



Toxins and the Citric Acid Cycle

Homotoxine der Matrix

Who I am?

- My name is Mark Schauss, D.B.A. and I am the President of Carbon Based Corporation and the developer of a computerized laboratory interpretive report.
- I have spent the past 20 years reviewing and helping to interpret over 30,000 laboratory tests.
- My company has worked with close to 1,000 health care practitioners in the past 10 years.
- I am also the father of two children one of whom has epilepsy partially due to exposure to pesticides.

Today's Discussion

- The prevalence of toxins in the environment.
- How toxins affect the Citric Acid Cycle.
- How to effectively test for the toxins.
- Discussion of petrochemical derivative - phthalates
- Biphasic dose responses
- Combinational toxicity
- Transgenerational and Epigenetic toxicity
- The use of homeopathic remedies to address low dose toxicity tied to the biphasic dose response.

Toxins – How Prevalent?

- According to the United States Environmental Protection Agency in 2002 through their “Toxic Release Inventory” tracking system, over 7.1 billion pounds of 650 different industrial chemicals were released in the air and water, 266 of which are linked to birth defects.
- Worldwide, the estimates approach 80 billion pounds of toxins released annually.
- Some of these toxins affect human health in microgram doses.

Toxicity – How prevalent?

- 9 individuals not in the chemical industry were tested for 210 chemicals and 167 of them were found in at least one of the people with an average number of chemicals found per person was an astounding 91. Most of these chemicals did not exist 20 years ago.
- In a recent study published by the Environmental Working Group (www.ewg.org) the cord blood of ten newborn babies was tested and 287 chemicals were detected, all of whom are linked to cancer, developmental problems and/or nervous system damage.

Toxicity – How prevalent?

- One of the most used cooking surfaces, Teflon, is at the center of major research on its effects on health in the United States.
- It has been implicated as a causative factor in elevated cholesterol and an increase in coronary heart disease.
- The perfluorochemicals (PFC's) are in Stainmaster, Teflon, Scotchguard, and Gore-Tex, all from DuPont.
- The company did not reveal the known health problems caused by this chemical.
- Elevated LDL may be a marker for toxicity exposure.

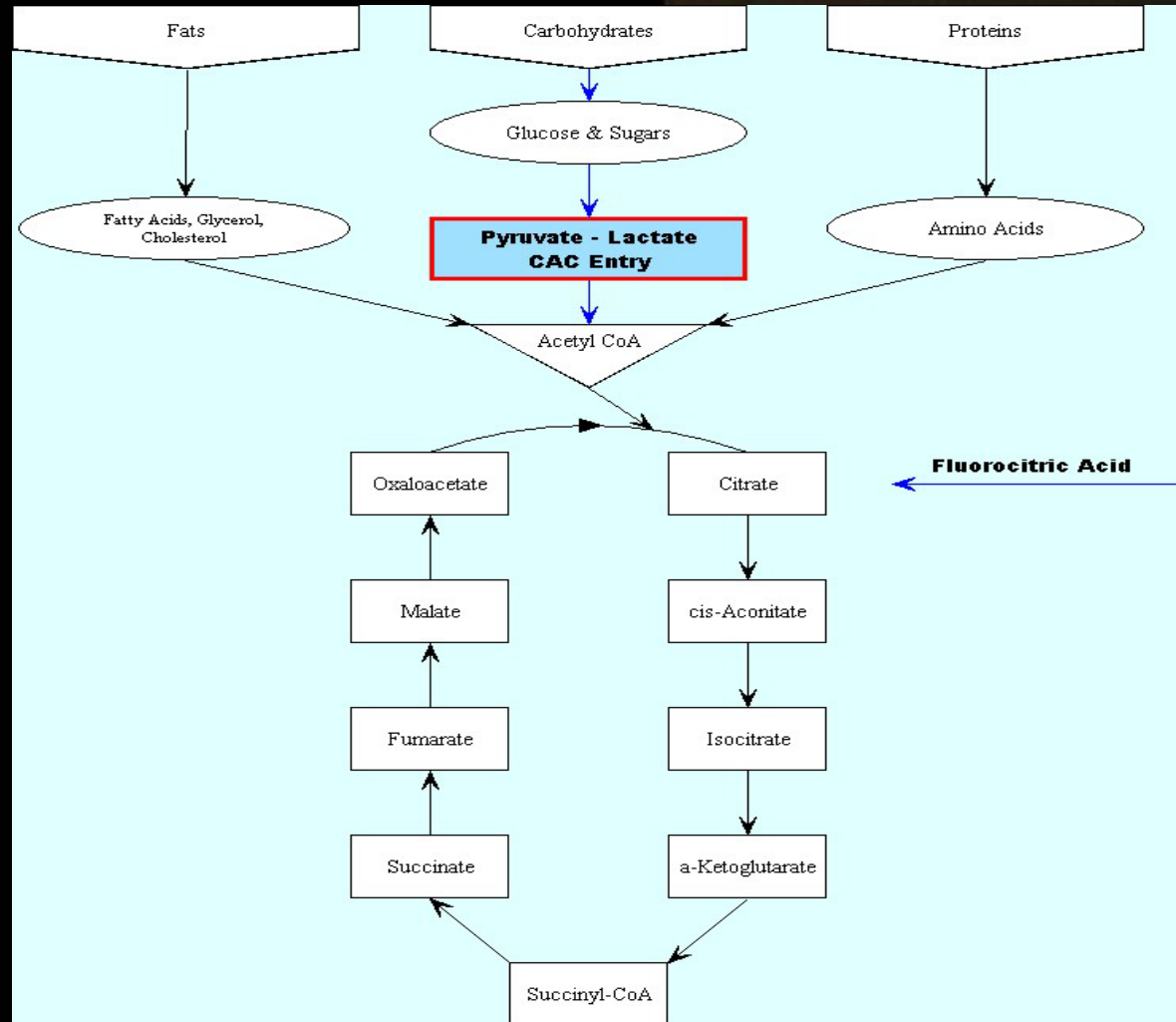
Toxicity – How prevalent?

