1 **Heavy Metals,**
Hair Testing, Tips and Analysis

Presented by Van D Merkle DC, DABCI, DCBCN

PRESS ON:

- Nothing in the world can take the place of persistence.
- Talent will not; nothing is more common than unsuccessful men with talent.
- Genius will not; unrewarded genius is almost a proverb.
- Education alone will not; The world is full of educated derelicts.
- Persistence and determination alone are omnipotent.

Calvin Coolidge

2 **Vitamin Sales Skyrocket in the Pandemic, but Buyer Beware *www.medscape.com***

- Mar 2, 2021 — The *supplement market*, valued at $48 billion in 2019
- 2020 - $52 Billion due to pandemic
- 2021 - $58 Billion is projected for 2021
- 2021- $193.5 Million spent on Chiropractic according to ACA
  - ACA Corporate report

3

- CHICAGO—January 16, 2019—More than 4 in 5 American adults (86 percent) take vitamins or supplements, according to a recent online survey conducted by The Harris Poll on behalf of the American Osteopathic Association. Jan 16, 2019

4 **CHICAGO, Jan. 16, 2019 /PRNewswire/ --**
NOTE: This was before the pandemic!

- More than 4 in 5 American adults (86 percent) take vitamins or supplements, according to a recent online survey conducted by The Harris Poll on behalf of the American Osteopathic Association.
- However, only about a quarter (24 percent) of those taking vitamins or supplements received *objective test results* indicating they have a nutritional deficiency.

5 **The Joint Chiropractic 6-14-2022**

- Text:
- Join today and receive 4 visits for only $45.00

6 **The Harris Poll on behalf of the American Osteopathic Association. Jan 16, 2019**

Why people take vitamins:

- Recommendations from a physician (51 percent)
- Their own research, based on personal needs (39 percent)
- Recommendations from a friend or family member (22 percent)

- The survey also found 13 percent of Americans choose their vitamins or supplements based on what items interest them in stores
- 13 percent go off of recommendations from a trainer, exercise professional or nutritionist
- 6 percent base their choices on endorsements by celebrities or social media influencers
-

7 **Medical physicians survey in 2020**
Dynamic Chiropractic June 10, 2022

- 23.80 percent of medical physicians intended to leave their practice within 2 years
- 31.4 percent intended to reduce their hours
- Quite possible that has gotten worse.
- A recent survey of physicians published in *Mayo Clinic Proceedings* revealed that one-third of us plan to reduce our work hours in the next year, and 20% anticipate leaving our current practice within the next 2 years. November 2022

8 **Leaving 'The House of God'**
Medpage Today November 26, 2022

- Damaged doctors need to heal our broken hearts
- by Elizabeth LaRusso, MD November 26, 2022

• Consider that prepandemic, male and female physicians committed suicide at rates 40% and 130% higher than those of the general population.

• Comment: With 70% of doctors burnt out, it is no wonder that the AMA, an organization that supposedly represents physicians in the US, reports that 155,000 physicians will quit in the next 2 years (AMA https://www.ama-assn.org/pr...

• John_Hsu_MD - We have gone from the top of the heap to the outhouse. We were the top of the class and we expected our opinions to be of value. Then we lost self-autonomy. 70% of physicians employed, meant that the top office was now held by administrators, nurses, pharmacists, EHR computer engineers, government officials who now tell us what to do. Hospital administrators decide how the business is doing

9 **Medscape April 21, 2023**

- A recent survey by Elsevier Health predicts that up to 75% of healthcare workers will leave the profession by 2025. And a 2020 study conducted by the Association of American Medical Colleges (AAMC) projected a shortfall of up to 139,000 physicians by 2033.
-

10 **Heavy Metals in Baby Food**
Published in Undark May 16, 2023

- The FDA has no standards for heavy metals in foods beyond the action level for arsenic in infant rice cereal and two draft guidance levels for lead in juice and baby food more broadly.
- And while processed foods can be systematically tested for heavy metals, Hettiarachchi's research has shown that even individual and community gardens can also be contaminated, meaning that the risk of exposure remains even with homemade food.
-

11 **Heavy Metals in Baby Food**

Published in Undark May 16,2023

12 **Heavy Metals in Baby Food**
Published in Undark May 16,2023

• Some heavy metals appear to harm brain development and cognition; and linked to ailments including lung disease, kidney disease, skin lesions, and cancer.

• Heavy metal exposure is especially dangerous for infants because, compared to adults, they eat more food relative to their body weight and their diet is less varied.

• Babies are also particularly sensitive to the toxic effects of heavy metals because their bodies are still developing.

•

13 **Heavy Metals in Baby Food**
Published in Undark May 16,2023

• In February 2021, the U.S. House Oversight and Reform Subcommittee on Economic and Consumer Policy released a report on heavy metals in baby food produced by several of the country's largest manufacturers. The 59-page document ended with a call for immediate action from the Food and Drug Administration.

• Two months later, the FDA announced the Closer to Zero initiative, which uses an iterative approach to reduce heavy metal exposure among babies and children.

• The FDA issued draft guidance on lead in fruit and vegetable juice in April 2022 and in baby food more broadly in January 2023.

• Action plans for arsenic, cadmium, and mercury aren't scheduled to be completed until 2024 at the earliest.

• In the meantime, botanists, soil chemists, and plant geneticists— continue to look for potential solutions, from new land management practices to nano-sized fertilizers to genetic engineering. Not all of these technologies are available yet; however, even when they are, eliminating heavy metals entirely won't be easy.

•

14 **Heavy Metals in Baby Food**
Published in Undark May 16,2023

• Heavy metals are naturally present in the Earth's crust and make their way into aquifers and rivers when water travels through underground rock formations and dissolves the toxic elements.

• Arsenic, for example, exists in high levels in the groundwater of the U.S., China, and India.

• Agricultural practices have also contributed to heavy metal contamination.

• The U.S. has led the world in the use of arsenic for agriculture and industry

• Insecticides with lead and arsenic were banned in the 1980s; soil, orchards, lumbar, paddy water, and rice grains still have detectable levels of the toxins.

• These contaminants get sucked up by the roots of a rice plant, which absorb nutrients through proteins in their cell walls.

• According to Parkash, arsenic essentially "hijacks" these pathways. As the plant grows, arsenic travels from the roots into the leaves and grains.

• Scientists including Parkash are looking for ways to stop arsenic from hijacking the plants to begin with.

• One approach is to apply more sulfur to paddy soils, which can bind to toxic metals and make them more difficult to absorb.

•

15 **Heavy Metals in Baby Food**
Published in Undark May 16,2023

- Study: rice plants treated with both inorganic arsenic, the element's more toxic form, and nanosulfur accumulated nearly a third less of the toxin in root tissue than plants exposed to inorganic arsenic alone.
- Parkash and Jason White, the Connecticut Agricultural Experiment Station

16 **Heavy Metals in Baby Food**
Published in Undark May 16,2023

- Wild plants like water spinach and water celery also slurp up nutrients and toxins, and scientists have studied intercropping rice paddies to help remove contaminants.
- When these aquatic vegetables are grown alongside rice, overall concentrations of arsenic in the soil decrease and the wild plants absorb the arsenic.
- Certain species of bacteria can tolerate high levels of arsenic, lead, mercury, and cadmium,
- Some bacteria have been found to mitigate the toxic effects these heavy metals have on plants.
- Other microorganisms can reduce arsenic concentrations in crops.
- Scientists have also genetically engineered bacteria to produce a specific protein that boosts their ability to break down arsenic.
-

17 **Heavy Metals in Baby Food**
Published in Undark May 16, 2023

- Genetic engineering of rice itself, to help the plant block heavy metals, has proven difficult, Shannon Pinson, a plant geneticist at the USDA's Agricultural Research Service, told Undark.
- There is no genetically modified rice in commercial production in the U.S. to date.

18 **Heavy Metals in Baby Food**
Published in Undark May 16,2023

- The FDA notes that strict limits may not be possible for manufacturers.
- Pinson told Undark that although it is possible to produce rice with relatively low levels of arsenic, supply chain realities make it difficult to achieve low levels in rice-based baby foods, in part because sellers merge grains from multiple truckloads from different farms into single bins, making low-arsenic rice difficult to trace.
- The manufacturing process can also increase concentrations in baby food products that make it on the shelf.
- The February 2021 Economic and Consumer Policy Subcommittee report found that, at least in tests from of one company's products, inorganic arsenic levels were 28 to 93 percent higher in the finished products compared to ingredients.
- The report points to high levels of arsenic in additives — like vitamin mixes and spices — as the cause of the spike pre- and post-manufacturing.
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19 **Heavy Metals in Baby Food**
Published in Undark May 16,2023

- For white rice infant cereal:
- Limit of 100 ppb would reduce cancer by almost 19 percent,
- Limit of 75 ppb would reduce cancer by almost 41%

- Limit of 50 ppb would reduce cancer by almost 79%
- The hazard models the report's authors used are a standard approach, but experts told Undark that the science of calculating health risks around heavy metal contamination is complex.
- FDA recommended inorganic arsenic limits at 100 parts per billion, which it first proposed in draft guidance in April 2016 and finalized in August 2020. This is more lenient than the 10 ppb proposed by national lawmakers in the Baby Food Safety Act, a bill that has stalled in Congress since March 2021

20 **Heavy Metals in Baby Food**
Published in Undark May 16,2023

- Investigations by Consumer Reports and the advocacy group Healthy Babies Bright Futures suggest that at least some baby food in stores across the U.S. contains more than 100 ppb of arsenic — four of seven infant rice cereals that were tested exceeded the FDA's limit.
- The February 2021 report, along with a follow-up report issued that September, showed that several companies set internal limits on arsenic above the FDA's guidance. And some companies found that arsenic levels in infant cereal still surpassed their higher limits.
- Baby food manufacturers hold a special position of public trust. Consumers believe that they would not sell unsafe products.
- Consumers also believe that the federal government would not knowingly permit the sale of unsafe baby food, the report read. Baby food manufacturers and federal regulators had "broken the faith."
- Despite evidence of arsenic in infant rice cereal above 100 ppb, there was no FDA-mandated recall. Instead, some companies voluntarily pulled products from the shelves.
- In June 2021, Beech-Nut announced it was leaving the market for rice cereal entirely.
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21 **Heavy Metals in Baby Food**
Published in Undark May 16, 2023

- The FDA has no standards for heavy metals in foods beyond the action level for arsenic in infant rice cereal and two draft guidance levels for lead in juice and baby food more broadly.
- And while processed foods can be systematically tested for heavy metals, Hettiarachchi's research has shown that even individual and community gardens can also be contaminated, meaning that the risk of exposure remains even with homemade food.
-

22 **Heavy Metals**

- Displace your nutrient minerals and cause deficiency.
- There is no positive metabolic function for these metals in the body.

23 **How they harm**

- Non-essential metals may mimic the essential metals, causing a disruption in cellular and enzymatic mechanisms.
- Cadmium can replace zinc
- Thallium can replace potassium
- Arsenic can replace phosphates

24 **Hair Analysis**
Practical Applications

- Drug testing

- Chronic Heavy Metals exposures
- Physiological excess, deficiency, or maldistribution
- Assess body's ability to eliminate heavy metals

25 **Diagnosis Depends on Laboratory Testing**

- Exposures to toxic elements can be acute (one time, short-term) or chronic (many times, long-term).
- Clinical signs and symptoms of toxicity are often different for acute vs chronic exposures but may be non-specific.
- Due to non-specific signs and symptoms of toxicity, as well as the fact that the duration and extent of exposure is often not known, diagnosis of most toxic element exposures depends on laboratory testing.

26 **Arsenic and Lead Are in Your Fruit Juice: What You Need to Know**
Consumer Reports January 30, 2019

- CR finds concerning levels of heavy metals in almost half of tested juices. Here's how to protect yourself and your family.
- They may also contain potentially harmful levels of arsenic, cadmium, and lead, according to new tests from Consumer Reports.
- prior research suggests they are common in food and drink.
- Children are particularly vulnerable to the harmful effects of heavy metals.
- "Exposure to these metals early on can affect their whole life trajectory"
- Not just in juices but also in infant and toddler foods, rice and rice products, protein powder, some types of fish, and sweet potatoes. The toxins may also be in the environment, including the water, the air, and the soil.
- Arsenic, cadmium, and lead each pose their own set of potential harms. Lead, for example, is associated with high blood pressure, heart disease, and fertility problems. Arsenic is linked to cardiovascular disease. And long-term cadmium exposure increases the risk of bone damage and kidney disease, among other issues.
-

27 **Arsenic and Lead Are in Your Fruit Juice: What You Need to Know**
Consumer Reports January 30, 2019 cont:

-

Among the findings:

• Every product had measurable levels of at least one of these heavy metals: cadmium, inorganic arsenic, lead, or mercury.

• Twenty-one (47 percent) of the 45 juices had concerning levels of cadmium, inorganic arsenic, and/or lead. (None contained concerning levels of mercury.)

• Seven of those 21 juices could harm children who drink 4 ounces (½ cup) or more a day; nine of them pose risks to kids at 8 ounces (1 cup) or more a day.

• Five of the products with elevated levels are juice boxes or pouches ranging from 4 to 6.75 ounces. These pose a risk to a child who drinks more than one box or pouch per day.

• Ten of the juices pose a risk to adults: five of them at 4 ounces or more a day, and five at 8 ounces or more a day.

• Grape juice and juice blends had the highest average heavy metal levels.

• Juice brands marketed for children did not fare better or worse than other juices.

• Organic juices did not have lower levels of heavy metals than conventional ones.

28 ☐ **Arsenic and Lead Are in Your Fruit Juice: What You Need to Know**
Consumer Reports January 30, 2019 cont:

- As for lead, the FDA has set a guideline for juice—50 ppb—but CR thinks it should be much lower. The standard for lead in bottled water, for example, is 10 times lower, at 5 ppb. And the bottled water industry seems to be meeting an even lower level of 1 ppb, according to an analysis of FDA data by the Environmental Defense Fund. That's what the American Academy of Pediatrics says the lead level in school drinking water fountains should be. "Juice should also meet this threshold," says Tom Neltner, chemicals policy director at EDF.
- Whatever the source, plants often take up heavy metals from contaminated soil and water. So careful sourcing and testing is key.
-

29 ☐ **Apples and Arsenic**
https://sites.dartmouth.edu/arsenicandyou/arsenic-in-fruits-juices-and-vegetables/

- Plants absorb arsenic from the soil in varying amounts and move it to different parts depending on the type of plant. Arsenic occurs naturally in soil, but arsenic containing chemicals were historically used on orchard fruit trees in the U.S. Although these chemicals are no longer used in this country, arsenic can stay in the soil for long periods of time.

30 ☐ **Apples and Arsenic**
Lower the Arsenic: Wash your fruits and vegetables
and peel root crops before eating.
https://sites.dartmouth.edu/arsenicandyou/arsenic-in-fruits-juices-and-vegetables/

- Fruiting crops like tomatoes, peppers, squash, cucumbers, peas, beans, corn, melons and strawberries – absorb very little arsenic in the parts that you eat.
- Leafy vegetables like lettuce, collard greens, kale, mustard and turnip greens – store more arsenic in the leaves than other types of vegetables do but not enough to be of concern.
- Root vegetables like beets, turnips, carrots, radishes and potatoes – have arsenic mostly in their skins. Peeling these vegetables will get rid of most of the arsenic, but avoid eating the peel or composting as this would put arsenic back into the soil.
- Apples, pears and grapes – absorb some arsenic that occurs naturally in soil or came from past use of pesticides.
- Apple, pear and grape juice – may contain low amounts of arsenic since it is present in the fruit. Juices you mix from concentrate could have higher arsenic if made with arsenic-containing water.
- Apple seeds contain cyanide – not arsenic – and the hard coating of the seed protects you from the small amount in each seed.
-

31 ☐ **Mercury in Foods, Fish, Dairy and Grains**

https://fromhungertohope.com/what-foods-contain-the-most-mercury/

- The US Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) both recommend limiting or avoiding certain types of fish depending on the level of mercury they contain:
  – Skipjack tuna, canned light tuna, mullet, salmon, Pollock, catfish and tilapia are all generally low in mercury.
  – White or albacore tuna tends to have a higher concentration of mercury so it should be limited to no more than 6 ounces per week — that's about one meal for most adults.
  – Orange roughy, marlin, king mackerel and swordfish are among those considered high in

mercury content and should not be eaten often. That means no more than once a month for adults who follow an average 2200 calorie diet per day according to FDA guidelines.

