

The Effect of Toxicity on Carbohydrate Metabolism

Or why the high protein diets are right but for all the wrong reasons.



A little background



- Developer of the CellMate Wellness System™ of analyzing and interpreting blood and urine tests
- Holder of 2 U.S. Patents
 - Medical Diagnostic Analysis System – 6,063,026
 - Disease Indicator Analysis System – 5,746,204
- Researching in the field of alternative and complimentary medicine for 18 years

A little background....



- I have reviewed over 25,000 laboratory tests in the past 18 years
- In the past 4 years I've focused on three tests in particular:
 - Urine Organic Acids
 - Plasma Amino Acids
 - Comprehensive Wellness Profile

A little background



- In 1999 my daughter Tasya was diagnosed with Epilepsy.
- After running numerous diagnostic tests we were able to pinpoint a possible trigger... environmental toxins.

A little background



- Because of my research trying to uncover the causes of Tasya's seizure activity as well as trying to develop a nutritional program to help control my daughter's condition, I made a few profound discoveries.

A little background



- In her organic acid in urine test she showed high levels of 2-methylhippurate which is a by-product of xylene and/or toluene exposure.
- As I delved into the effects of this toxin I began to see its effects and the effect of other environmental toxins on the Citric Acid Cycle (a.k.a. Krebs's Cycle).

Toxins – How prevalent?



- According to the EPA 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.

Toxins – How prevalent?



- A neurotoxin known as diazinon, a commonly used insecticide, was found in nearly 1/3 of drinking water during a national water sampling program.
- 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. Some of these chemicals did not exist 20 years ago

Toxins - Sources



- In the August 2001 issue of *Atmospheric Environment*, researchers reported that levels of dimethyl mercury (the most toxic form) from landfills “is higher, by a factor of 30 or 40, than concentrations of total mercury in the ambient air. They also reported that the dimethyl mercury concentration was 1,000 times greater than any measurement **ever!!!**

Toxins – Dosage



- According to a paper (Body Burden) by the Environmental Working Group (www.ewg.org) “A growing body of literature links low dose chemical exposures in animal studies to a broad range of health effects previously unexplored in high dose studies.”

Toxins - Dosage



- Many chemical companies and the government will site numerous studies where they have determined the “safety” levels of many chemicals below which the effects they have observed no longer appear.
- This gives us a false sense of security.

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 in 1998

Low Dose Toxicity



- In the April 17th issue of the *New England Journal of Medicine* researchers reported that concentrations of lead below 10 ug/dl may be *more* harmful to the brain than above.
- A recent CDC study published earlier this year indicated that 425,000 children had dangerously elevated blood-lead levels.

Petrochemicals



- Xylene – Toluene – Benzene
- These petrochemicals are found all over our environment and must be considered toxic to all of us but especially with our children.

Xylene



- This petrochemical derivative is found in the following sources:
 - petroleum products and fuels
 - formed during forest fires especially pine forests
 - used as a solvent in industry
 - constituent of paints, inks, and adhesives
 - used in production of epoxy resins
 - manufacture of perfumes and insect repellents.

Xylene uses



Xylene

Orthoxylene

Paraxylene

Phthalic Anhydride

Terephthalic Acid

Synthetic Lubricants
Pipe
Furniture
Bowling Balls

Polyester Fibers

Apparel
Carpet
Tie Cord
Home Furnishings

Polyester Resins

Beverage Bottles
Adhesives
Insulation
Tubing

Solvents


Return
to Raw
Materials

Petrochemicals



- This chemical family has a major effect on the Central Nervous System.
- They are absorbed most readily in the GI tract and lungs and are stored best in fat tissue.
- They also have been implicated in retinal disorders.

Now for the good stuff.....

How and why toxins may be at the root of the fattening of America (and the world).