- PFC's have been found in 90% of the people tested in the United States.
- It has also been found in similar percentages of people in Korea, China, India and Japan. These were the only countries tested so far.
- 17 of 18 species of animals tested positive for PFC's!

How Toxins Affect the Citric Acid Cycle

- An extreme example:
- Compound 1080 –
“The poison that keeps on killing”
- Fluoroacetate is a natural form of the slightly more toxic sodium fluoroacetate, also known as the notorious rodent poison 'Compound 1080'.
- When ingested and metabolized, fluoroacetate is transformed in cells to fluorocitrate – a strong enzyme inhibitor. Fluorocitric acid blocks the CAC Cycle completely!

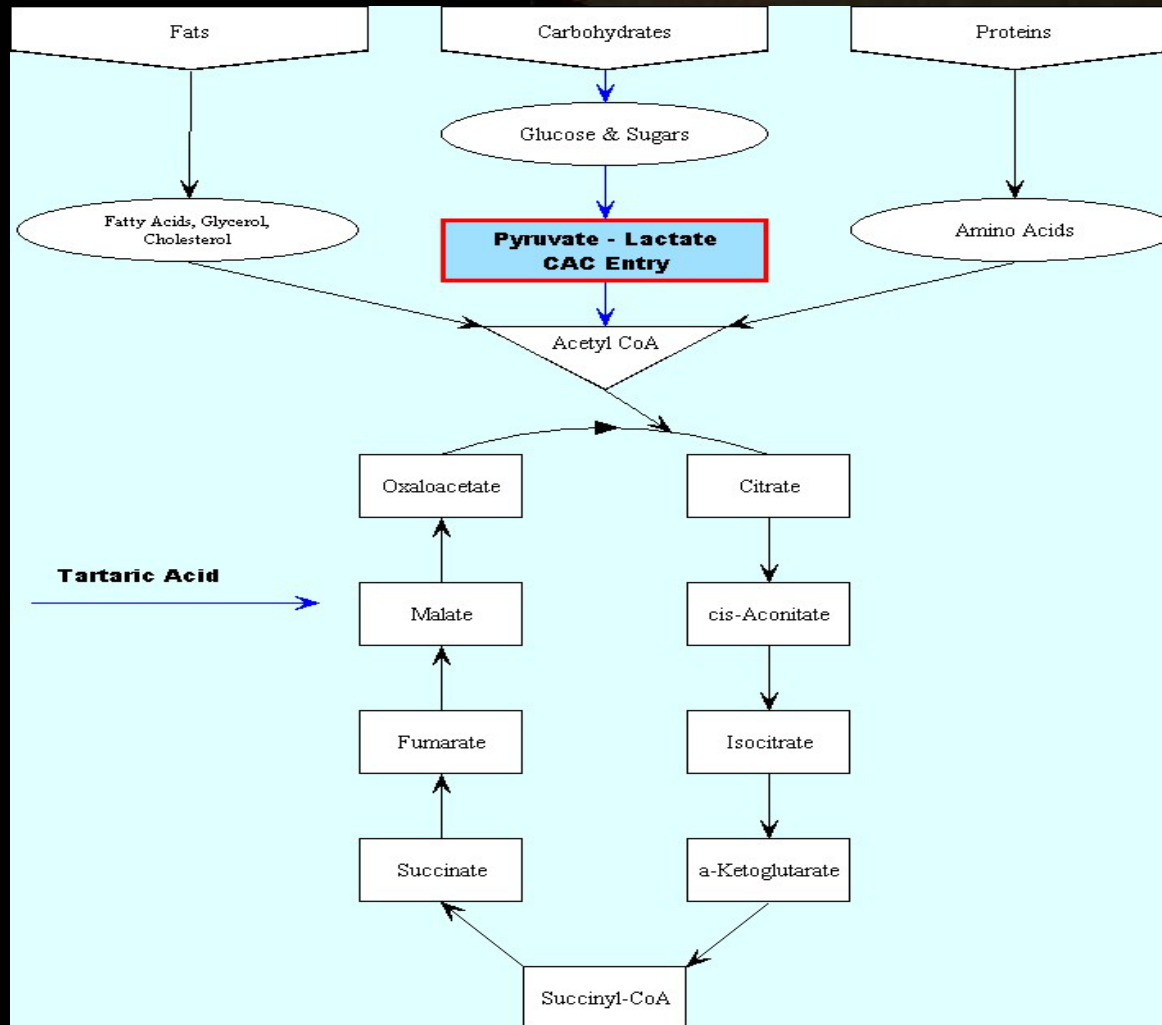
How Toxins Affect the Citric Acid Cycle



How Toxins Affect the Citric Acid Cycle

- Compound 1080 is an extreme case, tartaric acid is a more common one.
- It is a common component of many foods and drinks especially wine and grapes.
- It is not a yeast by-product.
- It interferes with the Citric Acid Cycle at the point where Malate comes in.

