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As "women's doctors", we are faced daily with patients' questions about therapies that are unknown to us. From now on, Philippe Blanchemaison, one of the first to join the loyal and enthusiastic editorial board at *Genesis* 16 years ago, will regularly take stock of topics that are worthy of interest and about which we know nothing, or almost nothing. D.E.

The "Detox" cure

My patient asked me about the advantages of an infrared "detox" treatment program. So what can a gynecologist think when a patient comes to his/her practice asking for an opinion about a "detox" treatment program using an infrared device in order to eliminate the buildup of heavy metals through a sweating process?

Women's magazines depict "Detox" treatment programs as very fashionable trends. They are all about "cleansing the body from a potential excess of heavy metals", thanks to nutritional supplements, capsules or herbal teas that contain specific plants with draining properties.
In view of the success of this concept of "body congestion" with our tired and stressed-out patients, it is interesting to consider a proven procedure for eliminating metabolic waste from the organism: Far Infrared therapy.
Heavy Metals feature among these "wastes".

- The modern definition of heavy metals exists in European law

The definition
Within the framework of the "directives on metabolic waste", in European law the term heavy metal refers to any Arsenic, Cadmium, Aluminum, Chromium, Lead, Mercury, Nickel, Tellurium, Thallium, Cobalt, Titanium, Vanadium, Silver, Molybdenum, Antimony compound as well as these materials in metallic form, classified as dangerous substances if they are

absorbed over a certain threshold." This new definition replaces the old one that described heavy metals as those metallic elements with a density over 4 000 kg/m^3.
An even older definition considered "heavy metals" as all the metallic elements between Copper and Lead in the Mendeleev's periodic classification.
Forty-one metals match this general definition, to which five metalloids must be added.

Heavy metal toxicity is acknowledged
These metals referred to as "heavy metals" are potentially toxic over a certain threshold and should be distinguished from trace elements (Zinc, Magnesium, Selenium, Silicon dioxide…) that the body uses daily as catalysts (in very small quantities they accelerate the enzymatic biochemical reactions without participating in them).
Nowadays, however, the definition of metallic trace elements or MTE tends to replace the definition of heavy metals. These MTE are more or less bio-assimilated and may also be concentrated within the food chain according to the elements and the context (acidity of the environment, MTE synergy between each other or their interactions with other pollutants).
This is the reason why some are subject to monitoring regulations in water, soil and air when they are associated with aerosols or dust as well as in food.

The AFSSA (Agence Française de Sécurité des Aliments - *French Food Safety Agency*) is on alert.
A report by the AFSSA (French Food Safety Agency) dated April 2005 on the "evaluation of the risks related to the use of filter systems for tap water covered with metal oxides" focuses on the use of selective adsorbent gratings composed of Aluminum Sulfate or Aluminum Chloride. The report states these gratings are "very efficient to begin with but become less and less efficient over time as the areas of adsorption become saturated".
Another report by the AFSSA, dated March 17th 2005, declares that "treatments based on sand covered with activated Iron or Aluminum oxides can present the following inconvenience: these filters act like biological reactors that can lead to the formation of Nitrates and/or Nitrites linked to the presence of Ammonium ions".
However, the report concludes that treatment processes covered with activated alumina, or Aluminum hydroxide, eliminate a certain number of heavy metals from drinking waters: Arsenic, Cadmium, Chromium, Nickel, Lead, without causing the formation of residues that are sometimes carcinogenic.

The potential dangers are very real.
The UFC "*Que choisir*" (French Federal Union of Consumers) questioned the AFSSA on the dangers related to consumers' exposure to Aluminum, and more specifically on the presence of Aluminum in the water supply and food.
These questions follow the publication by the 330 Unit at INSERM (French Institute of Health and Medical Research) in the American Journal of Epidemiology (1) of the results from the 8-year monitoring of the "Paquid" cohort, finding an increased risk of dementia, in particular Alzheimer's disease, in subjects exposed to Aluminum concentrations higher than 100 µg/l in the water supply, reopened the debate, begun in the 70's, on Aluminum's possible role in Alzheimer's disease. In order to answer this question, a report written by the AFSSA and the INVS (French Institute for Public Health Surveillance), published November 1st 2003, concluded "although some effects related to chronic exposure to Aluminum can currently be considered as proven (encephalopathy, psychomotor disorders, disorders of the bone tissue and of the hematopoietic system under the form of hypochromic anemia), it appears that no causal relationship can be reasonably considered for other initially-suspected effects (Alzheimer's disease), given the current level of knowledge".

However, studies evoking too high a level of heavy metals in human blood and tissue cells are regularly published.
Very recently, new concerns have arisen concerning the presence of Aluminum particles in food.
On the one hand, we are exposed to Aluminum that is naturally present in water and food, and on the other hand to Aluminum used in medicine and cosmetics, food additives, cooking utensils and in water treatment. After Iron, it is the most widely used metal for industrial applications.
In France, the average consumption is around 5 mg per day. However, these relatively low figures do not take into account the other sources of Aluminum (medicine, cosmetics and cooking utensils)!
Non-processed foods contain just a small amount of Aluminum. On the other hand, its use as a coloring agent inevitably implies the ingestion of high doses of this metal. It is allowed for coloring the surface of cooked meats, sweets, candy, tablet-making and cake decorations. It is therefore used as a food additive: acidifiers, colorants, emulsifiers and raising agents. They are the E 520, 521, 522, 523 that can be found in the egg white used in cooking preparations, preserved, crystallized and iced fruit and vegetables; and the E 541 used in pastries.
The E 554, 555, 556, 559 in dried foods in the form of powder (soups, purees), salt, nutritional supplements and sliced or grated industrial cheeses.
Aluminum salts (inorganic salts) are also used in deodorants and certain vaccines.

