The Effects of Environmental Toxicity on Chronic Illness

The Latest Research and Its Implications on Laboratory Testing and Treatment Protocols

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My Background

- Began researching the field of nutritional and complementary medicine in 1983.
- In 1985, developed a novel way to analyze blood tests.
- In 1995 was awarded a patent on disease patterning.
- In 1996 was awarded a second patent relating to patterning and decision making in analyzing lab tests.
- Taught classes on how to conduct drug and research trials to pharmaceutical companies and medical device makers.
- Have lectured on five continents on environmental toxicity, cognitive function, nutritional supplements and lab testing.

A Personal Perspective

In October of 1999, my daughter Tasya fell to the ground and proceeded to have her first grand mal seizure. It was not going to be her last.

When we went to a neurologist we were devastated to hear that she had a progressive form of epilepsy and was likely not to live past the age of 12. This was not a diagnosis I was going to accept.

My life since that fateful day, was to discover not only what to do to help my daughter survive but to find out why this happened in the first place.

It is this journey that has led me to research and publicize the effects of environmental toxins on the health of all of humanity.

A Personal Perspective

- When looking at the etiology of her seizures I discovered evidence that environmental toxins may have played a role.
- Further, just recently, we discovered that Tasya has an abnormality in a metabolic pathway that deals with drug metabolism, the handling of environmental toxins, production of cholesterol and balancing of hormones.
- It is part of cytochrome P450 known as CYP3A4.
- Originally thought to only exist in the liver and gastrointestinal tract, it has been shown to exist throughout the central nervous system.
- This breakthrough may help us to devise safer and more effective treatments for my daughter and countless other people with epilepsy and other neurological disorders.

A Historical Perspective

- Humans have been exposed to heavy metals since the dawn of the Bronze Age over 3,000 years ago.
- The problems of mercury, lead and arsenic poisoning was well know to the ancient Romans.
- The metal smelters of the time were forced to build taller smokestacks to push the toxins further away from the cities.
- Eventually, due to the number of people getting sick and the large number of deformed babies being born, the smelters and weapons manufacturers were forced to move away from the city.
- The toxicity issue was known over 2,000 years ago.

A Historical Perspective

- When it comes to petrochemical and related toxins, we are talking about a human exposure timeline of approximately 150 years.
- Many of the toxins I will discuss today have been affecting humans and animals for less than 50 years.
- The effects on life is well documented.
- There is little doubt that they cause a myriad of health disorders and diseases.
- The most concerning effect they have is on the future generations of humans as well as all life on earth.

Future Generations?

- For the first time in human history, males are becoming more infertile than women.
- The number of males being born is declining at an alarming rate.
- Even those males being born, are being feminized by the exposure to a broad range of chemicals never before seen by humans.
- Amphibians, reptiles, fish and mammals are seeing this change worldwide.
- Unless we decide to reduce, remove and reject the toxins, our species is in dire straights.

The Extent of Toxicity in Humans

- We must take for granted, due to numerous studies done on humans that our blood supplies contain large numbers of toxins, especially petrochemical ones.
- Testing blood or fat tissue levels of toxins is unnecessary in order to determine exposure or internal levels of petrochemical solvents.
- It is the excretion capacity of these toxins that is most important in helping people to achieve any semblance of health.
- Children are the second most vulnerable group because of their poor detoxification pathways.

The Insult to the Unborn

- The group most sensitive and vulnerable are the unborn.
- In a study published by the Environmental Working Group (www.ewg.org), entitled Body Burden II, the cord blood of the average baby at birth contains 200 chemicals.
- More would have been found had they been looking for them.
- A healthy foundation for a long life begins before birth, even before conception.
- If the parents are toxic, the child has little chance of living a healthy life.

Testing Protocols

- Any person who is thinking about having a child should, no absolutely must, have toxicity testing done before they think about conceiving a child.
- While there are a number of labs that are doing urinary toxicity testing, I recommend U.S. Biotek and Genova Diagnostics as both do this type of testing.
- Some chemicals need to be tested in blood such as volatile solvents, PCB's and chlorinated pesticides.
- Others, such as phthalates, parabens, organophosphates and bisphenol A are accurately measured in urine.