•

32 **Mercury in Foods, Fish, Dairy and Grains**

https://fromhungertohope.com/what-foods-contain-the-most-mercury/

- Mercury in Dairy Products
- Milk, cheese, and butter – contain varying amounts of mercury.
- Because mercury accumulates in the environment from industrial processes and pollution from landfills, it enters the food chain and eventually ends up in dairy products.
- Studies have found that cheeses made from raw milk contain highest concentrations, with levels 50 times higher than those found in pasteurized milk products like fresh milk or yogurt.
- Levels of mercury were also higher for cheeses with high fat content – as fat collects more toxins such as metals than other components of food.
- Cow's milk and other animal-based products can absorb much more mercury due to losing less during the digestion process compared to plant sources. This means that consuming large quantities of dairy products could lead to an excess exposure above safe limits.
- Hence, it is important to limit the intake of high-mercury dairy products when possible by choosing pasteurized or organic varieties where available and looking out for nutritional labels on foods which may indicate higher concentrations of the metal present.

•

33 **Mercury in Foods, Fish, Dairy and Grains**

https://fromhungertohope.com/what-foods-contain-the-most-mercury/

- Grains grown in areas with high concentrations of airborne pollution may be contaminated with elevated levels of mercury.
- Marine phytoplankton which are food sources for many seafood species can transfer heavy metals such as mercury into other food sources.
- Wheat and rye grown near aquatic regions or where there has been recent algal blooms should be avoided when possible.
- -Wheat (1/2 cup): Up to 0.25 parts per million (ppm)
  -Rye (1/2 cup): Up to 0.19 ppm
  -Barley (1/2 cup): Up to 0.15 ppm
  -Oats (1/2 cup): Up to 0.13 ppm
-
-

34 **Mercury in Foods, Fish, Dairy and Grains**

https://fromhungertohope.com/what-foods-contain-the-most-mercury/

- Mercury in Fruits and Vegetables
- Fruits and vegetables may contain trace amounts of mercury.
- Mercury exists naturally in the environment and can be released by both natural processes (such as volcanic eruptions) or human activities (such as mining).
- Mercury can become concentrated in living organisms due to its ability to bioaccumulate – meaning it accumulates in living organs at a higher rate than it is removed from the body.
- There are no established safe exposure levels for elemental or metallic mercury, additional

research is necessary.

• Ultimately, whether eating fruits and vegetables that contain trace amounts of mercury presents an unacceptable level of risk will depend on individual factors including age, gender, body composition mass index (BMI), overall medical history etc., so it is important for individuals to find out their own personal health risks from eating this type of food before making dietary decisions.

35 **Hair Analysis in Environmental Toxicology**

- Analysis of hair samples has many advantages as a preliminary screening method for the presence of toxic substances deleterious to health after exposures in air, dust, sediment, soil and water, food and toxins in the environment.
- The advantages of hair analysis include the non-invasiveness, low cost and the ability to measure a large number of, potentially interacting, toxic and biologically essential elements. Hence, head hair analysis is now increasingly being used as a preliminary test to see whether individuals have absorbed poisons linked to behavioral or health problems.[2]
- Detection of long term elemental effects
- There appears to be genuine validity to the use of hair analysis in the measurement of lifelong, or long-term heavy metal burden, if not the measurement of general elemental analysis. Several interesting studies including the analysis of Ludwig van Beethoven's hair have been conducted in conjunction with the National Institutes of Health, and Centers for Disease Control and Prevention to name a few.
- A 1999 study on hair concentrations of calcium, iron, and zinc in pregnant women and effects of supplementation, it was concluded that "From the analyses, it was clear that hair concentrations of Ca, Fe, and Zn could reflect the effects of supplementation... Finally, it could be concluded that mineral element deficiencies might be convalesced by adequate compensations of mineral element nutrients."[15]
-

36 **Hair Analysis in Forensic Toxicology**

- Hair analysis is used for the detection of many therapeutic drugs and recreational drugs, including cocaine, heroin, benzodiazepines and amphetamines.

37

38 **48 y/o Female**

- CA 27.29 185.70
- Chol 238
- HDL 102
- LDL 191
- CK, LDH, CRP are a Little high

39 **Breast Cancer Case Cont.**

40

41

42 ☐ **Hair Analysis Valid for Mercury Biomonitoring**

- The results of the validation showed that the method (hair analysis) is very well suitable for the determination of both species of mercury (total mercury & methylmercury) in hair for biomonitoring purposes.
  - *Determination of Mercury and Methylmercury in Hair of the Czech Children's Population.* Bio. Trace. Elem. Res. 2007 Oct 20.
- Multiple (many very recent) studies are posted at PubMed with regards to using hair analysis to assess chronic mercury, lead, cadmium and nickel exposure.

43 ☐ **Know What the Test Means**

- Study: The influence of the extraction and fixing of dental amalgams on the metallic concentrations of hair, urine, saliva and blood.
- The levels of mercury increased in urine, saliva and slightly in blood, with a maximum on the second or third day after the intervention
- The increase in hair was very low even at the end of 40 days.
  - Viala, et.al., *Influence of dental amalgams on the concentration of mercury and silver in biological fluids and hair.* Toxicol Eur Res. 1979 Jan;2(1):47-53
- This makes sense because hair cannot be used for acute exposure…why?
  - Growth rate of hair
  - Hair is excretory…elements that show up in the hair results are what the body is eliminating.
  - If very little elimination is showing up in the test results.
    - We have a problem.

44 ☐ **Most Important Use of Hair Analysis**

Raise patient awareness of heavy metals in their environment

45 ☐ **Limitations**

- Hair element analysis is not a diagnostic test of element function, and hair element levels (either high or low) are not always indicative of pathology.
- Not to be used for acute exposure.
- Use a company that washes the hair before analysis.

46 ☐ **Should you clean/wash the hair before analyzing?**

47 ☐ **Hair Washing Causes Erratic Results?**

- "I would suggest using the supplement suggestions on this site rather than those from Dr. Wilson.
- Dr. Wilson wrote to me saying, "Your readers might want to know that hair analysis tests from Great Smokies Lab, King James Laboratory, and Doctors Data will give significantly different results because they wash the hair in acetone and detergent.
- Analytical Research Labs and Trace Elements, Inc do not wash the hair. In the JAMA study referred to by Dr. Mercola, the labs that wash the hair produced erratic results. This is also what was found in earlier studies.
- Hair is biopsy material and harsh washing chemicals damage it. That is a main reason I use ARL (Analytical Research Labs)."
  - http://www.ithyroid.com/hair_analysis.htm
-

48 **Hair washing**

- From: David Quig, PhD
- Fascinating quote.
- It was actually ARL that had about 10 outlier values!
- Use of a standardized wash procedure, like standardization of any laboratory method, is why the National Institute of Standards and Technology (NIST) exists and strives to get consistency among labs.
- A simple response- does ARL have any legitimate data (published) other than their own self published paperback book to support their claims about the meaning of all of those ratios that they report?
- The utility of hair analysis is to evaluate exposure to toxic elements (see the interpretation sections for hair mercury, lead and arsenic on the Mayo Medical Laboratories web site and the CDC).
- Its labs like ARL that over interpret hair elemental analysis and give the entire industry, and CAM a bad rap.

49 **Why hair washing?**

- Hair grows from within the cell and a hair sample gives a 3-6 month indication of exposure
- Most people wash their hair everyday
-

50 **Hair washing**

- You want to test hair, not stuff on the hair.
- Maybe ingredients of hair products:
- Men's hair products to color it darker use or used to use lead.
-

51 **Hair Can Be Used To Determine**
Drug Use vs External Contamination

- 3 steps are usually employed in order to minimize the possibility of external contamination causing a misinterpretation.
  - First, decontaminating hair samples by washing the hair before analysis
  - Second, detection of the relevant metabolites in the hair samples
  - Third, is the use of cut-off levels.
    - Accessed via PubMed
    - Tsanaclis, et.al., *Differentiation between drug use and environmental contamination when testing for drugs* in hair. Forensic Sci Int. 2007 Nov 1

52 **Hair Can Be Used To Determine**
Drug Use vs External Contamination

- A wash protocol needs to be practical and ideally remove any drug deposited on the external portion of the hair.
- For drugs, the analysis of the wash residue (W) and its comparison with the levels detected in hair (H) can be used to reduce confounding factors.
  - Accessed via PubMed
  - Tsanaclis, et.al., *Differentiation between drug use and environmental contamination when testing for drugs* in hair. Forensic Sci Int. 2007 Nov 1

53 **Hair Can Be Used To Determine**

Drug Use vs External Contamination

- Where the W/H ratio is less then 0.1 or null, it would tend to indicate drug use as opposed to environmental contamination.
- Where the W/H ratio is above 0.1 but less than 0.5, it is likely to indicate possible use possibly combined with a level of external contamination.

54 **Does it matter if there is external contamination with regards to heavy metals?**

If it's in the environment, it's probably in you.

55 **Interpreting Hair Lab Results**

- Because of pollution, industry, and other environmental factors, there is no way you can totally eliminate your exposure to some of these toxic elements.
- However, there are things we can do daily to limit or reduce our exposure to these toxic elements and therefore lessening the total toxic burden on your body.

56 **Lead Puts 30 million Adults at Risk**

- Those with elevated blood levels of lead early in life have a 46% increased rate of mortality from all causes later on, indicating that children may carry a legacy of lead toxicity as they grow older.
- "It indicates that there is increased cardiovascular and cancer mortality in adults at blood lead levels we haven't been concerned about before."
  – Dr. Peter Orris, Director of the Occupational Health Services Institute at the University of Illinois at Chicago reported in the Archives of Internal Medicine 12-2002

57 **ADD/ADHD Plus in**
12 year old boy

- Typical ADD symptoms
- Skin rash all over body would occur 2 times per month and last for 2-3 days.
- Swollen inflamed gums all the time
- Cleared of all symptoms when the intake of 5-6 cans of soda were stopped

58 **ALUMINUM**

- Any Aluminum is too much.
- Aluminum toxicity is associated with Alzheimer's and Parkinson's disease, behavioral/learning disorders such as ADD, ADHD and autism.
- High levels of aluminum have been found in the hair of delinquent, psychotic, and prepsychotic boys, and in juvenile offenders.
- Aluminum has neurotoxic effects at high levels, but low levels of accumulation may not elicit immediate symptoms.
- Early symptoms of Aluminum burden may include fatigue, headache, and other symptoms.
- Aluminum is a heavy metal that displaces your other good minerals, such as magnesium, calcium, zinc and phosphorus.

59 **ALUMINUM**
Most Common Sources

1 • antiperspirants
- aluminum cookware
- antacids
- some baking sodas
- baking powder

- some breath mints
- pickles
- some skin lotion
- some cosmetics
- aluminum foil
- canned goods
- emulsifiers in some processed cheese
- table salt - anti-caking compound

2 • bleaching agent used in white flour

- buffered aspirin
- some toothpaste
- dental amalgams
- cigarette filters
- drinking water (tap water)
- do not eat or drink anything that comes in a can
- read your labels before you purchase. Aluminum has also been found in a granola bar.
-

60 **Aluminum**

- Fluoride and Fluoridation increases the absorption of Aluminum.
- Chlorella and Magnesium with Malic Acid have been reported to be quite effective in lowering Aluminum.
-

61 **Antimony**

- Antimony or Stibium have no known function in living organisms and is similar to but less toxic than arsenic.
- Like Arsenic, Antimony is conjugated with glutathione and excreted in urine and feces causing depletion of intracellular glutathione pools.

62 **Early Sign of Antimony Excess**

1 • fatigue

- muscle weakness
- joint pain
- altered EKG
-

2 • low back pain

- headache
- metallic taste
- nausea
- myopathy
-

63 **Later Symptoms of Antimony Excess**

1 • hemolytic anemia

- myoglobinuria

- hematuria
- renal failure
-

2 • "antimony spots" may resemble chicken pox
- common in patients with ADD/ADHD and autism
-

64 **Antimony**
Common Sources

1 • foods stored in enamel vessels and cans
- cigarette smoke
- textile industry
- paints
- glass
- ceramics
- solder
- batteries

2 • semiconductos
- antihelminthic & antiprotozoic drugs.
- concentration of Antimony are influenced by geography, season and refining of foods.

65 **Chronic**
Arsenic Exposure

1 • Bone marrow depression
- Leukopenia
- Normochromic anemia
- Exfoliation and pigmentation of skin
- Neurological symptoms
- Polyneuritis

2 • Altered hematopoiesis
- Liver degeneration
- Kidney degeneration
- Skin cancer
- Cancers of the respiratory tract
- agitation, learning impairment, and confusion.

66 **Arsenic**
Delayed Toxicity Symptoms

- abdominal pain
- nausea
- vomiting
- hematuria
- jaundice
-

67 **Arsenic**

- Ingestion of large amounts of soluble Arsenic compounds effect the myocardium, causing death

within a few hours.

68 **The current EPA standard for arsenic in public water systems is 10 ppb, reduced from 50 ppb in 2006. The standard applies only to drinking water sources that serve more than 20 people.**

69 **Ingesting Smaller Amounts of Arsenic**

- epigastric pain
- vomiting and diarrhea
- inflammation of the conjunctiva and respiratory mucous membranes
- epitaxis
- transient jaundice
- cardiomyopathy
- erythematous
- visceral rashes
- sweating

70 **Ingesting Smaller Amounts of Arsenic**

1 • Other symptoms
  – malaise
  – muscle weakness
  – eczema
  – dermatitis
  – increased salivation
  – strong "garlic breath"
  – Alopecia totalis
  – vomiting
  – diarrhea
  – skin cancer

2 – Hematological, renal, or pancreatic dysfunction may be observed.
  – Symptoms of neuropathy are experienced and typically appear as with tingling and paresthesia in the extremities.
  – Proteinuria and methemoglobinemia are frequently observed, causing renal failure and death.

•

71 **Arsenic**

1 Symptoms

2 – bone marrow depression
  – Anemia
  – skin discolorations
  – neurological symptoms
  – liver and kidney degeneration
  – Cancers
  – Agitation

•

3 – learning impairment
  – confusion
  – Malaise

- – Vomiting
- – Diarrhea
- – Eczema
- – muscle weakness
- – hair loss
- – stomach pain
- – respiratory issues
-
-

72 **Arsenic**

- Can be absorbed by the human body through the respiratory and GI tracts and through the skin.
- Elevated hair levels are seen long before clinical signs of arsenic toxicity are obvious.
- The relationship between cognitive functions and hair mineral concentrations of lead, arsenic, cadmium, and aluminum was examined for a random selection of 69 children. The data obtained showed a significant correlation between reading and writing skill and elevated arsenic levels, as well as interaction between arsenic and lead. Children with reduced visual-motor skills, had clearly elevated aluminum and lead levels.
-

73 **Arsenic, Water, Cancer**

- Even small amounts of arsenic might cause cells to lose some of their ability to repair genetic damage, a new study has found. The results help explain why arsenic contamination in drinking water can lead to certain cancers. Without the ability to repair its DNA, a cell could be vulnerable to damage from pollutants such as cigarette smoke.
  - – Dartmouth Medical School, *International Journal of Cancer* 4/2003

74 **Case: David P.**

- Extreme high Arsenic
- Severe abdominal pain and rectal bleeding.
- Dx'd with Crohn's disease and had his colon removed at age 20.
- MD's refused to consider Arsenic toxicity.

75

76

77 **Arsenic**

Common Sources

- tobacco smoke and is a suspected causative factor in lung cancer.
- metal smelting
- the production of glass, ceramics, insecticides, fungicides and herbicides mobilize environmental arsenic
- drinking water may also be a source of arsenic
- the use of arsenic-containing paints is a known source of arsenic poisoning.

78 **Arsenic**

1 • Sources
  - – Tobacco smoke
  - – Metal smelting

– Production of glass
– Ceramics
– Artificial Colors
2 – Insecticides
– Fungicides
– Herbicides
– Drinking water
– Wood treatments

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•

79 **Therapeutic Consideration for Chronic Arsenic Overexposure**

- Antioxidant therapy especially ascorbic acid
- Calcium ascorbate
- Vitamin E (all tocopherols)
- Increased intake of sulfur-containing amino acids
- Vitamin B6.
- Arsenic suppresses iodine and selenium.