- What is an infrared device's mode of action?

It is at the beginning of the 19th century that British astronomer William Herschel discovered infrared radiation. He held a mercury thermometer in the spectrum obtained with a glass prism in order to measure the temperature of each color. He found that the temperature was the highest towards the red end of the spectrum, including beyond the red end of the visible spectrum. For the first time, it was concluded that heat could be transmitted by an invisible form of light, that is to say neither by convection (hot air transfer) nor by conduction (propagation between solid bodies).

A touch of biotechnology
It wasn't until 1947 that the positive action of infrared radiation on human tissues was understood, when the Japanese government invested in research to find systems that would enable cells to regenerate from side-effects suffered by the Japanese population after the release of the two atomic bombs.
While this research was being carried out during the 50's, NASA took up research on infrared radiation because it discovered waves in the visible spectrum that are vital to the metabolism and growth of human tissues. This radiation, called "growth radiation", corresponds to far infrared waves, that is to say the region between 8 and 14 μm. In Japan, during the 80's, the first far infrared emitting devices were made using ceramic. This period marked the beginning of the development of infrared domes in Japan. The Iyashi Dome was then created, with the particularity of replacing the ceramic, a mineral, by organic plant material: "B-carbon" technology was born, delivering improved vibratory resonance with an emission wavelength between 5 and 20 μm.
In 1998, the Shimazu Laboratory discovered, for the first time, Dioxin in the sweat of a subject who had just spent 30 minutes in an Iyashi Dome. One Iyashi Dome session can cause the whole body to lose up to 600 ml of sweat.

There is a centuries-old tradition in Japan for people to bury themselves in the warm sand of various hot springs in order to purify their bodies and eliminate the toxins from their bodies. The heat (far infrared radiation emitted by the sun) is diffused by the earth and heats the sand which has specific properties.
This tradition is carried on today with the far infrared Iyashi Dome.

Eliminating heavy metals with far infrared rays.
A clinical trial was carried out and completed in 2010 on 22 patients living in the Swiss canton of Fribourg. Samples of sweat were taken from these patients and analyzed by the Laboratory MGD in Geneva (Switzerland). The possible exposure to heavy metals of each patient was recorded, according to their profession, where they lived, the nature of the water pipes in their apartment block, the number of cigarettes or cigars smoked per day, use of cosmetics, number of dental amalgam fillings and their eating habits.
As soon as the patient started sweating large drops, the sweat was taken using a Pasteur pipette from the patient's chest and arms. Particular attention was paid to not using any metal utensils when taking sweat samples.
In the control group, the analysis shows the presence of many heavy metals in particular Aluminum, Strontium, Copper and to a lesser extent Iron, Nickel, Mercury and Molybdenum.
Titanium, Chromium, Thallium, Cobalt, Silver, Vanadium, Cadmium, Arsenic and Antimony are either found in very small concentrations or are totally absent. Certain people have substantial concentrations of Aluminum (1 420 µm/l), Strontium (560 µm/l), Barium (313 µm/l), Lead (84 µm/l), Titanium (1 911 µm/l) and Chromium (38 µm/l). The values obtained were compared with quantities of the same heavy metals eliminated through urine. It is often incorrectly assumed that the quantity of eliminated urine per day is much greater than the quantity of sweat; and yet the elimination of sweat that occurs passively can range from 200 up to 1 500 ml/day in the case of an individual carrying out a light task in temperatures of 28°C. Moreover, Aluminum is only slightly eliminated by the kidneys (less than 100 µm/l compared to between 600 and 1,000 µm/l through sweat. Also, Nickel, Copper and Barium are eliminated in higher concentrations though sweat than through urine.
The analytical method used on the samples by the laboratory (ICP method, inductive couple plasma) requires heating the sweat that is then analyzed by paper chromatography, which enables each heavy metal detected to be quantified. The detection limit is 1 µm/l. The minimum volume of sweat for analysis is 1.5 µm/l. Some patients had high levels of Cadmium. Yet it has been proven that certain brands of dark chocolate contain Cadmium in greater concentrations than approved levels (under 1.5 µm/l).
- The analysis of the chart in figure 2 shows that the Iyashi Dome increases the amount of toxic heavy metals eliminated such as Strontium, Barium, Nickel, Lead, Molybdenum, Tellurium, Chromium, Cobalt, Arsenic, Cadmium, Aluminum and Copper. This chart shows that the total quantities of heavy metals are higher than the average quantity of 514 µm/l, with particular effectiveness with regards to Aluminum elimination.
- The chart in figure 3 shows the total quantity of heavy metals in micrograms eliminated per liter of sweat for each analyzed individual, as well as the quantity and percentage of Zinc and Aluminum that is present, when these values are higher than the reference values. It can immediately be seen that all the total quantities of heavy metals higher than the average value of 5,014.4 µm/l, have a large excess of Zinc, sometimes Aluminum.
One of the patients who was suffering from daily excessive perspiration, accentuated by stress, presented a very low overall heavy metal content, well below the reference values. On the other hand, this elimination rate significantly increased throughout the Iyashi Dome sessions.

- Conclusion

The analysis of 2ml of sweat taken from patients who underwent Iyashi Dome Far Infrared sessions lasting 25 minutes demonstrates that there is a real impact on the elimination of heavy metals from the body. The simultaneous analyses of urine samples show the heavy metals are essentially eliminated through sweat. The action is particularly efficient with regards to the elimination of Aluminum.

Figure 2: Variation of analyzed metals in the sweat of 22 individuals.
Figure 3: Average metal contents excreted in sweat with mean deviation, extreme values excluded. Blue: average without value, deviation too great. Red: mean + standard deviation.

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