The effect of petrochemicals on carbohydrate metabolism



- Disruption of the Citric Acid Cycle Entry Point
 - Inability to properly utilize carbohydrates to derive energy
 - May cause weight gain or weight loss problems
 - Create a hypoglycemic condition

The effect of petrochemicals on carbohydrate metabolism



- By depleting glycine in order to detoxify, you impair the process of gluconeogenesis which in turn can lead to hypoglycemic-like symptoms and impaired insulin responses.
- Those with moderate to severe impairment in their insulin response may show abnormal weight gain due to the overproduction of fat.
- Increasing the availability of glycine is a first step in controlling this abnormality.

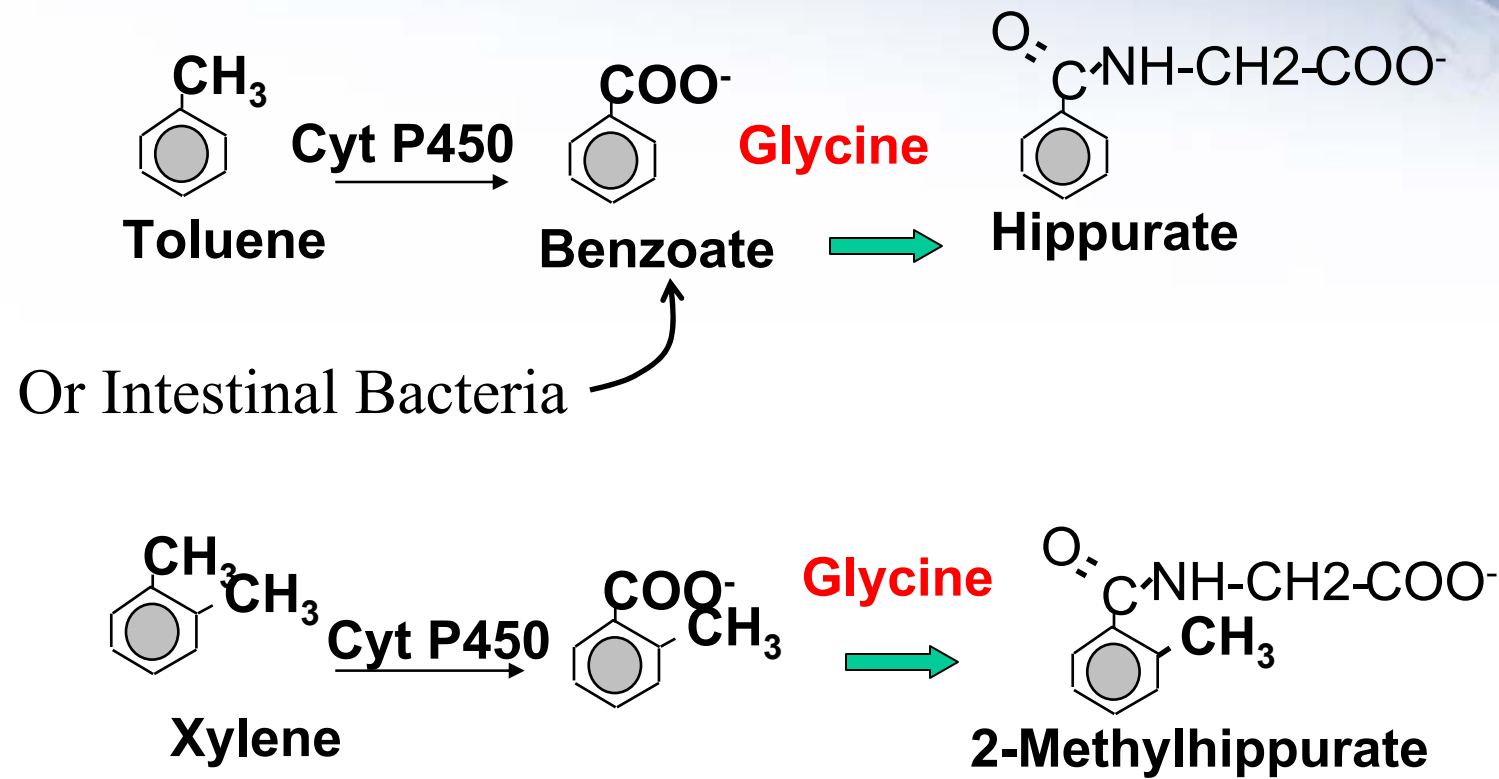
The effect of petrochemicals on carbohydrate metabolism