80 **As Water Levels Drop, the Risk of Arsenic Rises**
By Melissa Bailey May 24, 2023 reported in Medpage

- As Water Levels Drop, the Risk of Arsenic Rises
- Colorado- Now decades of climate change-driven drought, combined with the over pumping of aquifers, is making the valley desperately dry — and appears to be intensifying the levels of heavy metals in drinking water.
- Arsenic has been appearing in rising levels in drinking water in the valley
- Nationwide, about 40 million people rely on domestic wells, estimated Melissa Lombard, a research hydrologist for the U.S. Geological Survey. Nevada, Arizona, and Maine have the highest percentage of domestic well users — ranging from about a quarter to a fifth of well users — using water with elevated arsenic levels, she found in a separate study.
- During drought, the number of people in the contiguous U.S. exposed to elevated arsenic from domestic wells may rise from about 2.7 million to 4.1 million people, Lombard estimated, using statistical models.

81 **Arsenic- getting higher in wells**

- Arsenic has been shown to affect health across the human life span, beginning with sperm and eggs, James said. Even a small exposure, added up over the course of a person's life, is enough to cause health problems,
- Lifetime exposure to low levels of inorganic arsenic in drinking water, between 10 and 100 micrograms per liter, or µg/L, was linked to a higher risk of coronary heart disease.
- Other research has tied chronic exposure to low-level arsenic to hypertension, diabetes, and cancer. Pregnant women and children are at greater risk for harm.
- The World Health Organization sets the recommended limit on arsenic in drinking water at 10 µg/L, which is also the U.S. standard for public water supplies. But research has shown that, even at 5 µg/L, arsenic is linked to higher rates of skin lesions.
- Arsenic, which she said has been gradually increasing in valley drinking wells over the past 50 years

•

82 **Arsenic - It's colorless and odorless**

• Wells show elevated levels of heavy metals, including arsenic, uranium, tungsten, and manganese, which occur naturally in the soil.

• Unlike public water supplies, private domestic wells are not regulated, and they may go untested for years.

• "It's colorless, it's odorless," Zahringer said. "Most families don't know if they're drinking arsenic."

• If arsenic shows up in a private well, she encourages clients to install reverse osmosis water filtration at the kitchen sink.

•

83 **Barium**

• Symptoms of toxicity include muscular and myocardial stimulation, tingling in the extremities, and loss of tendon reflexes.

• Dietary sources of barium include milk, flour, potatoes, and some types of nuts.

• Barium is commonly used in Cat Scans and MRI

•

84 **Barium Side effects**

1. Cancer
2. Birth defects
3. Allergic reactions
4. Bloating
5. constipation (severe, continuing)
6. cramping (severe)
7. nausea or vomiting
8. stomach pain
9. tightness in the chest
10. trouble breathing
11. Anxiety
12. blood in the urine or stools
13. blurred vision
14. bruising
15. chest pain
16. confusion
17. cough
18. coughing or vomiting blood
19. dizziness, faintness, or lightheadedness
20. fainting
21. fast or slow heartbeat
22. hives or welts, itching, or skin rash
23. noisy breathing
24. persistent bleeding
25. redness of the skin
26. sweating
27. unusual tiredness or weakness

28.Constipation or diarrhea

29.cramping

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85 **Beryllium**

- Toxicity: Animal tests document that osteosarcomas can be induced with aerosols containing beryllium compounds such as beryllium oxide, phosphate and sulfate. Chronic beryllium exposure is increasingly mentioned in medical literature.
- Symptoms: Respiratory problems, Hepatic problems
- Biochemistry: Beryllium blocks several hepatic enzyme systems.
- Marcotte and Witschi (1972) suggested that this trace element binds to chromatin and interferes with DNA synthesis.

86 **Beryllium Source**

- Nuclear industries
- Metal processing, especially beryllium processing
- Telecommunications
- Aeronautical and computer industries
- Certain oil paints
- Like arsenic, beryllium is a by-product of tobacco smoke

Beryllium exposure is associated

with lung cancer.

•

87 **Bismuth**

- Bismuth is a major player in the metallurgical industry.
- Many industries are using bismuth instead of lead because lead is so toxic.
- Bismuth is nontoxic in ordinary amounts, but prolonged exposure or excessive use may lead to toxicity.
- It is a basic ingredient in a range of fusible alloys; an additive to aluminum, steel, and cast iron to improve machinability; and widely used to support dyes and molds.

88 **Bismuth**

- Bismuth has been used in health care for centuries.
- Slightly soluble mineral salts are used in antacids such as Pepto-Bismol.
- Bacterial properties of bismuth salts are used to treat skin injuries and infection.
- The medical profession used bismuth castings to shield vital organs during radiation therapy.

•

89 **Bismuth Toxicity**

1 • nephrotoxicity

- encephalopathy
- constipation
- bowel irregularity
- foul breath
- neurotoxicity
- mental confusion
- memory loss

- lack of coordination
- slurred speech
- joint pain
2 • tremor
- memory loss
- monoclonic jerks
- dysarthria
- dementia
- seizures
- muscle twitching and spasms
- foul breath
- blue/black gum line
- malaise

90 **Bismuth Sources**

- antacids
- Pepto-Bismol
- dental cement
- glass
- ceramics
- optical lenses
- synthetic pearls
- cosmetic formulations where they impart pearlescence to lipstick, nail polish and eye shadow
-

91 **Boron**

- Signs of toxicity
    - nausea
    - vomiting
    - diarrhea
    - dermatitis
    - lethargy
    - inflammation
    - edema in the legs
    - growth problems
    - testicular atrophy
- Boron is present in some cleaners, cements, ceramics, glass, water and soil.

92 **Boron**

- Make sure there are adequate levels of calcium, magnesium, phosphorus, riboflavin and B6.
- Recent studies clearly indicate that Boron has an important role in normal bone metabolism/density and may be needed for normal membrane function.
- In post-menopausal women consuming a very low boron diet, boron supplementation significantly lowered urinary excretion of calcium and magnesium and increased serum levels of estrogen.

93 **Boron Deficiency**

- skin allergies
- eczema
- acne
- enteritis
- Osteoporosis
- Estrogen deficiency
- Hormonal imbalance
-

94 **Boron**

- It is important in adrenaline and in carbohydrate and lipid metabolism
- Boron influences the metabolism of calcium, phosphorus, magnesium and cholecalciferol.
- Calcium supplementation is recommended with Boron.
-

95 **Cadmium**

- Cadmium is associated or known to cause cancer in:
  - Uterus
  - Mammary Gland
  - Kidney
  - Prostate
  - Testicular
  - Lung
  - Pancreas
  - Because of direct inhibition of DNA mismatch repair
    - McMurray, et.al., *Cancer, cadmium and genome integrity.* Nature Genetics 34, 239-241 (2003) doi: 10.1038/ ng0703-239
  -

96 **Cadmium**

- Cadmium (Cd) is a toxic, heavy metal with no positive metabolic function in the body, and is relatively rare but more toxic than lead.
- Moderately high cadmium levels are consistent with hypertension, while very severe cadmium toxicity can cause hypotension.
- Cadmium absorption is reduced by zinc, calcium and selenium.
- Alkaline Phosphatase is commonly elevated with Cadmium toxicity.

97 **Cadmium**

- Cadmium toxicity is common among welders and construction workers (cement dust).
- Contamination may come from perms, dyes, bleach and some hair sprays, and can cause false highs for Cd.
-

98 **Cancer, Cadmium and Genome Integrity**

- Cadmium is an element with no known biological function and is one of the most serious environmental pollutants.
- Cadmium has a high affinity for protein−sulfhydryl groups, competes with Zinc in proteins and binds to DNA bases with little sequence specificity causing single-strand DNA breaks.

- Cadmium toxicity may therefore represent a new mechanism by which genomes can be destabilized, and this observation expands the definition of the term 'mutagen'.

99 **Cancer, Cadmium and Genome Integrity**

- Roughly 15,000 tons of cadmium are produced worldwide each year for nickel-cadmium batteries, pigments, chemical stabilizers, metal coatings and alloys.
- Because of its low excretion rate (biological half-life = 10−30 years), cadmium accumulates in the body.
- Reported mutagenic effects of cadmium include generation of reactive oxygen species, inhibition of several types of DNA repair, depletion of glutathione and alteration of apoptosis.
  - *Cancer Epidemiology Biomarkers & Prevention* Vol. 9, 139-145, February 2000 American Association for Cancer Research

100 **Cadmium & Pancreatic Cancer**

- Most of the cadmium produced in the United States is extracted during the smelting of other metals, such as zinc, lead, or copper. Other sources of environmental cadmium are the burning of fossil fuels and waste materials and the use of phosphate fertilizers and sewage sludge.
- Food is the main source of cadmium for the non-smoking population. (found in shrimp, oysters, crawfish, etc.) In the United States, the average person consumes approximately 30 µg of cadmium per day in food and absorbs 1–3 µg from the gastrointestinal tract.
- Because the body has no mechanism for the excretion of cadmium, it accumulates in tissues. In humans, the largest amount of cadmium is deposited in the kidneys, liver, pancreas and lungs.

101 **Cadmium & Pancreatic Cancer cont.**

- Cadmium is one of the most potent agents known to induce transdifferentiation of the pancreas.
- Cadmium can induce or regulate the activation of several oncogenic proteins and tumor suppressor proteins that are in pancreatic cancers.
- Summary:
  - exposure to cadmium > Cadmium accumulates in the pancreas > increased differentiatiation and DNA synthesis and ocogene activation > increased risk of pancreatic cancer.
    - Departments of Cancer biology and public health sciences, Comprehensive Cancer Center of Wake Forest University, Winston-Salem, North Carolina 27157 (G.G.S)
-
-

102 **Cadmium Mimics**
Effects of Estrogen

- Environmental contaminants that mimic the effects of estrogen contribute to disruption of hormone-related cancers and diseases in Western populations.
- Previous studies have shown that functionally, cadmium acts like steroidal estrogens in breast cancer cells as a result of its ability to form a high-affinity complex with the hormone binding domain of the estrogen receptor
- Exposure to cadmium increased uterine wet weight. In the uterus, the increase in wet weight was accompanied by proliferation of the endometrium and induction of progesterone receptor (PgR) and complement component C3.
- In utero exposure to the metal also mimicked the effects of estrogens. Female offspring experienced an earlier onset of puberty and an increase in the epithelial area and the number of terminal end buds in the mammary gland.
  - Nature Medicine 9, 1081-1084 (2003) published online: 3 July 2003; doi:10.1038/nm902

•

103 **Association of Cadmium with Renal Cancer**

- Sixty-four cases of renal cancer in white males were compared with controls for past exposures to cadmium. Controls were also white males, and were group-matched to the cases on age for the analyses. Data on the three main sources of exposure to cadmium--diet, cigarette smoking and occupation--were obtained by interview.
- The results showed a significant association of renal cancer with exposure to cadmium, and favored a synergistic effect between occupational exposure and smoking. The relative risk for men who both smoked and worked in high-risk occupations was more than four times that for men who did neither.
  – Cancer. 1976 April 37(4): 1782-7
-

104 **Cd & Prostate**

- Cadmium exposure appeared to result in an increased risk for prostate cancer, most apparent for aggressive tumors.
- Cases were more likely to have worked in the following industries: mining, paper and wood, medicine and science, and entertainment, recreation and the tobacco industry or having smoked.
- www.pubmed.gov

105 **Hair Cadmium levels used to Dx Mental Retardation**

- 415 normal and 85 Mentally Retarded (MR) children's hair cadmium (Cd) contents were measured
- Hair of both male and female MR children were obviously higher than those of normal children
- If the Cd content in the hair of male children is higher than 0.239 microgram/g, and higher than 0.180 microgram/g in the female, MR can be diagnosed.
- Authors concluded, hair Cd can be used as an additional criterion in the diagnosis of MR and may be important in the screening for MR.
-
- PubMed accessed: Jiang, et.al., *Clinical significance of hair cadmium content in the diagnosis of mental retardation of children*. Chin Med J (Engl). 1990 Apr;103(4):331-4

106 **Cadmium**

- Cadmium (Cd) is a toxic, heavy metal with no positive metabolic function in the body, and is relatively rare but more toxic than lead.
- Moderately high cadmium levels are consistent with hypertension, while very severe cadmium toxicity can cause hypotension.
- Cadmium absorption is reduced by zinc, calcium and selenium.
- Alkaline Phosphatase is commonly elevated with Cadmium toxicity.

107 **Cadmium Affects**

1 • Kidneys
- Lungs
- Testes
- Arterial walls
- Bones
- Interferes with many enzymatic systems
- Depletes glutathione

- Leads to anemia
2 • Proteinuria
- Glucosuria
- Depletes
  – calcium
  – phosphorus
  – zinc
-

108 **Cadmium**

Symptoms of Contamination

- hypertension
- fatigue
- muscle and joint pain/osteomalacia
- anemia
- learning disabilities
- dyslexia
- delinquency
- schizophrenia
- high anxiety
- atherosclerosis
- kidney damage with associated urinary loss of essential minerals, amino acids and protein.

109 **Cadmium**

Common Source

1 • refined foods (white flour, white sugar, etc.)
- acid drinks left in galvanized pails or ice trays
- superphosphate fertilizers
- gluten flour
- some cola drinks
- tap water
- atmospheric pollution in the burning of coal and petroleum products
- seafood
2 • plastic water pipes
- margarine
- canned fruits and beverages
- sugar and molasses
- alcoholic drinks
- cigarette smoke
- zinc smelters
- cadmium plating used in soft drink dispensing machines.

110 **Cadmium**

- Cadmium toxicity is common among welders and construction workers (cement dust).
- Contamination may come from perms, dyes, bleach and some hair sprays, and can cause false highs for Cd.
-

111 ☐ **Calcium**

- High levels of calcium in the hair is most often associated with an imbalance of the calcium to phosphorus ratio in the body. Other causes include hyperparathyroidism and excess vitamin A or D intake.
- Excess calcium may depress nervous functions, and lead to depression, irritability, memory impairment, and psychosis.
- ODDLY: HIGH HAIR CALCIUM could be due to inadequate dietary calcium, protein or Vitamin D, physical inactivity, chronic stress, hormonal imbalance, excess phosphorus intake, chronic use of diuretics, laxatives or antacids containing aluminum, or alcohol.

112 ☐ **Calcium**

- Calcium is important not only for healthy teeth and bones, but also for proper heart function and has been found to benefit nerves, muscles, and skin.
- Good dietary sources of calcium include dark green leafy vegetables, broccoli, legumes, nuts, and whole grains.
-

113 ☐ **Symptoms of Calcium Depletion**

- muscle cramps or tetany
- myalgia
- skeletal pain
- insomnia
- heart palpitations
- irritability or agitation
- cognitive impairment
- delusions
- depression
- hyperactivity
- damaged teeth
- eventually osteoporosis
- Low hair calcium has been reported in autistic children versus sibling/neighbor controls.

114 ☐ **Chromium**

- Chromium is very important in carbohydrate and glucose metabolism and in the mechanism of insulin action.
  - Basically, this mineral is very important for hypoglycemics and diabetics.
- Depletion can result in reduced metabolism of amino acids, glucose and lipid metabolism.
- Associated with protein malnutrition, elevated cholesterol levels, atherosclerosis and corneal damage.

115 ☐ **Chromium**

- This has been seen in patients with allergic dermatitis, skin ulcers, bronchitis, lung cancer, cerebral thrombosis, and cerebral hemorrhaging, and has been reported to lead to insomnia and an increase in unpleasant dream activity.
- Elevated levels of chromium have been detected in the hair of children with psychotic and neurotic behavior, and in the hair of children with learning disabilities when compared to controls.

- Sources of exposure include stainless steel manufacturing, wood finishing, leather tanning, and handling of cement.

116 **Cobalt**

- Symptoms of toxicity include weight loss, loss of appetite, electrolyte imbalance, and impairment of myocardial metabolism.
- The only known biological use for cobalt is that it is absolutely necessary for vitamin B12 activity and function.
- Cobalt activates numerous enzymes and is stored in the liver as vitamin B12.

117 **Cobalt**

- Dietary cobalt and inorganic cobalt are poorly absorbed.
- Sources of Cobalt are found in all animal products, meats, fish, cheese, brewer's yeast and yeast extracts.
- Vegetarians (vegans) who refuse eggs and dairy products, as well as people who lack an intrinsic factor, risk vitamin B12 and cobalt deficiencies.
- Recommendation: eat an egg at least 2-3 times per week.