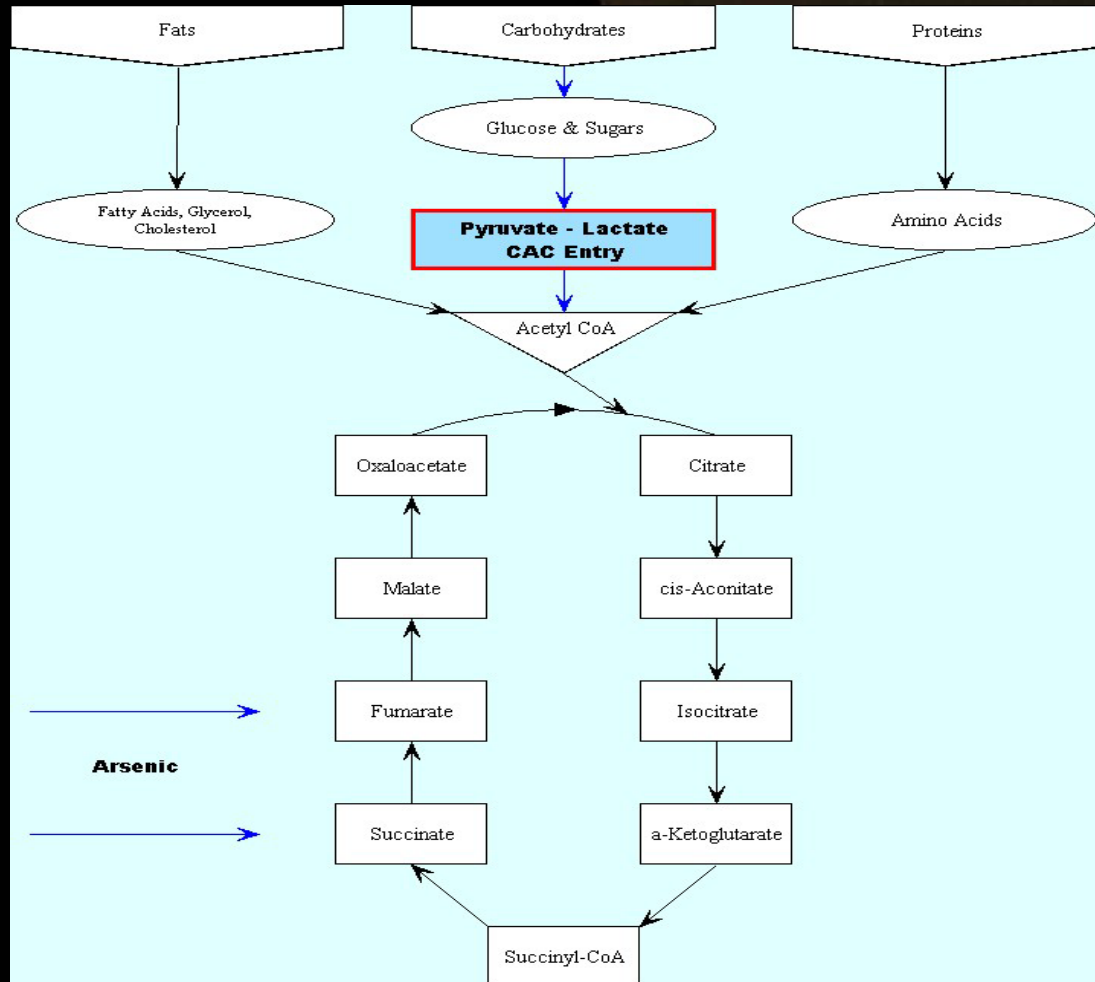
How Toxins Affect the Citric Acid Cycle



How Toxins Affect the Citric Acid Cycle

- Arsenic can disrupt the pyruvate and succinate oxidation pathways.
- This inhibition effectively blocks the Krebs cycle, which results in marked depletion of ATP stores.
- Alcohol affects the same cycle as arsenic, so arsenic toxicity is accentuated by alcohol ingestion by up to 100 fold.

How Toxins Affect the Citric Acid Cycle