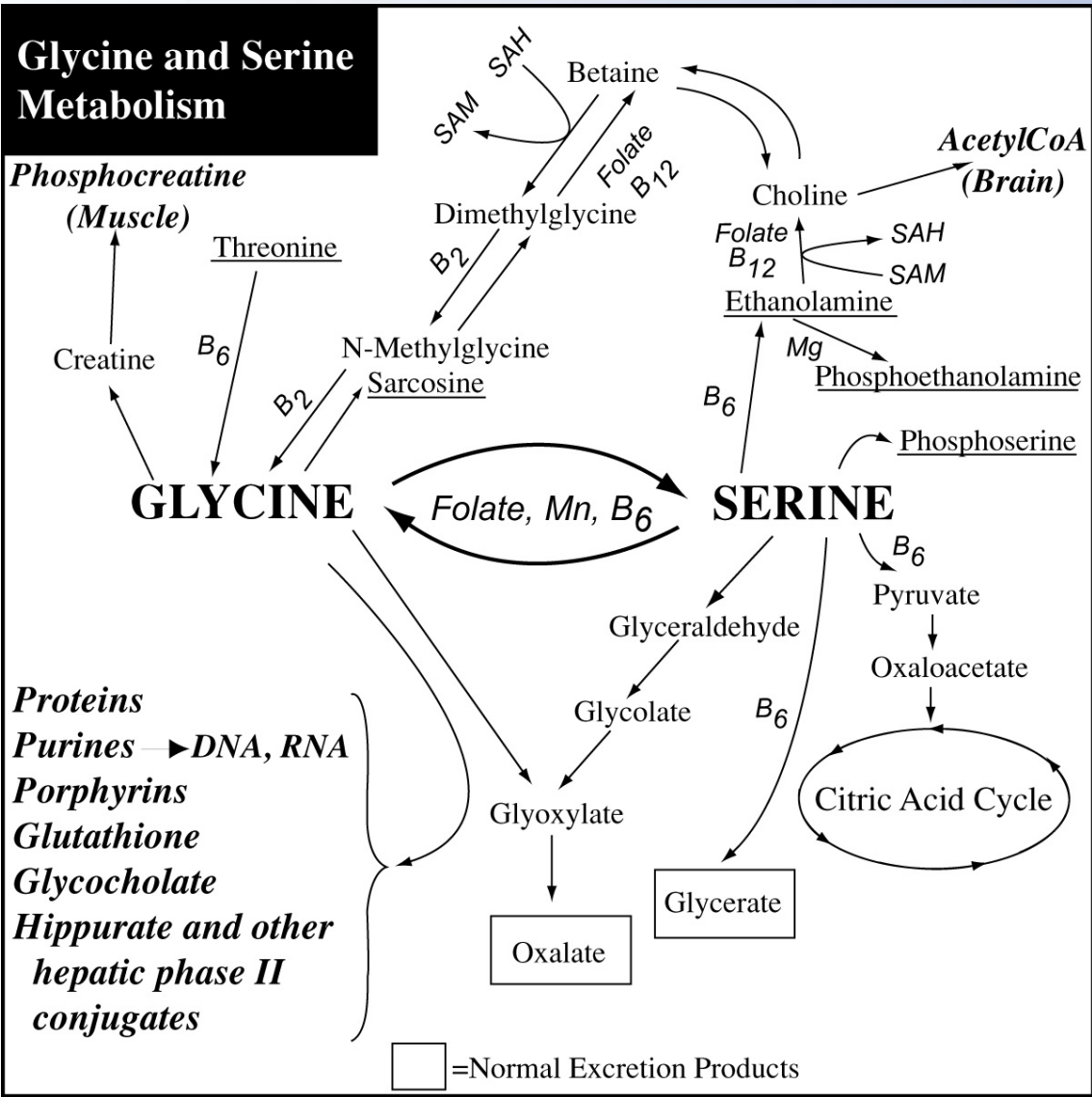
- Increase the demands on certain amino acids (and co-factor nutrients) in order to detoxify the body.
- The most effected amino acid is glycine as it is critical in the conjugation of the toxins and their removal.