118 **Symptoms of Copper Deficiency**

1
- elevated cholesterol
- increased inflammatory response
- anemia
- bone disorders
- reproductive failure
- microcytic anemia
-

2
- pancreatic dysfunction
- degeneration of the nervous system
- depression
- diarrhea
- impaired immunity
- heart disease

119 **Copper**

- Dietary sources include dried legumes, nuts, and dark green leafy vegetables.
- Insufficient intake of competitively absorbed elements such as Zinc or Molybdenum can lead to, or worsen Copper excess.
- Estrogen can increase copper in blood and hair levels
- Therapeutic considerations to normalize excess Copper include iron, manganese, selenium, zinc, molybdenum, vitamin C, amino acids and vitamin B6.
-

120 **Exogenous Copper Contamination Sources**

1
- permanent solutions
  – Hair dyes –red/orange
- dyes
- bleaches
- swimming pool/hot tubs

- water carried thru copper pipes
- food
- drinking water

2 • excess copper supplementation
- occupational or environmental exposure
- chocolate
- nuts
- wheat germ
- shellfish

121 **Copper**

Symptoms of Contamination

1 • biliary obstruction (reduced ablility to excrete Copper)
- liver disease (hepatitis or cirrhosis)
- renal dysfunctions
- Hodgkin's disease, leukemia and other malignancies
- anemia
- hemochromatosis
- Rheumatic fever
- Major and minor thalassemia
- dyslexia
-

2 • collagen diseases
- a potential complication in long-term hemodialysis patients
- muscle and joint pain
- insomnia
- arthritis
- depression
- irritability
- hyperactivity
- emotional instability
- tremor
- hemolytic anemia
- learning disabilities
- behavioral disorders

122 **Copper**

- Copper is an essential trace mineral needed for good health and wellness. Small amounts of copper is essential for life. However, as with all trace minerals, excess amounts of copper in the body can be toxic. The liver and brain contain the largest amounts of copper in the body; other organs contain smaller amounts.

- As with mercury and lead, high levels of copper are also associated with mental and emotional disorders.

123 **Frequent Signs & Symptoms**

- High systolic and diastolic blood pressure.

- Nausea.
- Eczema.
- Tender calf muscles. Joint pain, swelling, and stiffness.
- Kidney disease.
- Premenstrual syndrome.
- Sickle cell anemia.
- Stomach pain.
- Hemolytic anemia.
- Weakness.
- Severe damage to the central nervous system.
- Constant fatigue.
- Insomnia (frequent difficulty falling asleep, unsound sleep).
- Hair loss.

124 **Conditions That Suggest Copper Toxicity**

- Ulcerative colitis: excess copper may be absorbed in the intestinal tissues which lead to intestinal disorders, impaired healing and reduced resistance to infections.
- Mental, Behavioral & Emotional Disorders: Mood swings, clinical and postpartum depression, hallucinatory and paranoid schizophrenia, and tinnitus. Hyperactivity. Childhood hyperactivity. Irritability. Autism. Short-term memory failure, trouble concentrating. Senility, senile dementia.
- Metabolic Disorders: Hypoglycemia, headaches.
- Uro-Genital Disorders
- Premenstrual syndrome.
  - Estrogen results in increased copper absorption.
  - Eclampsia/Preeclampsia may be associated with copper toxicity.

125 **Causes**

Copper is a heavy metal that is toxic in the unbound form. Almost all of the copper in the body is bound to proteins, thereby reducing the concentration of unbound copper ions to almost zero. Most diets contain enough copper (2-5 mg) to prevent a deficiency and not enough to cause toxicity. The World Health Organization (WHO) suggests that 10-12 mg per day may be the upper safe limit for consumption. If as little as 2 grams of copper salt are ingested, usually with suicidal intent, the resulting copper-induced hemolytic anemia and kidney damage are generally fatal.

126 **Copper Toxicity is usually due to:**

- Excessive supplementation or low levels of other necessary nutrients. Low levels of zinc will result in raised levels of copper.
- The exact mechanism by which molybdenum prevents copper toxicity is poorly understood. However, it is known that an insoluble complex of copper and molybdenum can be formed in the gastrointestinal tract thus reducing copper absorption.
- This theory is substantiated by the fact that increasing dietary copper is an effective treatment of molybdenum toxicity.

127

- The increasingly common problems of low levels of zinc in the diet. Copper and zinc compete with each other for absorption in the gastrointestinal tract.

- Contaminated food and drinking water due to contact with metallic copper. Sources of copper include beer, tap water, and pasteurized milk, and various foods. An acidic food or beverage can dissolve milligram quantities of copper sufficient enough to cause acute toxicity and symptoms.
- Copper cookware, copper cooking utensils, copper plumbing pipes (acidic water, such as rain water, left standing in copper pipes) all contribute to contamination of foods and drinking water.

128

- External exposures such as a copper IUD or accidental agricultural overspray (pesticides), swimming pool chemicals, and permanent wave solutions.
- Tobacco use can cause a rise in the amount of copper in the body.
- Elevated estrogen levels often increase the serum copper levels to more than double normal values, while at the same time red blood cell levels, where copper is important, may actually be lower. The use of estrogen-containing oral contraceptives (birth control pills) contributes to the rise in the amount of serum copper in the body.

129 **Treatment/ Diagnostic Tests**

- Copper levels can be determined through blood tests, urine samples, and hair analysis.
- Normal urine samples collected over a 24 hour period contain 15 to 40mcg of copper.
- In people with diseases such as arthritis, heart disease, hypertension, schizophrenia, or cancer, serum copper levels tend to be high.
- During illness, copper is released from the tissues into the blood stream to promote tissue repair.
- High serum copper readings during illness should not be taken to mean that the copper is a cause of the illness; rather, it is an indication that the body's natural repair processes have been activated.

130 **High Copper**

- The use of oral contraceptives and/or tobacco can cause increase in copper in the body.
- Excess serum copper is also characteristic of anemia, cirrhosis of the liver, leukemia, hypoproteinemia, and vitamin B3 (niacin) deficiency.
- Serum copper levels during pregnancy tend to be higher than normal as well.
- Wilson's disease is a rare hereditary disorder in which the body is unable to metabolize copper properly, so the metal accumulates in the body.
-

131 **Options for High Copper Levels**

- Hair analysis can be used to determine levels of copper in the body.
- Extremely high level of copper, may require medical treatment with Chelation Therapy which removes toxic metals from the body and can be used to remove excess copper.
- If the copper levels are higher than normal, but not extreme, this can often be managed with supplements, notably Zinc, Molybdenum and Manganese
- If copper levels are very high, treatment with DMSA or EDTA may be needed.
- Most important is the reduction of exposure and intake of copper.

132 **Schizophrenia**

- Many people with schizophrenia have been found to have high levels of copper and iron, combined with deficiencies of zinc and manganese.

133 **Copper Elimination**

- Increasing the intake of zinc and manganese, whether through the diet or supplementation, increases elimination of copper and helps return copper levels to normal.

- Quickest way to reduce serum copper: phlebotomy
-

134 **High Copper**

- Decrease your intake of foods rich in copper, such as legumes (especially soybeans), nuts, cocoa, black pepper, seafood, raisins, molasses, avocados, whole grains, and cauliflower.
- Have your drinking water tested.
- Increase your intake of sulfur, found in such foods as eggs, onions, and garlic.
  - These help to rid the body of copper.
- Supplement your diet with pectin, which can be found in apples.
- Do not take a multivitamin and/or mineral supplement that contains copper.
- Do not use copper pots or other cooking utensils.

135 **Copper Management**

1
- Vitamin C w/ bioflavonoids + Rutin
  - 4000mg/day Vit C (ascorbic acid form)
    - Copper chelator
  - 60mg/day Rutin
    - Lowers serum copper
- Zinc chelate
  - 60mg/day… do not exceed 100mg total
  - Needed to balance copper.
  - Zinc deficiency predisposes one to copper excess.
- Calcium chelate
  - 1500mg/day
  - Binds with metallic ions in the body
- Calcium disodium edetate (Ca EDTA)
  - Adults: The avg daily dosage is 8 tablets (4gm.) in divided doses.
  - Children: Two tablets (1gm.) daily per 35;bs of body weight in divided doses.
  - Available by prescription only.

2
- Magnesium
  - 750mg daily
  - Works with calcium
- L-Cysteine, L-Cystine, L-Methionine
  - As directed on label, on an empty stomach. Take with water or juice. Do not take with milk. Take with 50mg Vitamin B6 and 100mg Vitamin C for better absorption.
  - Aids in elimination of copper from the body and protects liver.
- Manganese
  - 204mg daily. Take separately from calcium
  - Aids in excretion of excess copper
- Molybdenum
  - 30mcg daily
  - Prevents accumulation of excess copper in the body.
-
-

136 **Ceruloplasmin**

- Decreased in most instances of Wilson disease (hepatolenticular degeneration); hence, ceruloplasmin is used in evaluation of chronic active hepatitis, cirrhosis and other liver disease.
- In Wilson disease, there is decreased ability to incorporate copper into apoceruloplasmin. As a result, free copper levels in plasma and in tissue, especially liver and brain, are greatly increased.
- Ceruloplasmin is high in a variety of neoplastic and inflammatory states, since it behaves as an acute phase reactant, although levels rise more slowly than "acute phase reactants".
- Increases are described with carcinomas, leukemias, Hodgkin's disease, primary biliary cirrhosis and with SLE and rheumatoid arthritis.
- High levels occur in pregnancy, with estrogens and with oral contraceptive use when the agent contains estrogen as well as progesterone.
- Increased with copper intoxication.

137 ☐ **Ceruloplasmin**

Ceruloplasmin is an α_2-globulin containing copper.

- Ceruloplasmin is high in a variety of neoplastic and inflammatory states, since it behaves as an acute phase reactant.
- Increases are described with carcinomas, leukemias, Hodgkin's disease, primary biliary cirrhosis, and with SLE and rheumatoid arthritis.
- High levels occur in pregnancy, with estrogens, and with oral contraceptive use when the agent contains estrogen as well as progesterone.
- Increased with copper intoxication.
- Limitations A normal ceruloplasmin does not rule out Wilson's disease. Serum copper should be measured in addition.
- About 70% or more of total serum copper is associated with ceruloplasmin
-

138 ☐ **Germanium**

- I use Germanium when it is very low in the hair test and with cancers, be sure to retest to avoid over-dosing.
- Animal studies have shown germanium to have significant anticarcinogenic effects.
- This does not necessarily correlate with high levels of serum germanium.

139 ☐ **Iodine Deficiency**

- Seen with goiter, reduced mental response, dry/brittle hair, tendency to be overweight and hair loss.
- The primary sources of dietary iodine are seafood and drinking water
    - the amount of iodine in drinking water can vary greatly from one location to another.
- Iodized table salt has been introduced to help this deficiency
    - Iodine deficiency can be corrected with increased iodine intake.
    - approximately half of the table salt used in the United States contains sodium iodide.
- Added tyrosine supplementation enhances the iodine uptake and conversion into thyroid hormones.

140 ☐ **Excess Iodine**

- Do not recommend/use Iodine if it is high in the hair
- May be due to external contamination by hair treatments or it may be associated with hypersensitivity reaction, hypothyroidism, thyroiditis, goiter, immunologic or nonimmunologic, dermatological irritation or contact dermatoses, angio-edema, burning or soreness of mouth and throat, nausea/diarrhea and autoimmune thyrotoxicosis (Graves'disease) or autonomous

thyrotoxicosis (Plummer's disease).

-

141 **Iron**

- This does not necessarily correlate with low/high serum iron.
- Dietary sources include organ meats, poultry, fish, and dried beans and vegetables.

142 **Lead**

- Physiologically, the renal, nervous, reproductive, endocrine, immune, and hemopoietic systems are affected.
- Sub-toxic oral exposure to lead and cadmium increases the susceptibility to bacterial and viral infections.
- Lead is known to damage the kidney, the liver, and the reproductive system, as well as to interfere with bone marrow function, basic cellular processes and brain functions.
- It is known to be responsible for convulsions, abdominal pain, paralysis, temporary blindness, extreme pallor, loss of weight and appetite, constipation and numerous other problems.

143 **Lead**

- Lead causes nerve and mental problems, especially affecting learning ability in children.
- It was reported that the IQs of middle-class children dropped five to seven points after lead exposure, and Moon, et. al., demonstrated that lead levels also related to decreased visual and motor performance.
- Lead interferes with utilization of Calcium, magnesium, vitamin D and zinc

144 **Lead**

1 • Symptoms
  – abdominal pain
  – Colics
  – severe and repeated vomiting
  – Irritability
  – Hyperactivity
  – Anorexia
  – loss of appetite
  – mental disturbances
  – Anemia
  – gastric distress
  – Fatigue
  – weight loss
2 – Headaches
  – Vertigo
  – Tremor
  – joint pain
  – poor coordination
  – Neuritis
  – poor memory
  – Constipation
  – Interferes with calcium, magnesium, vitamin D and zinc.

145 **Lead**

Clinical Signs & Symptoms

1 • Abdominal pain
• Colics
• Severe and repeated vomiting;
• Irritability
• Hyperactivity
•

2 • Anorexia
• Loss of appetite
• Ataxia
• Mental disturbances

146 **Advanced Lead Contamination**

1 • Mental retardation
• Learning disability
• Speech disturbances
• Stupor or fatigue
• Intermittent fever
• Dehydration
• Constipation
• Diarrhea
• Nausea
• Altered sleep
• Epileptic seizures

2 • Headaches
• Poor memory
• Inability to concentrate
• ADD/ADHD
• Aberrant behavior
• Decreased coordination
• Irritability
• Pain in abdomen, bones and muscles
• Gout
• Anemia

147 **Lead: More Symptoms**

1 • fatigue
• weight loss
• vertigo
• tremor
• neuritis

2 • psychoneuroses
• loss of muscle strength
• muscle tenderness
• paresthesia

- signs of neuropathy

148 **Lead**

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149 **Lead**

- Lead causes nerve and mental problems, especially affecting learning ability in children.
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- Lead interferes with utilization of Calcium, magnesium, vitamin D and zinc

150 **Common Sources of Lead**

1 • lead based paints
- older homes
- crystal
- ceramics
- canned food
- food crops
- automobile emmissions

2 • lead smelting and lead-soldered cans
- water contamination
- newsprint
- industrial pollution
- some fertilizers
-

151 **Could used beer yeast be the solution to heavy metal contamination in water?**
A study shows that yeast, an abundant waste product from breweries, can filter out even trace amounts of lead.
David L. Chandler | MIT News Office
Publication Date: June 13, 2022

- A new analysis by researchers at MIT's Center for Bits and Atoms (CBA) has found that inactive yeast could be effective as an inexpensive, abundant, and simple material for removing lead contamination from drinking water supplies.
- The study shows that this approach can be efficient and economic, even down to part-per-billion levels of contamination.
- Serious damage to human health is known to occur even at these low levels.
- The method is so efficient that the team has calculated that waste yeast discarded from a single brewery in Boston would enough to treat the city's entire water supply.

- Such a fully sustainable system would not only purify the water but also divert what would otherwise be a waste stream needing disposal.
- The findings are detailed today in the journal *Nature Communications Earth and Environment*, by MIT
-

152 **Could used beer yeast be the solution to heavy metal contamination in water?**
A study shows that yeast, an abundant waste product from breweries, can filter out even trace amounts of lead.
David L. Chandler | MIT News Office
Publication Date: June 13, 2022

- Lead is highly toxic, even at tiny concentrations, especially affecting children as they grow.
- The European Union has reduced its standard for allowable lead in drinking water from 10 parts per billion to 5 parts per billion.
- In the U.S., the Environmental Protection Agency has declared that no level at all in water supplies is safe.
- Average levels in bodies of surface water globally are 10 times higher than they were 50 years ago, ranging from 10 parts per billion in Europe to hundreds of parts per billion in South America.

153

154 **Therapeutic Considerations**

- Mild lead exposure can be treated successfully
    - oral chelating agents
    - targeted mineral therapy
    - dietary measures

155 **Therapeutic Considerations**

- The following should be considered:
    - Lead displaced calcium.
        - In the case of calcium deficiency, lead is more readily deposited in tissues.
    - Increase phosphorus intake
    - Increase vitamin C
    - Increase vitamin B-complex
    - Increase pectin and vitamin E
    - Vitamins A and C
    - Chromium can avoid cellular damage and reduce lead levels
    - Inadequate vitamin D intake facilitates the absorption of lead.
-

156 **Subclinical Lead Poisoning**

- Decreased IQ
- Altered behavior
- Slowed nerve conduction

157 **<u>The EPA Decision on Lead in Gasoline</u>**

Decline in Blood Lead Levels

Greatly Exceeded Expectation

158

159 **Lead and Behavior**

- Lead Affects more than intelligence
- At age 7, Needleman et al. found a borderline association between teachers' ratings for aggression, delinquency, social problems and lead levels
- By age 11, increased delinquent and aggressive behavior were clearly evident in children with higher lead levels
- By age 18, young adults with higher lead levels at age 7 were more likely to be dyslexic and to have quit school
- Boys with higher lead levels were more likely as young men to be incarcerated

160 **Lithium**

- Lithium is a prescription medicine used to treat bipolar disorder.