CAC Entry Phase - This phase represents the place where carbohydrates enter into the citric acid cycle. Disruptions may be caused by petrochemical exposure, mercury or arsenic and pathogenic bacteria.

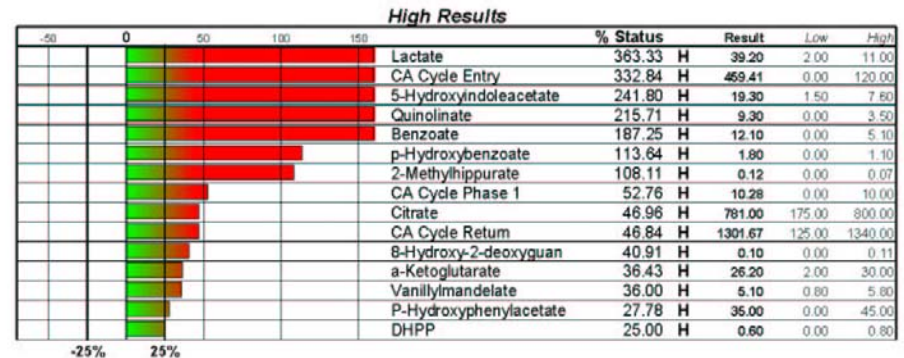
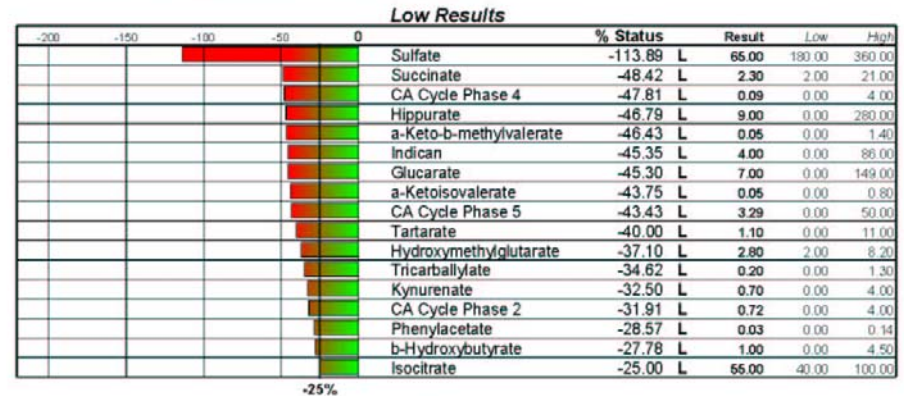
Sample of a patient with a citric acid cycle disruption. The test to determine a CAC cycle problem is a urine organic acid test. My company, Carbon Based are the first and only ones (not even the labs do this) to be able to pinpoint the location of the disturbance and help find the potential toxin.