Phthalates

- The findings on the effects of phthalates on human and especially on neonatal and fetal development are numerous.
- Disorders such as feminization of males (shrinking anogenital distance), atopic dermatitis, insulin resistance, asthma, and others are filling the reference libraries.
- This toxin is found in air fresheners, hair and beauty products, perfumes, soft plastics, new cars, cooking oil (2013 finding), and many other hidden sources.
- An excellent place to find household sources go to www.ewg.org and look at the Skin Deep database or http://www.naturalecosource.com.

Phthalates

- In an article from EHP in May 2014, Kobrosly, et al published their findings that prenatal exposure to phthalates was linked with behavioral problems in boys.
- There seemingly was little effect on girls.
- This is likely due to the effect of phthalates on testosterone.
- Data derived from the NHANES data gathered in 2005-2006 and reported in 2013 showed a link between phthalate exposure and wheezing, asthma, hay fever, and rhinitis.

Phthalates and Parabens

- As we age, phthalates have been shown in studies to depress testosterone, cause insulin resistance and increased waist circumference.
- Parabens, found in a great deal of personal care products has been implicated in breast cancer.
- Women with breast cancer have been found with higher levels of parabens in their tissue than women without the disease.
- Caution: a causative action has not been found yet.
- The likely culprit though is the affinity of parabens for a number of estrogen receptor sites.
  - Blair, R. M., H. Fang, et al. (2000). "The Estrogen Receptor Relative Binding Affinities of 188 Natural and Xenochemicals: Structural Diversity of Ligands." Toxicol. Sci. **54**(1): 138-153

Phthalates and Parabens

- Other health issues phthalates and parabens have been implicated in include:
  - Endometriosis
  - Infertility
  - Breast cancer
  - Ovarian cancer
  - Prostate cancer
  - Testicular cancer
  - Decreased sperm count
- In short, these chemicals should be tested for in anyone with an endocrine disorder.
- Also, men with depressed testosterone should absolutely be tested for phthalates.

Some Recent References on Phthalates

- Calafat, A. and R. McKee (2006). "Integrating Biomonitoring Exposure Data into the Risk Assessment Process: Phthalates [Diethyl Phthalate and Di(2-ethylhexyl) Phthalate] as a Case Study." Environmental Health Perspectives **114**(11): 1783-1789.
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- Jaakkola, J. and T. Knight (2008). "The role of exposure to phthalates from polyvinyl chloride products in the development of asthma and allergies: A systematic review and meta-analysis." Environmental Health Perspectives **116**(7): 845-53.
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- Lahousse, S. A., S. A. Beall, et al. (2006). "Mono-(2-ethylhexyl) Phthalate Rapidly Increases Celsr2 Protein Phosphorylation in HeLa Cells via Protein Kinase C and Casein Kinase 1." Toxicol. Sci. **91**(1): 255-264.
- Main, K., G. Mortensen, et al. (2006). "Human Breast Milk Contamination with Phthalates and Alterations of Endogenous Reproductive Hormones in Infants Three Months of Age." Environmental Health Perspectives **114**(2): 270-276.
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- Wolff, M., S. Teitelbaum, et al. (2007). "Pilot Study of Urinary Biomarkers of Phytoestrogens, Phthalates, and Phenols in Girls." Environmental Health Perspectives **115**(1): 116-121.

Petrochemical Exposures

- Xylene is one of the most common petrochemicals in the environment.
- Over 600,000 tons are released into the atmosphere annually in the U.S. alone.
- It is one of the leading causes of smog.
- It is known to cause birth defects, increases the risk of miscarriage and cleft palate.
- It is a neurotoxin.
- Alcohol intake will reduce the capacity of an individual to excrete xylene.

Petrochemical Exposures

- Toluene, is the petrochemical additive used to replace lead as the anti-knock agent in gasoline.
- It is has been suggested that it can affect the hypothalamus, the master gland.
- It is considered a neurotoxin.
- It may cause liver and kidney damage due to long term use.
- Another major source is in nail polish.
- Many adhesives and some cosmetics use toluene as well.