Side Effects of Lithium:

-Nausea
-Vomiting
-Diarrhea
-Stomach pains
-Dizziness
-Weakness
-Coma
-Hand tremors
-Lack of coordination of arms and legs
-Muscle twitches
-Seizures
-Slurred speech
-Uncontrollable eye movement
-Changes in mental status or altered thinking

-
-
-
-
- Kidney failure
- Drinking a lot of fluids
- Urinating more or less than normal
- Memory problems
- Movement disorders, muscle twitches, hand tremors
- Problems keeping salts in your body
- Psychosis (disturbed thought processes, unpredictable behavior)
- Coma (decreased level of consciousness, lack of responsiveness)
- Lack of coordination of arms and legs
- Seizures
- Slurred speech
- Slow Heart Rate

- Dermatitis
- Hypotension
- Confusion,
- Edema
-
-

161 ☐ **Lithium**

- I recommend Lithium if the hair level is very low and the patient is having mental dysfunction
- Only very small amounts of Lithium are needed.
- Hair levels of Lithium do not necessarily indicate a deficiency according to most recent studies.
  - If the follow-up hair test and related symptoms have not improved, very light therapy maybe indicated.
- Lithium is used in the manufacture of lightweight metal alloys, glass, lubrication greases, and batteries.

162 ☐ **Lithium and EV Batteries**

- By 2050 electric vehicles could require huge amounts of lithium for their batteries, causing damaging expansions of mining
- The US's transition to electric vehicles could require three times as much lithium as is currently produced for the entire global market, causing needless water shortages, Indigenous land grabs, and ecosystem destruction inside and outside its borders, new research finds.
- The global demand for lithium, also known as white gold, is predicted to rise over 40 times by 2040
- Lithium deposits are geologically widespread and abundant, but 95% of global production is currently concentrated in Australia, Chile, China and Argentina. Large new deposits have been found in diverse countries including Mexico, the US, Portugal, Germany, Kazakhstan, Congo and Mali.
- Lithium mining is, like all mining, environmentally and socially harmful. More than half the current lithium production, which is very water intensive, takes place in regions blighted by water shortages that are likely to get worse due to global heating.

163 ☐ **Low Magnesium**

- Low levels of magnesium are often associated with malabsorption, low dietary magnesium, alcoholism, kidney dialysis, renal disorders, antibiotic treatment, and prolonged diarrhea/laxative use.
  - Symptoms include muscle twitching, cramps, cardiac arrythmia, gastrointestional disorders, tremor, paresthesia, behavioral problems (including hyperactivity in children), suicidal behavior, dyslexia, poor appetite, skin lesions, insomnia, and mental depression.
- Dietary sources of magnesium include nuts, legumes, dark green leafy vegetables, and cereal grains.

164 ☐ **Magnesium Deficiency or Platinum Toxicity?**

- muscle tremors or spasms
- muscle weakness,
- insomnia or
- nervousness,
- high blood pressure,

- irregular heartbeat,
- constipation,
- fits or convulsions,
- hyperactivity,
- depression,
- confusion,
- lack of appetite,
- calcium deposits in soft tissue
- kidney stones
-

165 **High Magnesium**

- High levels of magnesium in the hair has been associated with hypoglycemia, maldistribution, renal failure, prolonged emotional or physical stress, depression of the central nervous system, and physiological imbalance of calcium and phosphorus.
  – Symptoms include chronic kidney disease, respiratory depression, cardiac arrest, and coma.
-
-

166 **Manganese**

1 • glucose utilization
- lipid synthesis
- lipid metabolism
- cholesterol metabolism
- pancreatic function and development
- prevention of sterility

2 • normal skeletal growth and development
- protein and nucleic acid metabolism
- activating enzyme functions
- thyroid hormone synthesis.
-

167 **Manganese Deficiency**

1 • fatigue
- lack of physical endurance
- slow growth of fingernails and hair
- impaired metabolism of bone and cartilage
- dermatitis
- weight loss

2 • reduced fertility
- increased allergic sensitivities
- inflammation
- ataxia
- fainting
- hearing loss
- weak tendons and ligaments
- possible cause of diabetes.

•

168 **Manganese**

- Manganese activates several enzyme systems and supports the utilization of vitamin C, E, choline, and other B-vitamins.
- Inadequate choline utilization reduces the acetylcholine synthesis, causing conditions such as myasthenia gravis (loss of muscle strength).
- Seizures are occasionally reported to be associated with severe Manganese deficiency.
•

169 **Excessive Manganese**

1 • lethargy
- disorientation
- memory loss
- anxeity
- emotional instability
- bipolar-like disorders

2 • Some possible causes of Manganese toxicity are:
  – iron or calcium deficiency
  – chronic infection
  – alcoholism
  – impaired liver or kidney function

170 **Mercury**

- Mercury (Hg) is a toxic element for humans and animals.
- Hair mercury level is often but not always an accurate indicator of mercury body burden.
- A considerable variance in the sensitivity of different individuals to mercury has been observed, with some exhibiting symptoms at 3 to 5 ppm.
- Even very low levels of mercury have been found to suppress biological selenium activity.

171

- After dental amalgams are used, elevated hair mercury may be observed for six months to over a year.
- Hair mercury has been found to correlate with acute myocardial infarction where on average a 1 ppm mercury was found to correlate with a 9% increase in acute m.i. risk.
- Mercury displaces Selenium (which is a major anti-oxidant), zinc (protein, DNA and energy metabolism) and copper.
  - Supplementation of magnesium, zinc, calcium, selenium, and manganese has been shown to be beneficial in relieving mercury loads.

172 **Acute Mercury Contamination**

1 • metallic taste
- thirst
- discoloration and edema of oral mucosa
- burning mouth pain
- salivation
- abdominal pain

2 • vomiting

- bloody diarrhea
- severe gastroenteritis
- colitis
- nephrosis
- anuria
- uremia
- shock

173 **Chronic Mercury Contamination**

1 • Gingivitis
- weakness
- ataxia
- intention tremors
- Chronic fatigue (caused by inhibition of thyroid conversion of T4 to T3)
- depression
- poor memory and cognitive function
- learning disabilities
- behavioral disorders
- emotional instability

2 • sleep disturbance
- decreased senses of touch
- hearing or vision
- hypersensitivity and allergies
- persistent infections including chronic yeast overgrowth
- compromised immune function
- cardiovascular disease
- peripheral numbness
- tingling or neuropathy
- speech impairment
- irritability

174 **Mercury**

- It disrupts intracellular transport in neurons and can decrease the production of neurotransmitters.
- Eventually this can lead to autoimmune diseases such as SLE (systemic lupus erythematosis), myelinopathies such as MS and myasthenia gravis, rheumatoid arthritis, MCS (multiple chemical sensitivity), and chronic candidiasis.
- An inverse relationship has been observed between hair mercury levels and intelligence scores in elementary school children.
-

175 **What are the 2 most common sources for exposure to Mercury?**

- #1 Amalgams
  - After dental amalgams are used, elevated hair mercury may be observed for 6 months to over a year.
  - Find a dentist who is trained in the removal of mercury fillings.
  - Don't do all at once.

176 **What are the 2 most common sources for exposure to Mercury?**

- #2 Vaccines
  - In the mid-1980s, one in 2,500 children had autism compared with one in about 300 children in 1996
    - an increase of over 800 percent in 20 years.
  - As the government has increased the number of mandatory vaccines, some recent studies suggest the rate of autism has had comparable increases
  - Some say the cause may be mercury poisoning.

177 **The study found a two- to six-fold increased occurrence of neurodevelopment disorders after an additional 75- to 100-microgram dosage of mercury from thimerosal-containing vaccines as compared to thimerosal-free vaccines.**

Journal of American Physicians and Surgeons
Spring 2003

178 **Mercury and Vaccines**

- Other disorders linked to vaccines:
  - asthma, Diabetes, auto-immune disorders [rheumatoid arthritis]
- We've traded infectious disease for chronic disease.
- Approximately 12 out of the 18 vaccine doses the average American child receives before the age of two contain Thimerosal.
  - Cumulatively, that's more than 200 micrograms of mercury, which would fit on the head of a pin.
- Think about the idea of injecting your own child with levels of mercury that are 30-40 times what's considered safe for an adult

179 **Still Think Vaccines Have Nothing To Do With Autism and other Neurological Disorders?**

- Compare the symptoms of autism vs. the symptoms of mercury poisoning
- Meningitis, Encephalitis and Seizures
- Does MMR cause Autism?

180 **Alzheimer's and Flu Shot**

- If you take 5 flu shots in a row
- It increases your chances of developing Alzheimer's Disease by 8-fold!

181 **The Law**

- Vaccines are "mandated"
- Exemptions in Ohio
- Email us and we can send you our Vaccine Packet

182 **Amalgams**

- Number of amalgam restorations had a significant dose-response relationship with urine mercury level.
- Daily gum chewing in the presence of amalgam was associated with high urinary mercury.
  - PubMed accessed: Dunn, et.al., *Scalp hair and urine mercury content of children in the Northeast United States: The New England children's amalgam trial*. Environ Res. 2007 Oct 23

183 **Tooth Whiteners Release Mercury from Amalgams**

- Exposure to hydrogen peroxide bleaching agent was associated with increased metal ion released from dental amalgams compared to treatment with a control solution.
- Metal ion release for the elements (Mercury (Hg), Silver (Ag), Tin (Sn) and Copper (Cu)) increased with exposure to increasing concentrations of hydrogen peroxide.
    - Al-Salehi,et.al., *The effect of hydrogen peroxide concentration on metal ion release from dental amalgam.* J Dent. 2007 Feb;35(2):172-6. Epub 2006 Sep 1

184 **Mercury Sources**

1 • large fish
- pesticide residues
- mercurial fungicides on seed grains
- dental fillings
- coal burning
- calomel (mercurous chloride)

2 • Pharmaceuticals
- the manufacture of paper
- pulp and plastic products
- Water
- interior paints

•

185

186 **Show Mercury Video**

187 **Mercury and Candida**
THIS MIGHT BE THE MOST IMPORTANT SLIDE OF THE DAY!*****

- Many practitioners and holistic doctors believe that the deeper underlying cause of Candida overgrowth is due to mercury toxicity.
- When mercury and other heavy metals are in the body, the cell walls of Candida bind to mercury and other heavy metals and prevent it from entering the blood stream. It acts like a sponge soaking up the mercury.
- There does not appear to be any published research on this relationship between Candida overgrowth and mercury toxicity but that may be since orthodox medicine does not acknowledge that intestinal Candida exists, nor that dental mercury amalgam is dangerous.
  – Detox Mercury If You Want To Cure Candida For Good; The Detox Specialist.com
- DR MERKLE- I have seen 4-5 patients get severely ill, even hospitalized, after taking drugs and herbs to kill candida and I believe this releases the mercury back into the system, as they all tested high in Mercury and other heavy metals.
  – Take care of the heavy metals and glucose problems and the Candida and yeast will resolve.

188 **Mercury Video**

189 **Autism and ADD/ADHD**
Dr. Van D. Merkle

190 **Neurotoxicity of Organophosphate Pesticides**

- Research stimulated by 1993 NAS Report
  - Children are not little adults
  - Proportionately greater exposures
  - Unique windows of vulnerability in early development
-

191 **Common Environmental Exposures**

1 ▸METALS
- Mercury
- Cadmium
- Aluminum
- Lead
- Nickel
- Arsenic
- Cobalt
- Manganese

▸SOLVENTS
- Alcohol
- Chlorinated Solvents
- Benzene

▸

2 ▸INDUSTRIAL CHEMICALS
- PCBs
- Pesticides
- Herbicides

▸All induce oxidative stress and Glutathione (GSH) depletion

▸Multiple exposures are additive/synergistic!

▸

▸

192 **Thimerosal**

- mercury based preservative
  - Developed by Eli Lilly in 1929
  - Added to drugs in 1931 as an antibacterial, anti fungal agent
  - An organic compound that is 49.6 % ethyl mercury
  -

193 **Result**

- Autism first diagnosed in 1943
- Autism didn't exist before thimerosal was added to vaccines
  - Coincidence?
  - Diagnosis changes?
- Autism has increased significantly as more and more children's immunizations are required.

194

195 **Vaccine Ingredients**

1 • Present in trace or large amounts depending upon the vaccine
  – Lab altered virus' and bacteria
  – Aluminum
  – Mercury
  – Formaldehyde
  – MSG
2 – Gluteraldehyde
  – Sodium chloride
  – Hydrochloric acid
  – Antibiotics
  – Hydrogen peroxide
  – Bovine serum albumin
  – Human serum albumin
•

196 **Each autistic child can cost the school system $30,000**

500,000 children = $15 billion

197 **Outcome**

- There was great fear of lawsuits against the drug companies
- There was also fear that if thimerosal was removed that autism would decline making a connection hard to dispute.
  - This is already happening in California
- A cover-up was initiated
  - CDC paid for a study to debunk link between thimerosal and autism
  - Incriminating findings were hidden by claiming data was "lost"
  - To prevent Freedom of Information, the CDC gave their giant database to a private company and said it was off limits to researchers.

198 **Looking at the Damage the Fire Has Caused Instead of the CAUSE of the Fire!**

199 **Biomarkers Tested**

1 • Autoantibodies
• Free fatty acid response to insulin and glucose stimulation
• Hair amino acids
• Plasma and RBC cholinesterase activity
• Serotonin
• Plasma dopamine-betahydroxylase
• Thyroid hormone
• Plasma elements
• Plasma amino acid
• Hemaglutination-inhibition antibody titer
•
2 • Plasma levels of folates, riboflavin, vitamin B6, and ascorbate
• Urine peptides
• CSF monoamine metabolites
• Plasma c-AMP and c-GMP

- Hair minerals
- Brain opiods
- Catecholamines
- CSF indoleacetic acid
- Homovanillic acid (HVA)
- Lactic Acid
- Plasma growth hormone
- response to hypoglycemia

200 **More biomarkers…**

1
- Plasma growth hormone response to oral l-dopa
- Platelet size and number
- Whole blood tryptophan
- Antiserotonin antibodies
- Growth hormone
- Immunoglobulins
- Plasma and urinary levels of biopterin, neopterin, and related pterins and plasma levels of folate
- Plasma norepinephrine
- Oxytocin
- Plasma beta-endorphin
- ACTH
- Carnitine
- FMR1 protein
-

2
- N-acetyl galactosaminidase deficiency (Schindler disease)
- Neuropeptides and neurotrophins
- PKU
- Secretin
- Serum neural cell adhesion molecule (NCAM)
- Cortex S6 Ribosomal Protein Phosphorylation
- Mitochondrial Markers
- Urine Arginine Vasopressin (AVP)
- CSF beta-endorphin
- IL-2 receptors
- Plasma androgens

201 **Consider the obvious**

202 **Autism Testing**

- Environmental effects on metabolism is widespread and can be missed by existing reference ranges
- Autism's sensitive physiology may mean trouble for the individual even when labs are within the population "normal" range

203 **Autism and the World**

- "We.. …question the universality of Infantile Autism…Our research of the literature has convinced us that infantile autism appears to be an illness of Western Civilization…the illness seems to be

quite infrequent in Latin American countries, Africa, and India…" -VD Sanuna

- Int J Soc Psychiatry, 1984
- http://www.iom.edu/Object.File/Master/42/435/Newschaffer%20final%2004_19_07.pdf

204 **Statistics**

1
- In the U.S.
  - 1980s
    - 1 Child in 2500 was autistic
  - Today
    - 1 child in 166 is autistic
    - 1 in 80 for boys
-

2
- In China
  - 1998
    - No cases of autism
  - Today
    - 1.8 million cases of autism following introduction of drugs from U.S.

