Environmental Working Group database of products - Skin Deep <http://www.cosmeticsdatabase.com>
- MELISA® Medica Foundatin. <http://www.melisa.org/articles.php>



Thank you