Petrochemical Exposures

- Styrene, commonly found in styrofoam, has been found in the blood of every man, woman and child tested in the United States since 1970.
- In 1998, it was estimated that over 56 million pounds of this toxin were released into the atmosphere in the United States alone. Chances are it is a lot more.
- It is a potential carcinogen as well as being a known neurotoxin and endocrine disruptor.

Petrochemical Exposures

- Bisphenol A is an estrogen like chemical that has been implicated in a wide number of health issues.
- The list of health implications of this toxin is long.
- It induces fibroblast differentiation into adipocytes.
- It disrupts glucagon secretion as well as disrupting glucose transportation in fat cells.
- It damages male sperm cells.
- It may be a cause of multiple birth defects including Down's Syndrome.
- It has been implicated in a number of cancers, especially in women
- This chemical generates $100 million dollars per hour worldwide.

Bisphenol A (BPA)

- A 2014 study from France has linked BPA to food intolerances.
- The higher the level in the blood the more intolerances people have.
- The best test to determine whether you have food intolerances is the MRT/LEAP from Oxford Biomedical.
- It looks for the inflammatory response to foods and food additives.
- As for removing BPA from plastics, do not be fooled.
- Instead of making them non-toxic, they have replace it with BPS and BPF, neither are tested for safety.
- They may actually be more toxic.

Bisphenol A (BPA)

- In a study published in EHP in April 2014 by Posnack, et al, BPA can slow electrical conduction in the heart.
- This can exacerbate health issues in people with cardiovascular disease.
- In another study from the same journal in May 2014, showed a clear relationship between levels of BPA and disruptions of hormone levels in men.
- A very big source of BPA is on coated store receipts.
- So as my friend Charles Poliquin would say when asked if he wanted his receipt after purchasing groceries, “No thanks, I’m trying to give them up.”

Toxicity and Cognitive Decline

- In our aging society, cognitive decline is one of the most important issues facing us today.
- Many petrochemicals we come in constant contact with are known neurotoxins.
- Testing for the effects on cognitive function is important as people react differently.
- Important aspects of organic acids as they pertain to brain function include catecholamine pathway markers vanilmandelate and homovanillate
- These two markers help us more than just telling us about phenylalanine and tyrosine adequacy or the production of epinephrine, norepinephrine, and dopamine.

Toxicity and Cognitive Decline

- In the Journal of Environmental Science and Health, researchers found links between elevated homovanillate and petrochemical solvents.
  - Tomei, F., M. Rosati, et al. (2003). "Work exposure to urban pollutants and urinary homovanillic acid." J Environmental Science and Health **38**(12): 2909-2918.
- In *Environmental Health Perspectives*, this marker was also found to be altered with heavy metal exposure, particularly arsenic, lead, cadmium and mercury.
  - de Burbure, C., J. Buchet, et al. (2006). "Renal and Neurologic Effects of Cadmium, Lead, Mercury, and Arsenic in Children: Evidence of Early Effects and Multiple Interactions at Environmental Exposure Levels." Environmental Health Persepectives **114**(4): 584-590.

Toxicity and Cognitive Decline

- Numerous other studies have implicated petrochemicals in hastening cognitive decline due to a number of different mechanisms.
- Especially telling is the increased risk and speed of development of dementia for people exposed to petrochemicals at their jobs.
- But even low level exposures can increase the risk especially when we understand that we have multiple exposures of multiple chemicals on a daily basis.

Low-Level Toxicity

- In the article entitled "Low-level exposure to multiple chemicals: Reason for human health concerns"* the authors led by Kortenkamp say that there should be a grave concern about the effects of multiple toxin exposures and human health.
- The term – NOAEL is used by toxicologists to define the level of a toxin where **N**o **O**bserved **A**dverse **E**ffect **L**evel is seen.
- When mixing multiple chemicals at NOAEL levels, they found that there were effects greater than the sum of the chemicals.
- * (Environmental Health Perspectives, Dec 2007 Supplement pages 106-14)

Toxicity and Autism

- Based on research coming from the CHARGE study which began in 2003, we see evidence that pesticide exposure during pregnancy and autism is associated.
- A study published in the October 2014 issue of *Environmental Health Perspectives* is adding to the weight of the correlation.
- The authors, led by Shelton, said the following in their conclusion, "This study of ASD strengthens the evidence linking neurodevelopmental disorders with gestational pesticide exposures, particularly organophosphates, and provides novel results of ASD and DD associations with, respectively, pyrethroids and carbamates."