205 **Statistics (cont)**

- Based on study of flu shots from 1970 thru 1980
  - Individuals that received five consecutive flu shots were ten times more likely to develop Alzheimer's disease

206 **Why Some Are Autistic**

- Autistic children have lower levels of mercury in their hair due to a decreased ability to excrete the substance
- The less ability to excrete mercury, the more likely a child is to become autistic
- The inability to excrete mercury can be caused by glutathione depletion
- Boys are 4 times more likely to become autistic than girls

207 **Autism**

- Medical treatment: antibiotics
- Alternative treatment focus:
  - Correct Gut dysfunction and gut toxicity from pathogenic bacteria and chemicals
  - Reduce or eliminate toxic exposures
  - Eliminate toxic load
  - Enhance healing capacities of the body

208 **Possible Diagnostics for Autism**

- Comprehensive blood test including inflammatory markers
- Urine testing including Amino Acids
- Stool testing for pathogens and Fatty acids
- Heavy Metal Chelation testing- urine
- Hair testing
- Celiac disease and food sensitivities

209 **Possible nutrients**

1
- Calcium
- Vit D
- EPA/DHA
- GLA
- Vit C

2
- Glutathione
- B Vitamins
- Trace minerals
- Other chelating nutrients including:
  - EDTA
  - DMSA
  - Chlorella
  - Cilantro
-

210 **Before Pregnancy**

- Get tested
- Eliminated environmental exposures
- Improve nutritional status
- Exercise

211 **Prevent Autism**

- Avoid
- Vaccinations
- Artificial colors, preservatives and sweeteners
- Environmental exposures to lead, mercury, pesticides and other chemicals
- Improve essential mineral and antioxidant status

212 **What to do for your Autistic Child**

- Stop vaccinations
- Reduce environmental exposures
  - Be persistent!
- Get tested
- Improve nutritional status

213 **Dr. Cutler's DMSA protocol**

- Andy Cutler's Chelation Protocol
- April 29th, 2009 Mom
- Before I get into the protocol we're using to recover Nicholas, I just want to mention that Andy's books, *Amalgam Illness* and *Finding Hidden Hair Toxicities* have been two of the most helpful books I have purchased yet.
- *Amalgam Illness* has a wonderful section all about supplements and I've referenced this section more times than I can count. He explains the plateau many parents experience while chelating – and why you should continue because you will start seeing gains again.
- The Protocol:
  Dosing – 1/8 to 1/2 mg of DMSA (and then add in ALA after a few rounds or months if there was recent mercury exposure) per pound of body weight. So, a 50 pound child's dose would be 6.25 – 25mg per dose.

- Dose Frequency – Every 3 hours from Friday through Monday (including overnight – you can stretch to 4 hours while asleep, but no more)
  We chelate every weekend unless I need to sleep through the night without getting up to give him his dose or if we have something else going on. Some parents do every other weekend.

214 **Dr. Cutler cont.**

- Many people ask me how I possibly get up in the middle of the night to give him his dose. Well, I have no other choice.
- After researching other protocols, I felt that this was the one that was safest. I know there are others who give their child DMSA every 8 hours and still see gains, however, I have also heard from many others that this worked for a while and then they hit a wall and their child regressed.
- The problem with infrequent dosing protocols is that the half-life of the chelator is not taken into account. For example, when you give doses of dmsa every 8 hours for 3 days, this is what is happening:
  - dose > redistribution > dose > redistribution > dose > redistribution > dose > redistribution > dose > redistribution > dose > redistribution > dose > redistribution > dose > redistribution > dose > redistribution.
- When you dose properly in 3-4 hour intervals, this is what is happening:
  - dose > dose > dose > dose > dose > dose > dose > dose > dose > dose > dose > dose > dose > dose > dose > dose > dose > redistribution.
  - You want to minimize redistribution as much as you possibly can.

215 **Dr. Cutler cont.**

- Getting up does get easier, I can assure you. On these weekends, my husband and I take turns with the night doses – I take the first one (and sometimes I stay up researching, then go to bed) and then he takes the 6am dose – so at least we both got a descent stretch of uninterrupted sleep.
- Many people have also asked me about yeast during oral chelation because they have been made to believe that yeast would be uncontrollable. We were told by a DAN that our only choice for chelation would be IV because my son is a gut and yeast kid.
- Well, in our case, he could not have been more wrong and unfortunately the strong-arm technique to get me to subject my son to IV's (when taking him for bloodwork was a nightmare) and not even agree to oversee my son's case for a trial of this protocol just ended up in him losing a patient – and a recovery story.

216 **Dr. Cutler cont.**

- The yeast has not been what I thought it would be – and in 31 rounds, we haven't skipped weekends because of yeast or gut issues – NOT ONCE.
- I have Nicholas taking 40mg of Biotin every day split into 4 doses of 10mg. Nicholas is also taking 900mg of Enhansa now (best supplement EVER!) and 2 caps of Klaire's detox probiotic, 2 culturelle and a dropperful of Living Streams probiotics. That's it.
- The key here is to start slow – making your child sick or intolerable does not mean you are going to recover him/her faster. Giving larger doses increases your chances of gut issues, yeast flares, etc – and you will have to stop chelating to deal with these issues – so in the end, it's just not worth it. You want to find a dose they are comfortable with so you can continue to live your life while chelating. This is not a race – and this process can take you 1 or more years, so keep telling yourself… This is not a sprint, this is a marathon.

217 **Dr. Cutler cont.**

- How do you split up 25mg capsules? Well, some folks open the capsule out and dump it onto a

clean surface and split the piles into equal sizes (using a razor blade, credit card, etc.). If you want a 5mg dose, you split a 25 capsule into 5 equal piles. Exact measurement is not required — the dosing frequency is more important than having a 5.25mg dose and then a 4.75mg dose.

- Others, myself included, will take 5 teaspoons of juice (I use four 25mg dmsa caps and two 25mg ALA caps now for 5 doses) and will mix all of these capsules up very well.
- I will then put one dose in a syringe that hold's a teaspoon and do this 5 times. I put the syringes, tip up, in the refrigerator until I am ready to give the dose. (I do this when I need to give dose 1, so that the last dose has only been in the fridge 12 hours. Longer than this, you can start losing potency from what I understand. Then when you are ready to give it, squirt it in a cup or whatever you are giving it in and you're done. Using an acidic juice, like orange, works best.

218 **Dr. Cutler cont.**

- There are suggested (required, really) supplements that your child should be on prior to starting. They are probably getting many of them in their multi-vitamin, but check just to be sure. As with all supplements, add one at a time so you if your child is reacting to one supplement in particular.
  - Calcium: 5-20 mg/pound divided into four doses over the day
  - Essential Fatty Acid (fish oil or flax, see notes above) 1 to 3 tbsp/day
  - Magnesium: 10 mg/pound divided into four doses over the day
  - Milk Thistle: ¼-1 cap (20-80 mg) per dose/ 4 times a day
  - Molybdenum: 5-20 mcg/pound divided into four doses over the day
  - Selenium: 1-2 mcg/pound/divided into four doses over the day
  - Vitamin A: 5 RDA's/day. Be sure to consider if your EFA is a source
  - Vitamin B: 12.5-25 mg/4 times a day
  - Vitamin C: 5 to 20 mg/pound per dose/4 times a day
  - Vitamin E: 500 IU/day
  - Zinc: 1 mg per 2 lbs + 20 mgs divided into four doses over the day.
- Want support from other parents using this protocol?
  Join us on this group:
  http://health.groups.yahoo.com/group/AndyCutlerChelationForAutism/
- A great post from Andy:
  Andy's post about recovery percentages, etc.

219 **Dr. Cutler cont.**

- March 21, 2010 – Edited to add:
- Change the variables and you're not doing Cutler's protocol…
  Cutler's protocol is not just simply dosing dmsa & ala every 3-4 hours. If you change any of the variables, you are not necessarily following Andy's protocol.
- I'm getting more and more feedback lately from parents that concern me, so I just want to clarify a few things in hopes that it helps…
  1. Night dosing IS required. Skipping the night doses or deciding to dose at midnight, then 8am – is NOT this protocol. Eliminating the dose in the middle defeats the purpose of doing the protocol as you are now creating several opportunities for the redistribution of metals versus the one per round stated on Andy's protocol.
  2. If you start with high doses, versus the 1/8th -1/4 mg per pound, you are not increasing the amount of metals that are going to be pulled as much as you might think. The whole point of the protocol is to dose low so as few side effects are experienced as necessary, not to make yourself

or your child miserable. You DO NOT start a 40 pound child on a 25mg dose. We saw results with 8mg! Have a little faith before you go overboard with the dose.

220 **Dr. Cutler cont.**

- 3. The top dose is 1/2mg per pound. Again, you are not increasing the amount of metals that are going to be pulled as much as you might think. The whole point of the protocol is to dose low so as few side effects are experienced as necessary, not to make yourself or your child miserable.
- 4. Giving a "sprinkle" of ala or dmsa is not Cutler's protocol. Capsules should be divided into the doses you intend to give. I hear of parents opening capsules and just giving a sprinkle of each not knowing how much they are or aren't giving. If you cannot eyeball the contents of the capsule to divide into the appropriate dose, ask your dr for a script and get them compounded to the correct dose.
- 5. Starting an aggressive anti-viral protocol at the same time you start chelating is not recommended. Most find that waiting to start addressing viruses until after round 50 makes life so much easier for all involved.

221 **Dr. Cutler cont.**

- 6. Do not assume that your child does not have yeast issues. If you are chelating and not seeing gains, it could be that any gains you would see are hidden by yeast. Get on a good anti-fungal, whether it's natural or rx and see if that clears it up.
- 7. Adding products like NDF, NDF+, chorella, cilantro, etc.Adding any of these to Cutler's protocol is not a good idea. You can search Autism-Mercury's archives for Andy's explanation if you so choose and I would actually recommend you doing just that. For me, there is not enough research about any of these being a true chelator doing more than just moving metals around. Using dmsa and ala have worked very well here

222 **NH…Male, Age 4**
Height: 3'0" Weight: 38lbs

- Thrush since 18 mo.
- Has had all shots, was nursed for 18 months, mother avoided soy & dairy or he would get diarrhea
- Had lot of antibiotics prior w/ ear infections, is on anti-fungals now but not working so well, a lot of food allergies
- behavior changes (hyperactivity) w/ yeast/thrush infections;
- 4 sinus infections in 4 months, eats meat but no dairy, ear tubes x3, frequent oral thrush
- In past year has taken-Fulvicin, Diflucan, Previcid, Pepcid, Claritin, Zyrtec, Zithromax, Gentian Violet.
- Identifying and removing the toxins is the first step.
- Providing proper nutrition is crucial for the safe elimination of the toxic elements and for regeneration and development of the nervous system and the whole body.

223 **NH…Male, Age 4 Hair Elements 5/23/2007**

224 **NH…Male, Age 4 Urine Challenge**

225 **NH…Male, Age 4 Urine Comparative Retest**

226 **Osteopetrosis Case**

Dr. Van D. Merkle DC, DABCI, CCN, DCBCN

227 **Yeast and fungus have the unique ability to bind and hold toxic elements at very high levels without killing the fungus. In some way this is protective of the body, by binding the toxins up; it keeps them from going into the body. (When anti fungal drugs are used, this can or often does release the toxic elements back into the body.) I believe that this is the case with GH that the fungus is binding up the toxic elements. When the toxic elements are properly reduced and eliminated, the fungus will go away.**

228 **NH…Male, Age 4 Supplement Therapy 6/12/2007**

229 **NH…Male, Age 4 Hair Comparative Retest**

230 **Conclusion**

- Autism is epidemic in the United States
- There is a direct and proven link to thimerosal based vaccines
- There has been a massive cover-up by the agencies that should be protecting us
- Everyone has a choice to investigate and decide if their children should be immunized.

231 **What's Gluteraldehyde**

- Glutaraldehyde can sensitize your skin, lungs and respiratory system.
- Once sensitized, further exposure to even very small amounts can lead to:
  - Dermatitis
  - Rhinitis, conjunctivitis, hay fever.
  - Asthma

232 **Impact of Mercury Exposure**

- Impacts brain development
  - Disrupts division and migration of brain cells
  - Oxidative stress can kill brain cells
  - Mercury moves easily through the blood-brain barrier
    - Collects in the cerebellum which controls movement and cognition
    - The cerebellum is the region of impairment in autistic children

233 **Mercury Levels Above EPA Standard**

1 ▸ Day of birth
- ◦ Hepatitis B
  - 12 mcg
  - 30 times safe level!

▸ 4 months
- ◦ DTaP & HIB
  - 50 mcg
  - 60 times safe level!

▸ 6 months
- ◦ Hepatitis B, Polio
  - 62.5 mcg
  - 78 times safe level!
  -

2 ▸15 months
- 50 mcg
- 41 times safe level!

▸By 2 years of age, a child has received 237 mcg of mercury!

▸Case: 18 month old neighbor's grand daughter

234 **52% of American dentists now are mercury-free.**

FACT Email Newsletter by Dr. Garry Gordon www.toxicteeth.org/Mercury%20survey.pdf

235 **Studies**

- Journal of American Physicians & Surgeons Dr. Mark Geier 2003
  - thimerosal doses vs guidelines
  - Incidence of autism with & without thimerosal
  - Mercury dose vs disabilities

236

237 **"This study provides strong epidemiological evidence for a link between increasing mercury from thimerosal-containing childhood vaccines and neurodevelopment disorders…."**

-Dr Mark Geier

238 **Amish Study**

- 2005 study of Amish community
- As a "control" Amish don't immunize their children
- In population of 22,000 only 4 autistic children where there should have been 130
- All had been exposed to mercury outside of the Amish community

239 **Joint Statement**

- July 1999
  - Joint statement from the American Academy of Pediatrics & US Public Health Service called for removal of thimerosal from vaccines.
- 2004
  - Iowa was the first state to ban thimerosal followed by California
- Similar bans are being considered in 32 other states.
  -
-

240 **Autism: a national health emergency**

- 1 in 150 children
  - roughly 1 in 65 families
- 36,000 otherwise normal toddlers will regress into autism in this year alone
- Harvard Study: $3.2 million/child over a lifetime
  - Society costs: Approx. 2 TRILLION dollars
- Insurance seldom pays because treatments aren't "research-based"
- Families devastated both economically and emotionally
- Murder/suicides are on the rise
  - Laura Bono- NAA (National Autism Association)

241 **Autism: environmentally induced**

- If it is environmental, then it is treatable and preventable.
- It is NOT HOPELESS and lifelong.
- It is HOPEFUL, with a possible cure.

242 ☐ **What is autism?**

- Developmental Disorder
- Must onset before age 3 years
- Development affects symptom expression
- Symptoms exacerbated/alleviated by development
- One of several Pervasive Developmental Disorders or Autism Spectrum Disorders
- Autism Pervasive Developmental Disorder – Not Otherwise Specified
- Asperger Syndrome
- Rett Disorder
- Childhood Disintegrative Disorder

243 ☐ **Autism is characterized by:**

- Deficits in Social Interactions (2 or more)
- Impairment in use of nonverbal behaviors
- Failure to develop peer relationships
- Lack of spontaneous seeking to share enjoyment
- Lack of social or emotional reciprocity
- Communication deficits (verbal & nonverbal) (1 or more)
- Delayed/lack of spoken language
- Inability to converse with others

244 ☐ **Characterizations continued…**

- Stereotyped and repetitive or indiosyncratic language
- Lack of make-believe or social imitative play
- Fixated interests and/or repetitive behaviors (1 or more)
- Preoccupation with one or more restricted interests
- Inflexible adherence to specific nonfunctional routines
- Stereotyped and repetitive motor mannerisms
- Persistent preoccupation with parts of objects

245 ☐ **Autism: a whole-body problem**

- Immunological dysregulation with a unique inflammatory bowel disease
- Oxidative stress, systemic inflammation, and severely disordered urine and serum chemistries
- Decreased methylation capacity, limited transsulfuration and glutathione deficiency
- Increased toxic body burdens – primarily of heavy metals esp. mercury and lead
- Chronic viral, fungal and bacterial infections
- Central nervous system hypofusion/abnormal regulation of blood supply to the brain
- Microglial activation, lipid peroxidation, mitochondrial dysfunction, inactive enzyme systems and exitotoxicity

246 ☐ **Clinical Clues: Regressive Subtype**

- Normal development until 12 – 30 months age and then loss of language and social skills
- 15-50% of autism has regressive features (rate depends on definition of regression)
- Reported prognosis for regressive autism is poor

- Regression can be acute or slow and subtle
- Videotapes often show that development wasn't completely normal before regression occurred, but obvious loss of acquired skills.