Xylene & Toluene Detoxification



Glycine Metabolism



A Caveat



- Unless you assess the presence of a petrochemical insult, you are flying blind.
- Laboratory testing, specifically urine organic acids and plasma amino acids are critical in the assessment process.

Plasma vs Urine Amino Acids



- It is difficult to assess the availability of amino acids by measuring the excretion of said amino acids.
- The preferable test to run when trying to develop a nutritional protocol incorporating amino acids is a plasma amino acid profile.

Basic Status Report (High/Low)

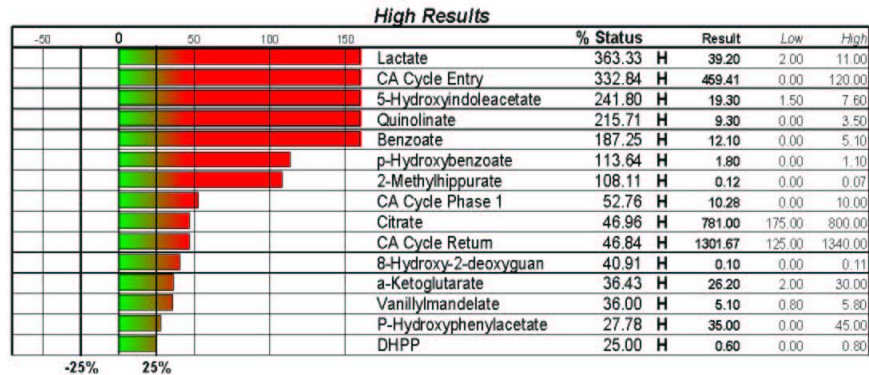
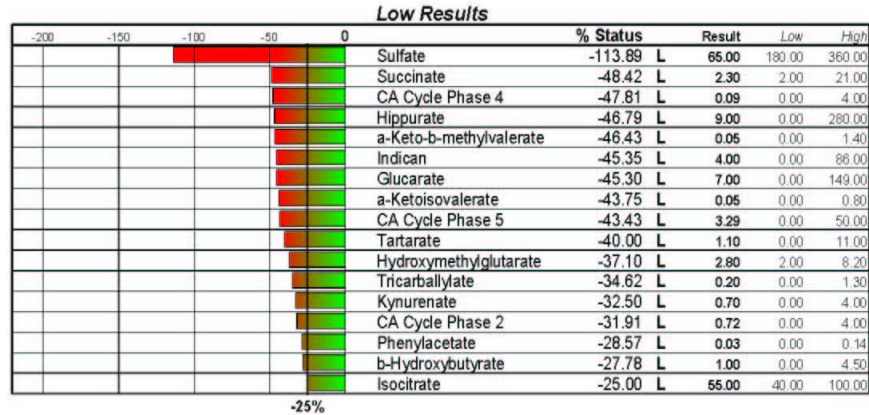
Urine Organic Acid Date: 5/22/2003