Toxicity and Cancer

- The link is definitive and the research robust.
- The 2008-2009 report stated that "the true burden of environmentally induced cancers has been grossly underestimated."
- This panel was appointed mostly by President Bush and was non-partisan.
- Immediately the American Cancer Society said that the conclusion "does not represent scientific consensus. Rather, it reflects one side of a scientific debate that has continued for almost 30 years."
- Wonder who provides major funding for the ACS?
- Don't.s

Toxicity and Obesity

- Since 2002, I first talked about the link between obesity and environmental toxicity.
- In my research I have found more and more studies that have confirmed my initial findings.
- A major study on 100,000 children has begun to determine the extent of the role of the environment and toxicity on obesity.
- It will be a 21 year prospective study which is the largest study of its kind ever undertaken.
- Two of the main chemicals to be reviewed are Bisphenol A and Phthalates.

Toxicity and Obesity

- The study is entitled “Environment and Obesity in the National Children’s Study” by Trasande, et al.
- You can download the paper in its entirety from the journal Environmental Health Perspectives at www.ehponline.org.
- They discuss how exposure during pregnancy to certain endocrine disruptors can increase the risk of obesity in childhood.
- They also discuss the correlation between early life exposure to toxins and the progression of disease in adulthood.
- The disruption of the hypothalamic-pituitary axis by toxins is also a focus point.

Toxicity and Obesity

- We know of the endocrine disruptive features of many of these petrochemical solvents.
- What we don’t know fully is the effect on mitochondrial energy production.
- Resting metabolism is where I believe most of the problem lies.
- These toxins reduce the efficiency of the citric acid cycle.
- Resting metabolism accounts for 50-75% of our daily energy production.
- If a person ingests an average of 2,500 calories daily and they exercise moderately which burns 625 calories, we are left with 1,875 to burn.

Toxicity and Obesity

- If toxins reduce resting metabolism by 7%. 131 calories remain unburned.
- Do this for one year and you end up with 47,815 calories left over.
- If 3,500 calories equates to one pound, you would gain 13.66 pounds in a year.
- Do this for ten years and you would have gained 136 pounds.
- And all of this can happen if you eat a normal healthy diet.

Treatment Protocols

- Now for the good news.
- The main focus for everyone in dealing with the toxicity issues is to become a good excretor.
- Aside from the effects on human health there are a number of other reasons to decrease the load on people.
- In a recent study, bisphenol A, can at low nanomolar doses reduces the effectiveness of chemotherapy on certain lines of breast cancer cells.
- This may lead oncologists to use more toxic therapies under the false assumption that the treatment is not working.
- There are numerous studies that show similar effects with a number of other toxins.

Treatment Protocols

- How many times have you seen nutritional interventions not working or where the response was less than expected?
- How often is this due to toxic loads, even small ones?
- Assessing excretion potential before starting a treatment protocol is crucial.
- Assess your toxic load which will help determine the source of exposure.
- Incorrectly detoxifying certain petrochemicals can increase their carcinogenicity.
- Also, by identifying the toxin, you can identify the sources leading to the avoidance of the toxin.

Treatment Protocols

- There are a few universal things you can do to help move out those petrochemical toxins.
- Make Glycine part of your everyday regime.
  - It is the main conjugate of many petrochemicals (Phase II).
  - Doses can vary from 500 mg daily to 5 grams.
  - Safe to 30 grams (not recommended).
  - Can cause problems in people with Parkinson's disease and those with congestive liver disorders.
- Sauna, electrolytes and fluids.
  - Heat, hydration and the proper balance of electrolytes will help pump the toxins out of the system.
- These need to be ongoing.

Treatment Protocols

- Probiotics
  - A healthy gut helps the detoxification process.
  - With benzene toxicity, pathogenic bacteria can increase the carcinogenicity of the petrochemical solvent by converting the amino acids phenylalanine and tyrosine into phenolic compounds.
- Boosting glutathione reserves.
  - Add more vitamin C, selenium, N-acetyl Cysteine and in some instances, whey protein to the patient's diet.
- Drainage remedies
  - Whether herbal or naturopathic, helping the toxins drain out of the system is critical. This is a controversial recommendation and is purely anecdotal.