247 ☐ **Pathogenesis of Regressive Autism**

248 ☐ **Autism is treatable.**

- The research paradigm needs to shift from "autistic children are genetically defective" to "autistic children are sick".
- Study the children's biochemical imbalances and find more effective ways of intervening medically and nutritionally
- Identify toxicities or triggers

249 ☐ **Toxic and Essential Elements in Autism and Childhood Behavior**

David Quig, PhD and Meghan Higley, ND

250 ☐ **A Case-Control Study of Mercury Burden in Children with Autistic Spectrum Disorders**

- Evaluations of mercury excretion levels
- 3 day treatment with an oral chelating agent, (DMSA) was undertaken.
- Results showed ↑urinary mercury concentrations among 221 cases of children with autistic spectrum disorders in comparison to 18 normal controls.
- no association was found between urinary cadmium or lead levels and autistic spectrum disorders among the children examined.
- The mercury measured in this study is compatible with exposure to mercury in childhood vaccines, while the contribution of thimerosal in Rho-D immune globulin and other potential environmental sources of mercury exposure, both acute and chronic, may be contributory.

251 ☐ **Analyses of Toxic Metals and Essential Minerals in the Hair of Arizona Children with Autism and Associated Conditions, and their Mothers**

- This study assesses the levels of toxic metals and essential minerals in hair samples of children with autism spectrum disorders and their mothers compared to controls.
- Iodine
  - levels were 45% lower in the children with autism (p=0.005).
- Chromium
  - Autistic children with pica had a 38% lower level of Chromium (p=0.002).
- Lithium
  - The mothers of young children with autism had especially low levels of lithium (56% lower, p=0.005), and the young children (ages 3-6) with autism also had low lithium (30% lower, p=0.04).

252 ☐ **Reduced Levels of Mercury in First Baby Haircuts of Autistic Children**

- First baby haircut samples were obtained from 94 children diagnosed with autism using *Diagnostic and Statistical Manual of Mental Disorders,* 4th edition (DSM IV) criteria and 45 age- and gender-matched controls.
- Information on diet, dental amalgam fillings, vaccine history, Rho D immunoglobulin administration, and autism symptom severity was collected through a maternal survey questionnaire and clinical observation.
- Hair mercury levels in the autistic group were 0.47 ppm versus 3.63 ppm in controls, a significant difference.
- The mothers in the autistic group had significantly higher levels of mercury exposure through

Rho D immunoglobulin injections and amalgam fillings than control mothers.

- Hair mercury excretion patterns among autistic infants were significantly reduced relative to control.

253 **Mineral Status, Toxic Metal Exposure and Children's Behavior**

- 237 children attending grades K-4 in Victoria, British Columbia schools.
- Children were classified on the basis of behavioral status.
- Amongst all of the elements considered,calcium in particular appears to be of importance, with significant positive associations observed between low hair levels of this macro-mineral and problematic behavior.
- With respect to specific problem behaviors, distractibility may be the most affected by mineral status, significant associations were observed between problem behavior of this type and low calcium, high manganese, and high cadmium.

254 **Hair Lead and Cadmium Levels and Specific Depressive and Anxiety-Related Symptomology in Children**

255 **Environmental Assaults**

256 **What we don't know about environmental triggers---quite a bit!**

- 53,000 commercially important chemicals
- NTP survey of 49,000 industrial chemicals
  - ~80% lack adequate toxicity data (especially DNT)
- 3,400 pesticides are more heavily regulated
  - ~64% lack adequate data for risk assessment
- 3,400 cosmetic ingredients
  - ~74% lack adequate data for risk assessment
- 8,600 food additives
  - ~80 % lack adequate data for risk assessment
- National Toxicology Program Report (1992)

257 **Environmental Toxicants and Neurobehavioral Development Future Challenges**

- 82,000+ industrial chemicals (~40% polymers)
  - Food additives, ~8600
  - Cosmetic ingredients, ~3400
  - Pharmaceuticals, ~1800
  - Pesticides (active), ~1000
- Developmental toxicology data available on only 200
- Human neurodevelopment toxicology data available for fewer than 10
- Almost no information available on toxicity of mixtures…the chemical cocktail effect

258 **Chlorinated hydrocarbon**

- Lindane (head lice, scabies)

- Hepatchlor (1988)
- Chlordane (1988)
- Dieldrin (1987)
- Kepone (1978)
- Toxaphene (1990)
- To appreciate the effectiveness of these materials as termiticides, consider that wood and wooden structures treated with chlordane, aldrin, and dieldrin in the year of their development are still protected from damage--more than 55 years!

259 **Molybdenum**

- Molybdenum is essential for plants.
- Medical research states that it is possibly anti-carcinogenic.
- The states of Colorado and Ohio have soils particularly rich in Molybdenum, and report the lowest incidences of cancer of the esophagus.
  - This type of cancer is particularly widespread in South Africa, which has very low Molybdenum concentration.
- Molybdenum is important for uric acid metabolism.

260 **Molybdenum Sources**

- Meat Sources:
  - Liver and kidney
- Plant Sources:
  - legumes, wheat germ, and leafy vegetables
-

261 **Molybdenum Deficiency**

- reduced resistance against cancer
- impotence
- uric acid accumulation (gout)
- defects in the metabolism of sulfur amino acids
- dental caries
- susceptibility to asthma
-

262 **Excess Molybdenum**

- loss of appetite
- anemia
- arthritic conditions
- Sources of exposure are mostly occupational and include lubricants, catalysts, pigments, organic glazes, and steel alloys.
-
-

263 **Nickel Sources**

- atmospheric pollution by burning of coal and petroleum products
- cigarette smoking
- nickel coins
- eyeglass frames

- costume jewelry
- kitchen appliances
- pins
- scissors
- hair clips
- hydrogenated oils and margarine
- electronics and computers

264 **Nickel**

- Its widespread presence in environmental pollution and its toxic effects on human health warrant its classification as toxic.
- High nickel tissue levels have been associated with myocardial infarction, and are often present in patients who suffered strokes, dermatitis, chronic rhinitis, hypersensitivity reactions, hypersensitize the immune system, hyperallergenic responses to many different substances, pulmonary inflammation (due to smoke and dust), liver necrosis and toxemia.

265 **Nickel**

1 • Symptoms
  – myocardial infarction
  – Strokes
  – Dermatitis
  – chronic rhinitis
  – hypersensitivity reactions
  – autoimmune reactions
  – liver necrosis
  – toxemia

2 • Early symptoms
  – Apathy
  – Diarrhea
  – Dermatitis
  – Dyspnea
  – Fever
  – Insomnia
  – Vertigo
  – Vomiting
  – Headaches
  – gastrointestinal pain
  – Eczema
  – Vitiligo

266 **100 Warts**

- 14 year old girl with over 100 warts on the back of each hand and fingers for the last 12 months
- Dermatologist - burning, acid, freezing- a futile painful effort, no help
- Patient had been in braces for 15 months

267

- It is well established to be nephrotoxic and carcinogenic.

- Early symptoms of toxicity include: apathy, diarrhea, dermatitis, dyspnea, fever, insomnia, tachypnea, vertigo, vomiting, headaches, gastro- intestinal pain and eczema.
- Other symptoms: Allergies, immunosuppression, vitiligo.
-
-

268 **Platinum**

- Platinum is poorly absorbed in the gut but may be absorbed via inhalation.
- Most platinum exposures are industrial.
- Platinum compounds are used in catalytic converters, chemotherapy (they are highly toxic to both cancerous and healthy cells), dentistry and jewelry.

269 **Platinum**

- Chemotherapeutic agent (Cisplatin) has platinum in it.
- 30% of patients who receive this drug end up with neuropathy as a result of the platinum in the drug concentrating in the dorsal roots of the spinal nerves, which would cause sensory damage.
- Chelation therapy might be able to extract the platinum and help his neuropathy.

270 **Platinum toxicity cont.**

- Most people are exposed to platinum on a daily basis
- It can accumulate in your body over time and cause serious health problems.
- Platinum is not 'inert'
-

271 **Platinum toxicity Cont.**

- Platinum toxicity can cause:
  - DNA alterations,
  - cause cancer,
  - allergic reactions of the skin and mucous membranes,
  - it can cause damage to organs such as the kidneys and intestines
  - damage hearing
-

272 **Platinum toxicity Cont.**

- Platinum can be found:
  - jewelry,
  - from mining
  - vehicle emission control devices
  - in metal tooth filling amalgams,
  - Used to make silicone rubber and gels
  - medical implants
    - breast implants
    - joint replacements

273 **Platinum toxicity Cont.**

Common Symptoms

- Allergic reactions of the skin & or mucous membranes
- Kidney disease's
- Intestinal & digestive problems

- Muscle spasms
- High blood pressure (Hypertension)
- Deafness
- Cancer
- Adverse heath condition after medical implants
- Allergies to rubber, silicone & gels
-

274 ☐ **Platinum toxicity cont.**

- It can disrupt essential nutrients mostly magnesium & selenium
- A deficiency of magnesium and selenium can also be signs or symptoms of platinum toxicity.
- Being deficient in magnesium and or selenium can allow the accumulation of platinum in your body leading to toxicity.
-

275 ☐ **Selenium Deficiency or Platinum toxicity Cont.**

- family history of cancer,
- cancer
- signs of premature aging,
- cataracts,
- high blood pressure,
- frequent infections

276 ☐ **Magnesium Deficiency or Platinum Toxicity?**

- muscle tremors or spasms
- muscle weakness,
- insomnia or
- nervousness,
- high blood pressure,
- irregular heartbeat,
- constipation,
- fits or convulsions,
- hyperactivity,
- depression,
- confusion,
- lack of appetite,
- calcium deposits in soft tissue
- kidney stones
-

277 ☐ **Potassium**

- High hair Potassium is not necessarily reflective of dietary intake or nutrient status.
  - However, elevated Potassium may indicate adrenocortical insufficiency, or it may be reflective of metabolic disorders associated with exposure to potentially toxic elements and toxic heavy metals.
- Elevated Potassium may reflect overall retention by the body or maldistribution of this element.

278 ☐ **Potassium**

- Hair is occasionally contaminated with Potassium from shampoos
- Symptoms of potassium deficiency include muscle weakness, fatigue, and tachycardia.
  - Eat at least 1-2 servings of potassium rich foods per day.
  - The best sources of Potassium are found in broccoli, bananas, avocado and sweet potatoes.

279 ☐ **Rubidium**

- There is inconclusive evidence that rubidium is essential to the body, but high levels have been shown to be toxic.
- Symptoms of rubidium toxicity
  - inhibition of iodine uptake by the thyroid
  - interference with cardiac muscle contraction
- Sources of rubidium include electrical equipment, soybeans, beef, tomatoes, and ground coffee.

280 ☐ **Selenium**

- Selenium is found in the liver, Red blood cells, platelets and other tissues.
- It is a strong antioxidant that works with vitamin E.
  - It is an antioxidant that helps prevent chromosomal damage and protects cellular function.
- A deficiency has been associated with many types of cancers and tumors.
- In animals, a deficiency of selenium can lead to brain dysfunction, cardiovascular, liver and muscle problems and can affect fetal development.
- Statistically, the occurrence of cancer is considerably higher in areas with a low selenium content of the soil.
- It also counteracts the effects of chemical allergies and sensitivities.

281 ☐ **Excess Selenium**

- This is most often from external exposure, such as to dandruff shampoos.
- Toxicity can cause interference in the metabolism of sulfur-bearing amino acids, structural changes and red pigmentation of the hair and nails, garlic breath, metallic taste in the mouth, discoloration of teeth and skin, and gastroenteritis.
- High hair selenium is an accurate indicator of high serum levels.

282 ☐ **Selenium Deficiency or Platinum toxicity Cont.**

- family history of cancer,
- cancer
- signs of premature aging,
- cataracts,
- high blood pressure,
- frequent infections

283 ☐ **Silver**

- Toxicity: Silver is deposited in the skin and organs, causing gray discoloration.
- Silver occurs naturally in very low concentrations in soil, plants, and animal tissues.
  - also found in food that comes from silver plated vessels, silver solder, silver foil (used in decorating cakes), jewelry, electronic equipment, dental fillings and photographic materials.
  - Silver is found at hazardous waste sites and in water.
  - Some water treatment systems including water filters use silver compounds to kill bacteria.
  - Silver has been used extensively for medicinal purposes particularly in the treatment of burns.

•

284 **Silver**

1 • Symptoms:
  – Skin disorders
  – organ system function
  – deposited in the skin and organs and interferes with their function
  – causes gray discoloration.

2 • Sources:
  – food in silver plated vessels
  – silver solder
  – silver foil
  – Jewelry
  – dental fillings
  – water contamination
  – used for medicinal purposes particularly in the treatment of burns
  – Intake of colloidal silver has been reported to give rise to tumors in the liver and spleen in laboratory animals.

285 **Colloidal Silver**

- There is much controversy over the long- term safety of consumption of colloidal silver.
- Very high intake of colloidal silver has been reported to give rise to tumors in the liver and spleen of laboratory animals.
-

286 **Colloidal Silver**

- Distributors (usually untrained multi-level marketers and therefore unaware)
- Argyria
  – *Permanent* discoloration (slate gray or blue coloration) of the skin following consumption of silver containing products.
  – Made worse by sunlight
  – Numerous documented cases since the rise in popularity with colloidal silver

287 **Sodium**

- Sodium (Na) is an essential element.
- Blood testing for Sodium and electrolyte levels is much more diagnostic and indicative of status.
- High Hair Sodium may be the result of an electrolyte imbalance, or possibly adrenocortical hyperactivity.
  – In this condition, Blood Sodium is elevated while potassium is low.
  – Potassium is elevated (wasted) in the urine.
- High levels of Sodium and Potassium in the hair are commonly high in association with elevated levels of toxic elements or xenobiotics.
  – Elevated Sodium and Potassium levels are frequently concomitant with low levels of Calcium and Magnesium in hair.
-

288

- Commonly associated with dehydration, gastrointestinal losses (vomiting, diarrhea), excessive

sweating, renal disease, diuretic use, diabetes mellitus, emotional stress or electrolyte imbalance.
- Symptoms include low blood pressure, reduced immune function, weight loss, cardiovascular weakness, ocular diseases, and anorexia.
- Increased protein intake and sparing use of sea salt are recommended.
-

289 **Sulfur**
- The mineral sulfur is needed for the manufacture of many proteins, including those forming hair, muscles, and skin.
- Sulfur contributes to fat digestion and absorption, because it is needed to make bile acids.
- Sulfur is also a constituent of bones, teeth, and collagen (the protein in connective tissue).
- As a component of insulin, sulfur is needed to regulate blood sugar.
- Most dietary sulfur is consumed as part of certain amino acids in protein-rich foods.

290 **Sulfur Containing Amino Acid Sources**
- Meat and poultry
- organ meats
- fish
- eggs
- beans
- dairy products
- Sulfur also occurs in garlic and onions.
-

291 **Thallium**
- Thallium is odorless and tasteless.
- It is absorbed by plants and easily stored up in fish and shellfish and apparently accumulates in the body with age.
- It is used mostly in manufacturing electronic devices, used in the semi-conductor industry, used in the manufacture of special glass, used in certain medical procedures, and used as a rodent poison.
- Eating contaminated food is a source of exposure for most people, breathing workplace air in industries that use thallium, living near hazardous waste sites, and smoking.

292 **Symptoms of Thallium Over-Exposure**
- autonomic dysfunction
- tachycardia
- hypertension
- numbness in fingers and toes
- vomiting, diarrhea
- hair loss
- effects on the nervous system involving the heart, liver, and kidneys.

293 **Thallium**
- Studies in laboratory rats, show adverse developmental effects with high levels of thallium.
- Data suggests that male reproduction may be susceptible to damage in low levels of thallium.
- No levels are available on humans or animals on the carcinogenic effects.
-

294 **Thorium**

- Thorium is a naturally-occurring, radioactive metal that is more abundant than uranium.
- Small amounts of thorium are present in all rocks, soil, above-ground and underground water, plants, and animals.
- Thorium is not stable and produces a series of decay substances including radium and radon, as well as alpha, beta and gamma radiation.
- Burning contaminated coal or making products that contain thorium also release thorium into the environment.
- Thorium is used to make ceramics, lantern mantles, and alloys used in the aerospace industry.
- Thorium can also be used as a fuel for generating nuclear energy.