Basic Status Report (High/Low)

Urine Organic Acid Date: 5/22/2003

Female / Age: 34

The % Status is the weighted deviation of the laboratory result.



How Toxins Affect the Citric Acid Cycle

- Mycotoxins produced from fungus, staphylococcal alpha-toxins, poisonous mushrooms, heavy metals such as titanium, mercury and many others all have an effect on the citric acid cycle.
- These effects lower the ability to create energy from the foods we eat.
- It also lowers metabolism which has major implications in weight loss.

Toxicity – Implications in Weight Management

- Laboratory animals undergoing toxicity testing showed decreased body temperatures.
- Researchers believe that the movement towards hypothermia may be a protective device used by the body to slow down the effects of the toxins.
- A theoretical model I have proposed over the past few years is that the greater number of people being seen today with low basal temperature is our response to an increase in toxic load.
- Lower Metabolism and low temperature = Slower Toxic Effects = Poor Energy Creation = More Weight Gain = Slower Weight Loss

Toxicity – Implications in Weight Management

- *In the July 2004 International Journal of Obesity, Dr. Angelo Tremblay of Laval University in Quebec, Canada said the following:*

“Pollution seems to be a new factor affecting the control of thermogenesis in some obese individuals experiencing body-weight loss.”

Toxicity – Implications in Weight Management

- What this study found was metabolic rates slowed down in proportion to concentrations of organochlorines more so than in the concentrations of leptin. Two mechanisms were proposed, first the effect on the thyroid by these toxins and second as a mitochondrial toxin. My proposition, which comes from the data gathered from thousands of tests is that the affect of environmental toxins, from organochloric, phosphic, petrochemical, bacterial, or heavy metals is on the Citric Acid Cycle.

Toxicity Testing

- When dealing with environmental toxins, it is ***CRITICAL*** to know what you are dealing with.
- There is truly only one way to determine what your toxin is and that is through the use of laboratory testing.
- Because of new techniques and the work of dedicated scientists, many of the tests that are available are non-invasive, do not need blood draws.

Heavy Metal Testing

- The four main tests for heavy metals are:
 - Hair
 - Stool
 - Urine
 - Blood
- Each has its benefits, each has its problems.

Heavy Metal Testing

- Hair Elements – If properly interpreted, an inexpensive and effective means of determining long term exposure and excretion capabilities.
- RBC Mineral Toxin – Helps review intracellular trace minerals and heavy metals. Somewhat limited but does give you an excellent insight into trace mineral competency.

Heavy Metal Testing

- Urine Challenge for Heavy Metals – An excellent method of determining exposure to heavy metals but can cause unwanted side-effects.
- Fecal Metal – Determines if there is an ongoing exposure to heavy metals. Can be useful in testing for patients excretion methods (kidney vs. stool).

Environmental Solvent Testing

- Solvents, made from petrochemicals are ubiquitous in our environment.
- They are being implicated in a growing number of health issues.
- Testing methods for these toxins include:
 - Fat Biopsy
 - Blood Draws
 - Urine Metabolites

Environmental Solvent Testing

- Fat Biopsy – Accurate yet expensive and painful. Many of these solvents reside in fat tissue so this is a good assessment tool.
- Blood Measurements – Accurate, expensive and requires a blood draw. Another limitation is that you have to know what your looking for and since everyone has some solvents in their blood.....