Female / Age: 34

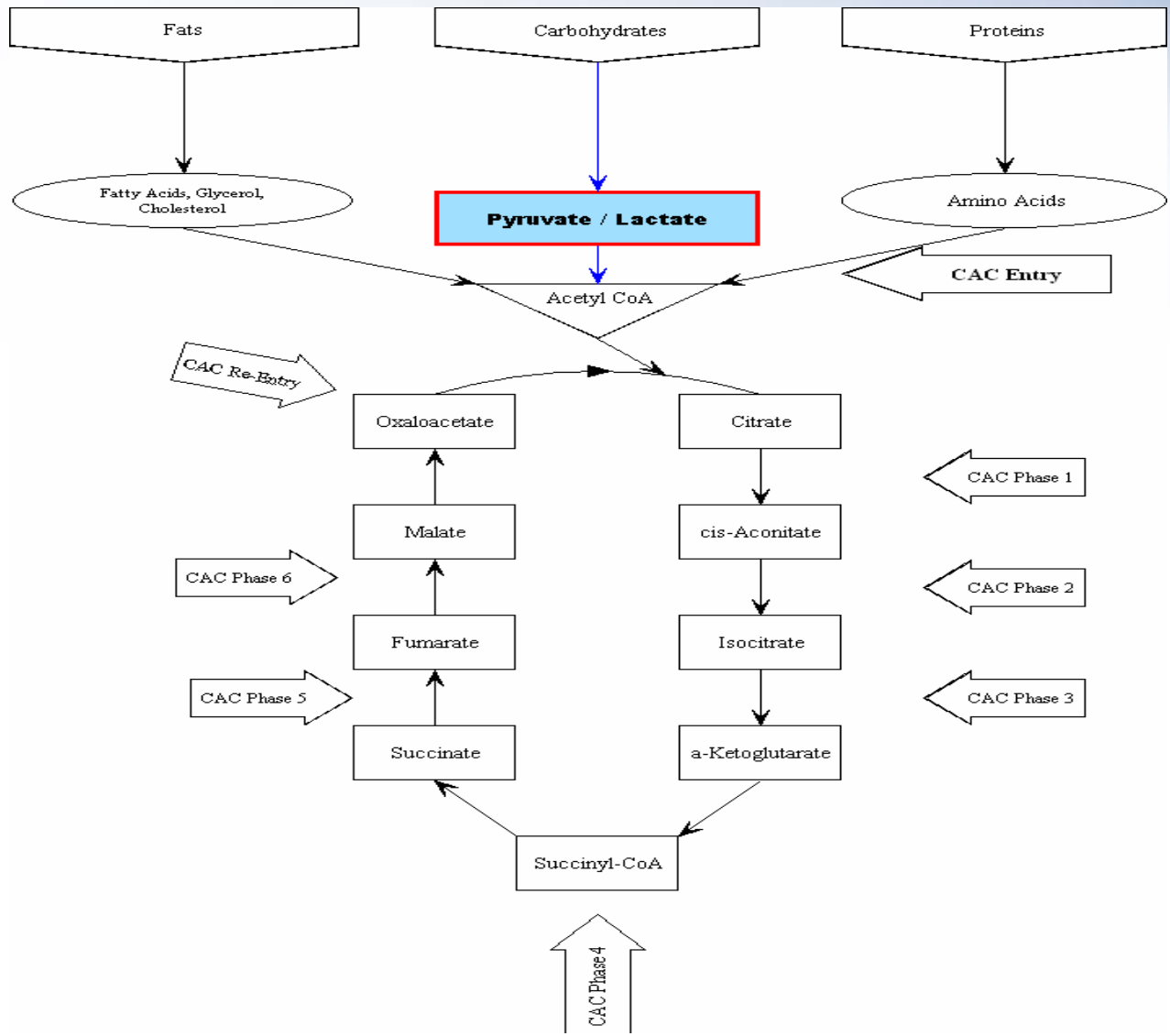
The % Status is the weighted deviation of the laboratory result.



Sample
of an
individual
with a
CAC
Entry
Blockage



Citric Acid Cycle Disruption



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.
- In other words, the cat that ate the rat that was poisoned by 1080 has forfeited all its nine lives.
- It is tasteless and odorless, biodegrades quickly in contact with soil and in water, but is residual and remains fully active in mammalian tissue. It can be readily taken up into vegetable tissue by leaf absorption or root uptake and into fish tissue.
- It is totally water soluble and is still in use in the United States by licensed exterminators.