295 **Thorium Exposure**

- The main way it enters the body through thorium-contaminated dust.
- Some forms of thorium can say in your lungs for long periods of time.
  - However, in most cases, the small amount of thorium left in your lungs will leave your body in the feces and urine within days.
- After you eat or drink thorium, almost all of it leaves your body in the feces.
- The small amount of thorium left in the body may be stored in bones and stay there for many years.
- Thorium can also enter the body through the skin.
- Food grown in thorium-rich areas and water near hazardous waste sites may contain dangerous concentrations of thorium, but most people in the United States are not at risk.
-

296 **Thorium Carcinogenicity**

- The US Dep. of Health and Human Services has determined that thorium dioxide is a known carcinogen.
- Studies of thorium workers have shown that breathing thorium dust may increase chances of developing lung disease and cancer of the lung or pancreas many years after being exposed.
- Changes in genetic material has also been shown to occur in workers who breath thorium dust.

297

- Liver diseases and effects on the blood have been found in people injected with thorium in order to take special X rays.
- Many types of cancer have also been shown to occur in these people many years after their exposure to thorium injections.
- Since thorium is radioactive and may be stored in bone for a long time, bone cancer is also a potential concern for people exposed to thorium.

298 **Tin**

- Organic Tin has appreciable toxicity.
- Experiments have shown that increased tin ingestion causes depressed growth and reduced hemoglobin levels and liver function in rats.
- Elevated tin resulted in elevated losses of calcium, selenium and zinc.
-

299 **Sources of Tin**

1 • processing and packaging of:

– gelatin
– smoked fish
– macaroni
– dried legumes
– dried milk
– milk in large cans
– tea
– dental amalgams
– cosmetics
– preservatives
– pewter
– bronze
– anticorrosive platings

2 • tap water
• preserved foods in tin cans
• asparagus packaged in glass
•

300 **Symptoms of Excess Tin**

1 • muscle weakness
• anemia
• testicular degeneration
• vomiting
• diarrhea
• abdominal cramps
• loss of appetite
• tightness of chest
• depressed growth
• low hemoglobin
• decreased liver function
•

2 • skin, eye, GI tract irritation
• metallic taste
• dry throat
• coma (in very extreme cases)
• pneumoconiosis as a result of excessive inhalation of tin oxide
•
•

301 **HA Case Study: K. S.**

2 years old
Doctors had told her parents she has asthma
Parents thought she was having allergic reactions

302

303 **Titanium**

- Titanium generally has low toxicity.
- Titanium (Ti) has wide industrial uses, and elevated Ti may be the result of industrial exposure.
- Titanium is used in metal alloying and is used as titanium dioxide to coat welding rods.

304 **Titanium Dioxide Pigment Present in:**

1
- Paints
- inks
- dyes
- shoe whiteners
- plastics
- some cosmetics
- toothpaste
- conditioners
- shampoos
- paper fillers
- ceramic glazes

2
- Elevated hair titanium also may be an artifact (false high) of hair treatments such as dyeing or "highlighting"
- Surgical or dental implants may be a source of Titanium in the hair.
-
-

305 **Uranium**

- Hair is a good indicator of uranium exposure.
- Blood and urine have been noted as NOT being representative of the body burden since the blood is rapidly cleared of uranium.
- Most forms of uranium are poorly absorbed by the body with the exception of the lungs, which absorb airborne uranium readily.
- Uranium forms many complexes with proteins and bone and can substitute for calcium.
- It is deposited throughout the body and chronic fatigue is often reported in association with high hair levels.
- Published data correlates Uranium exposure, nephrotoxicity and all forms of cancer.

306 **Uranium**

- Kidney and bone are the primary sites of Uranium accumulation.
- Uranium has been noted to be higher in female hair than males living in the same home.
- It is a moderately common element with three isotopes. U238, the most common isotope, represents over 99% of the naturally occurring element.
- It is the only isotope of concern in this analysis.
- It is reasonably stable with a low level of radioactivity and a half life of 4.5 billion years.

307 **Uranium**

- Uranium is used in glass manufacturing, ceramics, colored glass, high phosphate fertilizers and in some chemicals.
- Drinking water is a significant source of U238 in many regions.
- Radon can be a by-product of U238 decomposition.
-
-

308

1 • Purple/green tongue
• gastrointestinal problems, including diarrhea and cramps (especially when concurring with discoloration of the tongue)
• impaired reflexes and neuromuscular irritation
• eczema
• dermatitis
• conjunctivitis
•

2 • respiratory tract irritation (resulting in rhinitis, pharyngitis, chronic bronchitis and diffuse pulmonary fibrosis)
• tachycardia
• manic depression, central nervous system problems
• hematological effects including anemia, neutropenia and leukocyte changes
• hypoglycemia
•

309

• Vanadium is found in the body of mammals, and there is evidence that it is essential for chicks, rats, and goats.
• Chickens require vanadium for the growth and development of wings and feathers.
• In rats, inadequate vanadium intake results in stunted growth.
• Vanadium-deficient goats show irreversible bone deformities in their front legs.

310

• Catalyzes the oxidation of catecholamines (norepinephrine: adrenergic vasoconstriction, epinephrine, dopamine: vasoconstriction)
• May inhibit cholesterol synthesis and lower phospholipid levels in blood
• May have anti-hyperglycemic function
• A weight-reducing function
• Some anabolic effects
• Reduces caries formation
• Influences sodium/potassium transport.

311

• Vanadium supplementation reduced fasting blood glucose levels after only a few days.
  – Vanadium activated transport and conversion of fructose independent of insulin.
• Long-term excessive vanadium supplementation can be toxic because vanadium readily combines and interferes with the biological functions of amino acids, peptides, proteins, enzyme substrates, nucleotides, carbohydrates and ATP.
• Toxicity is higher after inhalation.
• Vanadium is poorly absorbed by the gastrointestinal tract.
•
•

312

1 • liver

- pancreas
- kidneys
- thyroid
- testes
- fiber-rich foods
- dill seeds
- parsley
- black pepper
- Vanadium is a by-product of the heavy metal industry and is found in industrial waste, dust, and fumes.
-
-

313 **Zinc Deficiency**

- Low levels of Zinc in the Hair are commonly associated with diabetes, ADD/ADHD, and autism.
- Symptoms of zinc deficiency include fatigue, decreased vision, anorexia, anemia, dermatitis, weak or brittle nails and hair, impaired wound healing, and sexual dysfunction in males.
- Dietary sources of zinc include lean meats, eggs, and whole grain breads and cereals.

314 **Zinc Excess**

- Commonly associated with contaminated water, welding, brass manufacturing, white paint, and pesticide production.
- Symptoms of Zinc toxicity include gastrointestinal disorders, tachycardia, blurred vision, and hypothermia.
-

315 **Zirconium**

- Low hair zirconium does not necessarily correlate with low serum zirconium.
- High hair levels of zirconium have not been proven to be clinically significant.

316 **Artificial colorings**
(FD&C colors and dyes)

- The great bulk of artificial colorings used in food are synthetic dyes.
  - For decades synthetic food dyes have been suspected of being toxic or carcinogenic and many have been banned.
- In a life's time, a woman will consume 4-6lbs. of lipstick!
- Blue 2: The largest study suggested, but did not prove, that this dye caused brain tumors in male mice. The FDA concluded that there is "reasonable certainty of no harm."

317 **Artificial Colors**

- Citrus Red 2: Studies indicated that this additive causes cancer. The dye does not seep through the orange skin into the pulp. No risk except when eating peel.
- Yellow 6: Industry-sponsored animal tests indicated that this dye, the third most widely used, causes tumors of the adrenal gland and kidney.

318 **Red #40**

- First introduced in the mid 1960's and approved for use in the United States in 1974.
- The testing procedure was ended after 21 of the 24 months required for testing, when the rat colony being tested was destroyed by pneumonia.

– Why did they get pneumonia?

- Although the United States accepted the toxicology results to date, this fact caused Canada to refuse the dye until later studies were completed.
- However, Sweden, Switzerland, the United Kingdom, the Netherlands, and a few other countries still refuse to accept it (Newsome, p.52).

319 **HA Case Study: Kara S.**

- 2 years old
- Doctors had told her parents she has asthma
- Parents thought she was having allergic reactions

320

321 **HA Case Study: Christian T.**

- 6 years old
- Many food allergies
- Behavioral problems
- Family had lived in an old farm house until he was 5 years old
- Loose bowel movements twice a day

322

323

324 **Supplement Recommedations**

325 **Final Thoughts**

- Actually this is pretty much what I was hoping to see.
- Assuming he is not being exposed to higher levels, we actually are starting to see his body eliminate some of these toxic elements.
- There are fewer nutrient deficiencies, in fact we see higher levels of calcium, magnesium, sodium and potassium which your body will use to carry out the toxic elements.
- It looks like his body is cleaning out.
- He is low in a couple of them such as lithium, germanium and selenium. We need to make sure that he is supported with these.
- Overall, I think that he is on the right track. There are certain nutrients that he was on before that I want to make sure that he stays on to help eliminate the toxic elements.

326 **HA Case Study: Rita B.**

327

328 **Supplement Recommendations**

1 • Betaine 2/meal
- Calcium MCHC 3/day
- Chlorella 3/day
- Chromium Picolinate 6/day
- Magnesium Glycinate 3/day

2 • Meda-Stim 2/day
- MLK1000 2/night
- Ultra Preventive 2/day

- Vanadyl Sulfate 3/day
- Vitamin B6 1/day
- Vitamin C 3/day

329

330 **HA Case Study: Mike F.**

331

332 **Supplement Recommendations**

1
- Betaine 2/meal
- Calcium MCHC 3/day
- Chromium Picolinate 3/day
- Co-Q-10 3/day
- Glucoril 4/day
- Inflavonoid 4/day
- L-Tyrosine 2/day
- Lacto-Key 1/day
- Liver 3/day

2
- Magnesium Glycinate 4/day
- MLK 1000 3/night
- Monolaurin 4/day
- Niacinamide 1/day
- Norwegian Kelp 1/day
- Sublingual B12 + Folic Acid 4/day
- Vanadyl Sulfate 1/day
- Vitamin B6 1/day
- Vitamin C 3/day

333

334 **HA Case Study: Jim B.**

335

336

337

338 **Final Thoughts in Hair Testing**

- Hair grows from within the cell so the findings indicate what is happening inside the body.
- If it is on you or in your environment it is in you.

339 **Final Thoughts in Hair Testing**

- Heavy metals are rarely seen in the blood except for recent exposure

340 **Final Thoughts in Hair Testing**

- We commonly test the water for contamination sources.

- Test the water coming into the house
- Test the water used for showers/bathing.
- Test the water used for drinking
  – Improperly installed filtration system have revealed high toxic elements.
  –

341 **Final Thoughts in Hair Testing**

- SBN Hair testing also shows mineral levels
  – High levels can be toxic especially copper
  – Low levels are important to identify

342 **Heavy metals in Electric Car Batteries**

- NMC batteries, which accounted for 72% of batteries used in EVs in 2020 (excluding China), have a cathode composed of nickel, zinc, manganese, and cobalt along with lithium.

343 **Patient: S P – Presenting Symptoms**

- Ulcerative Colitis (major flare up about once a year, has blood in stool 6 months out of year)
- High blood pressure
- Low energy
- Dry skin
- edema

344 **S P - Medications**

- Norvasc – high blood pressure
- HCTZ – (in conjunction w/ Norvasc)
- FemHRT – hormone replacement
- Colazol – ulcerative colitis
- Prednizone – ulcerative colitis
- Pentasa – ulcerative colitis

345

346

347 **S P – Primary Findings**

1 • Hypercholesterolemia
  – Total Cholesterol, LDL, VLDL
- Hypoglycemia
  – Glucose
- Low Minerals
  – Calcium, Phosphorus
- Low Serum Potassium
- Gastro/Intestinal dysfunction
  – BUN, Calcium, Protein, Albumin
- Low Functioning Thyroid- T3, T7
-

2 • Anemia- RBC, Hgb, Hct
- Possible infection and/or inflammation

– ESR, CRP

- Chronic Wasting Disorder- Alk Phos
- Very High Hair Uranium; Very High Hair Cobalt; Very Low Hair Vanadium
-

348 **S P – Vitamin List**

1 - 2 - Betaine 496mg + Pepsin 140mg
- Calcium 1500mg/day
- Chlorella 750mg/day
- Co-Q-10 150mg/day
- 4 - Thyroid Support with Tyrosine and chromium
- 1 - B-Complex
- 3 - Garlic
- 3 - Turmeric, ginger, bioflavonoids
- Mag. Glycinate 300mg/day
-

2 - 2 - Omega-3's EPA,DHA
- 3 - Multiple
- Potassium 99mg/day
- 2 - Chelated trace minerals
- 3 - B12, Folic acid
- Vanadyl Sulfate 500mg/day
- Vitamin C 3000mg
- Vitamin D 5000IU/day + Vit. A 10,000IU/day
- Vit. E 400IU/day w/selenium 50mcg/day
- Zinc 50mg/day
-

349 **S. P. – Self Evaluation 10/23/02**

- Poor memory/concentration – better
- Arthritis – worse
- High blood pressure – better
- Ulcerative colitis – better
- Rough skin – worse
- Frequent urination – worse
- Patient stopped her HCTZ (for high BP), reduced her Norvasc (for high BP) in half, and reduced her Colazol (for Ulcerative Colitis) by 2/3
-

350

351 **Pancreas removal averted**

- Patient First Name: Susan; Patient DOB: 4/13/1958; Sex: Female
- 2/9/22 Signature: Dr. Laura.
- Comment: This patient just had a CT scan and MRI done of her pancreas and is being told she has to have it removed because it is double in size. The final diagnosis is chronic pancreatitis. Her CA 19 was 69. I have a couple questions. What blood tests would have caught this? 2. She

definitely doesn't want her pancreas removed, so I would appreciate guidance on a supplement route. Thank you.

•

• Replied on *2/9/22* at *9:32 AM*

• The cancer panel would likely have caught it as you noted the CA 19 is elevated. This is possible a recent acute situation. do another SBN panel and CA 19 to see if the cancer is getting higher. Then do the Cat 1 diet and cancer protocol, must be strict for the next 2 weeks then retest. I would start the Cat 1 and protocol AFTER she retests to get a good baseline before starting your treatment protocol to get her healthy. should see good progress in a couple of weeks if you can help. compliance is likely the key.

• however, we have seen crazy labs after the covid vaccines, this might be one of those. when did she have the vaccine, and how many covid vaccines? IS she on any other meds?

• Van

•

•

352 **Pancreas removal averted cont.**

• Signs of pancreatic failure?
  – White or clay colored stools
  – Stools that float
  – Poorly formed stool

353 **Pancreas removal averted cont.**

• Replied on *11/26/22* at *9:11 AM*

• Creon is a lipase medication. I would use so mething like PanX10, maybe Ultrazyme and use high doses. I would lean more to PanX10 due to the severity. maybe 2-4/meal maybe between meals too. should take maybee 20 a day.

• the labs look better overall and pt reports stools are darker and not floating.

• I don't see anything urgent.

• I haven't seen the pt but the labs would indicate to stay the course.

• V

•

354 **Pancreas removal averted cont.**

• Replied on *4/23/23* at *3:39 PM*

Mayo, Northwestern and Barnes are all still pushing for surgery for this patient. (removing the pancreas, spleen, gallbladder and part of the small intestine. Her scans have barely changed, and her Ca19-9 is not increasing. I suggested she get another opinion from Envita in Scottsdale. What are your thoughts. Her hair has improved, and her stools are still darker and more solid. She feels fine also. Should we change anything?

•

• Dr. Van replied on *4/24/23* at *8:48 AM*

I would recommend stay the course for another 3-6 months. especially with these lab numbers. no rush to do anything. I am quite familiar with Envita and that is who I would get a second opinion from but even then, no rush.

the WBC has been this low before.

maybe reduce iron intake and increase silymarin a little to try to lower the iron and ferritin. not sure I would dump a pint of blood, but it wouldn't be bad if she lost a little.

Stay on the same diet and vitamins except as noted above.
good job.

- Van
-

355 **The END**

356

PRESS ON:

- Nothing in the world can take the place of persistence.
- Talent will not; nothing is more common than unsuccessful men with talent.
- Genius will not; unrewarded genius is almost a proverb.
- Education alone will not; The world is full of educated derelicts.
- Persistence and determination alone are omnipotent.

Calvin Coolidge