Treatment Protocols

- Other natural substances that can greatly improve detoxification pathways include:
  - Beet Root
  - Modified Citrus Pectin
  - Milk Thistle
  - Calcium-D-Glucarate
  - Cruciferous Vegetables
  - N-acetyl Cysteine
  - Citrus Bioflavonoids
  - Vitamin C, D, E and the B's
  - MSM
  - Vitamin A helpful with Dioxin exposure

Laboratory Testing

- In order to know how to battle the toxins you need to know what they are.
- You also need to assess your Phase I/Phase II detoxification capabilities are.
- In testing for petrochemical exposure as well as Parabens and Phthalates, the simple first morning urine test from US Biotek is my personal favorite.
- It is also cost effective coming in at around $150.
- The interpretive report allows you to see if you are being exposed and gives you potential sources for the exposure.

Laboratory Testing

- In addition, the report provides you with safe and effective detoxification protocols.
- When you know what you are being exposed to, you can eliminate it.
- www.scorecard.org can help find out if you live in an area where toxins are being emitted by businesses.
- Detoxification can no longer be viewed as an event.
- It must be viewed as a lifestyle.
- I would highly recommend using bone broth as a cornerstone of a detoxifying lifestyle.

Laboratory Testing

- Heavy metal testing is a challenge.
- Some medical practitioners recommend heavy metal challenges using powerful chelators.
- There is a risk of side effects, some of which can be devastating.
- Blood levels of heavy metals are not valuable in most cases as they do not reflect total body burden.
- Blood lead levels are the exception as long as you are not chelating at the time.

Laboratory Testing

- My suggestion is to use hair analysis.
- My favorite lab, although there are other competent ones, is Doctor's Data.
- There have been studies that claimed that hair testing is unreliable and vary widely from lab to lab.
- The truth of the matter is, some labs do a very poor jobs and others are quite competent.
- When you compare competent to competent, hair testing shines.
- The interpretation of the data is the critical part.

Laboratory Testing

- A fabulous guide to interpreting hair test comes from Dr. Andrew Cutler, PhD.
- He has written two books on the subject, *Amalgam Illness* and *Hair Test Interpretation: Finding Hidden Toxicities*
- You can find them at www.noamalgam.com

Heavy Metal Detoxification

- If you thought that heavy metal testing was controversial, heavy metal detoxification is even more so.
- Some have suggested natural products like cilantro and chlorella.
- Problem is, many of these so-called safe options are themselves loaded with heavy metals like mercury.
- Others recommend IV chelation.
- It is a costly and has marginal benefits if only done occasionally.
- Low dose, DMSA or DMPS and Alpha Lipoic Acid along with boosting transporter proteins is best.

Heavy Metal Detoxification - Mercury

- Back to Dr. Andrew Cutler, his recommendation with both ALA and DMSA is to dose at ¼ to ½ mg per 1 kilogram of body weight of each every 4 hours for 3 days.
- Then take either 4 or 11 days off.
- Considering that each cycle removes approximately ½% of the total body burden of mercury, complete removal can take up to two years.
- DO NOT TAKE MORE!!!
- The side effects of high dose chelation can be catastrophic.

Heavy Metal Detoxification

- Transporter amino acids like N-acetyl-cysteine and glutathione and crucial.
- They help transport the heavy metals through the stool instead of through the kidneys.
- Taking 500-1,000 mgs of NAC daily along with vitamin C (2,000 mgs) and selenium (200 mcgs) will also help boost glutathione production.
- Cold processed whey protein is another fabulous source to help boost glutathione production.

Bottom Line

- First, test yourself. Finding out what your enemy is will allow you to proceed with the next three items.
- Reduce exposure. While you cannot eliminate all of your exposures, it is important to avoid the overt ones.
- Become a good excretor. You must pave the road for the toxins to leave your body as rapidly as possible. The shorter the time in your body, the less damage that can be done.
- Vote with your dollar. Stop buying toxic products and they will stop producing them. Buy non-toxic alternatives and they will make more of them. Educate yourselves, your friends and your families. We must demand better. By not doing so, you become the problem.

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