Arsenic



- Arsenic can disrupt the pyruvate and succinate oxidation pathways.
- This inhibition effectively blocks the Krebs cycle, interrupting oxidative phosphorylation, which results in marked depletion of ATP stores. Arsenic also can produce a thiamine deficiency by preventing transformation of thiamine into acetyl-coenzyme A (CoA) and succinyl-CoA.
- Alcohol affects the same cycle as arsenic, so arsenic toxicity is accentuated by alcohol ingestion.

Bacterial Interference in the CAC Cycle



- In a lecture given in 1998 by Dr. Paul Cheney, M.D., he states “Tartaric Acid looks like Malic Acid and poisons cells by interfering with the Krebs Cycle”.
- Tartarate a compound produced by yeast and fungal overgrowth, has been called an anti-metabolite along with Citramalate, β -ketoglutarate and Arabinose, because they block metabolic pathways through molecular mimicry.¹

¹ Bralley JA and Lord RS, *Laboratory Evaluations in Molecular Medicine*. IAMM, 2003.

Bacterial Interference in the Citric Acid Cycle



- In the case of some species of aerobic bacteria they produce a by-product known as Tricarballic acid which can be bound so tightly to magnesium, an important co-factor in proper CAC Cycle function, as to induce a major Mg, Ca and Zn deficiency.

So why was the Atkins Diet so successful?



- He was right for many of the wrong reasons.
- Increasing protein intake is helpful in improving the detoxification capabilities of the liver and kidney.
- Amino acids slide into the citric acid cycle by-passing the metabolic blockade caused by environmental toxins.
- By creating a ketotic environment you activate the Acetyl Co A thereby forcing the blockade open but you don't solve the problem.

Problems with too much Protein



- Hyperammonemia is a major problem if the person has inadequate excretion capabilities, e.g. low arginine, ornithine.
- Note also that ammonia is toxic, due to the left-shift in the glutamate dehydrogenase reaction, depleting alpha-ketoglutarate levels, hence depressing CAC activity, resulting in energy depletion.

So what do we do?



- First off, you need to educate your clients on how to avoid as many of these environmental toxins as possible.
- Secondly, you need to assess the patients toxic load, using reliable and reputable lab testing procedures.

So what do we do?



- Third, you need to properly interpret the data and develop a logical and sequential nutritional support program to help your client lessen the present load and to protect against future environmental insults.

How do we do it?



- The education phase requires research and reading. The Internet of course, is a valuable resource. There are a number of good books on the subject. My website at www.carbonbased.com is another resource to find out how to avoid toxins in our everyday lives.

How do we do it?



- The assessment of environmental toxicity is a tricky one. We all have some exposure, and some residual levels in our system. The tests chosen must be ones where the results provide a direction in developing a solid program for the client.

How do we do it?



- By continuing our education at events like this to determine the best nutritional supplements and the best nutritionally rich foods for the individual.
- To avoid the problems hyperammonemia presents, a well-balanced amino acid supplement complete with a balanced array of co-factors is essential.

How do we do it?



- To avoid the problems hyperammonemia presents, a well-balanced amino acid supplement complete with a balanced array of co-factors is essential.
- Customization of the amino acids through the use of a plasma amino acid panel is also very helpful.

How do we do it?



- A supplement regime must also be targeted to the present nutritional status of the individual, not the perceived needs of the average person.
- Reassessment is critical as the individual is not static but dynamic. Modifications are necessary depending on the phase and nature of the toxin removal.

Wrap up



- One of the best ways to improve the ability of your client to utilize carbohydrates more efficiently is to address the abnormalities in the Citric Acid Cycle caused by environmental toxins, heavy metals, the array of bacterial invaders and nutrient co-factors.

How to contact me



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