Environmental Solvent Testing

- US Biotek in Seattle, Washington, U.S.A. has developed a urine environmental pollutants panel for the following solvents
 - Phthalates
 - Xylene
 - Benzene
 - Toluene
 - Styrene
 - Trimethylbenzene
 - Parabens

Environmental Solvent Testing

- The test is a first morning urine sample.
- Relatively inexpensive and very accurate.
- Comes with specific detoxification protocols developed by my team at Carbon Based Corporation and exposure sources for any elevated solvent markers.
- Combine it with a urine organic acid test from the same lab or MetaMetrix in Atlanta, Georgia and it is an effective method to assess toxicity and its effects.

Physician: Joel Grimwood, DC

Patient: Anika Schauss

Accession #: 200504349

Age: 2 years

Sex: F

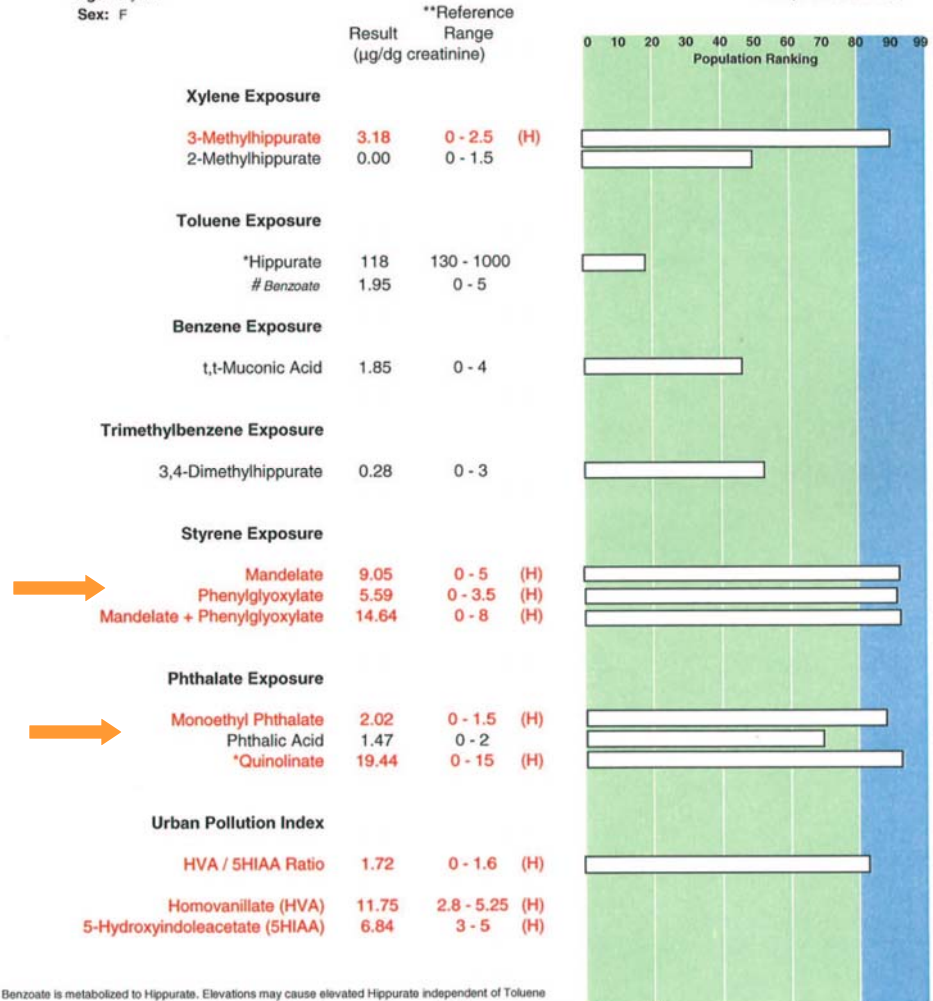
Assay Batch #: 0503080A

Collected: 02/23/05

Received: 02/25/05

Completed: 03/11/05

**Sample
test
indicating
exposure
to plastics**



Benzoate is metabolized to Hippurate. Elevations may cause elevated Hippurate independent of Toluene

(µg/mg creatinine)

** Reference ranges are gender specific

CLIA #: 50DO965661

© US BioTek 2003

US BioTek Laboratories has developed and determined the performance characteristics of this test.

This test has not been evaluated by the U.S. Food and Drug Administration.

This test does not assess for neonatal inborn errors of metabolism and is based on stable renal function and normal renal clearance in the adult.

Phthalates

- Phthalates a plasticizer used in cosmetics, shampoos, and perfumes are powerful endocrine disruptors.
- They are used to hold color and scent in consumer products, used in glues, solvents, insect repellants, lubricants, adhesives as well as a component of time released medications.

Phthalates

- A study has implicated phthalate exposure to DNA damage to male sperm
 - The Relationship between Environmental Exposures to Phthalates and DNA Damage in Human Sperm Using the Neutral Comet Assay Susan M. et al Environmental Health Perspectives July 2003.
- They will also change the anogenital distance in developing male fetuses. The higher the level of phthalates the greater the damage.
 - Male Rats Exposed to Linuron in Utero Exhibit Permanent Changes in Anogenital Distance, Nipple Retention, and Epididymal Malformations That Result in Subsequent Testicular Atrophy. McIntyre BS, Barlow NJ and Foster PMD, Reproductive and Developmental Toxicology 2002.

Phthalates

- Phthalate exposure has been correlated to the shortening duration of pregnancy
 - Exposure to phthalates commonplace in pregnant women may shorten duration of pregnancy by one week. Latini G. et al – Environmental Health Perspectives November 2003.
- Environmental chemicals are being strongly implicated in fetal development and reproductive health.
 - How strong is the evidence of a link between environmental chemicals and adverse effects on human reproductive health? Sharpe RD and Irvine DS, British Medical Journal, February 21, 2004.

Appropriate Detoxification Methods

- My discussion of detoxification methods will focus on petrochemical solvents.
- Each solvent needs to be detoxified in slightly different ways.
- Two different protocols are universal:
 - The use of the amino acid Glycine is critical.
 - The buildup of stores and production of the tri-peptide Glutathione.
- Reduction of exposure to the many sources of these toxins is also important.

Biphasic Dose Response

- With some chemicals, an effect seen at a high dose is not seen at a low dose and visa versus.
- Perchlorate, a rocket fuel component, causes changes in the brain at .01 – 1 mg/kg per day but not at 30 mg/kg per day according to Argus 1998 and others.
- We see with perchlorates that an effect seen at a low dose does not appear at a higher dose.
- Many other toxins in the environment have similar effects.

Biphasic Dose Response

- If we detoxify too quickly we may cause the body to have an inability to deal with this biphasic dose response.
- Homeopathy may provide a way around this due to its ability to deal with such small quantities of toxins.
- We are hoping to put together a study in the year 2006 to see if homeopathic remedies can reduce the side effects of overly aggressive detoxification protocols.

Combinational Toxicity

- Most toxicity research has been done on the effect of a single toxin on a single organ system.
- Recently, research has begun on combinational toxicity of multiple toxins on multiple organ systems.
- The combination of bromoform, chloroform and tetrachloroethylene cause neurological damage while by themselves or in pairs has no effect even in doses 1000 times greater than when all three are mixed together.
 - January 2005, Environmental Toxicology and Pharmacology.

Combinational Toxicity

- Research is going on at Carbon Based Corporation to determine the effects of multiple toxins on the Citric Acid Cycle.
- We are also developing detoxification protocols to deal with these combinations using safe and effective protocols.

Transgenerational Epigenetics

- In a study published in the journal Science, researchers led by Anway, found that fetal exposure to certain endocrine disrupting toxins not only affected the individuals exposed in the womb but in subsequent generations.
 - Anway MD, Cupp AS, Uzumcu M, and Skinner MD, Epigenetic Transgenerational Actions of Endocrine Disruptors and Male Fertility, *Science*, 308:1466-1469, June 2005.

Transgenerational Epigenetics

- The fourth generation of rats tested had the same damage as the exposed rat in generation one.
- The inheritance of the damage was not to the DNA but by altering patterns of DNA methylation.
- This transgenerational epigenetic effect makes detoxification of individuals, especially those of child bearing age more important than ever.

In summary.....

- Environmental toxicity has a number of effects on human health.
- Disruption of the Citric Acid Cycle and the ability to create energy is a major factor in health and disease.
- The use of laboratory testing should be a focus point in developing the proper detoxification protocols in healing the patient
- Avoiding the toxins is critical.

Contact Information

Mark Schauss, D.B.A.
Carbon Based Corporation
3545 Airway Drive, Suite #114
Reno, NV 89511 U.S.A.
T:775-851-3337
F:775-851-3363
info@carbonbased.com
www.carbonbased.com