Body Toxicity and Detoxification

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Are We Toxic?

- Alarming studies
  - 1976 EPA National human adipose (fat) tissue survey
  - Found 5 chemicals in 100% of samples
    - Dioxin
    - Styrene
    - Dichlorobenzene
    - Xylene
    - Ethylenol
  - 98% of the samples contained PCB's

Toxicity

- From a dozen to 500 chemicals can be found in measurable quantities in the body fat of every living human
- Not a question as to whether we have the chemicals but one as to how much and how do they effect our health

Chemicals and disease

- Enough evidence of a positive correlation between chemical exposure and disease to document that a serious problem exists and that caution is urged

Toxicity

- Sick building syndrome
- Multiple chemical sensitivity
- Environmental cancer concerns
- Reproductive concerns

Fertility

- Chemicals are being studied in relationship to
  - Reproductive system abnormalities
    - Smaller penises
  - Infertility
    - 1 couple in 6 currently has trouble conceiving
    - 1/3 of couples in their 30’s are infertile
  - Female health problems
    - Endometriosis (related to dioxin), fibroids and menstrual disorders
Male fertility
- Infertility in a couple is due to male problems 40% of the time
- There has been a 50% decrease in sperm count in the last 50 years
- A study of male Danish farmers showed that those who ate organic food just 24% of the time had a 43% higher sperm count

World Health Organization
- “there is a rapidly growing body of scientific evidence that a number of substances interfere with the normal functions of the body governed by the endocrine system and have, thus, the potential of causing adverse effects to health. One of the most impressive consequences of such hormonal interference could be the decrease in sperm count and quality recently reported in a number of countries”
  - Statement released March 1998

Prenatal exposure
- 30% of women tested have detectable levels of PCBs, DDT and lindane in the amniotic fluid.
- Umbilical cord blood has 33-90% of the level of dioxin found in the mothers body
- An unborn baby does not have fully functioning liver or kidneys so it is unable to clear out the pollutants

Breast Milk
- Mother milk is 3% fat
- Many chemicals are fat soluble and are stored in fatty tissues
- Tests of mother milk have shown it can contain higher levels of contaminants than are permitted in cow’s milk sold in the grocery stores.

Children
- Correlation between pesticide use in the home and brain cancer in children
- Early puberty related to chemicals in the environment
- Pesticide exposure to the pregnant mother has been shown to have definite effect on children’s neurological behavior
- Learning and behavioral problems
  - Lower IQ scores
  - Hyperactivity

Cancer
- Cancer mortality (not related to smoking) has increased by 200% in men since 1940
- Cancer mortality (not related to smoking) has increased by 50% in women since 1940
- Estrogenic effects of certain environmental chemicals are suspected to be related with estrogen sensitive cancers
- Increases in cancers
  - Breast
  - Prostate
  - Testicular
World Health Organization

“Indications for an increase in the incidence of some hormonally sensitive carcinomas, including female breast cancers, as well as testicular and prostate cancers, could also be linked to the effects of these chemicals”
- Statement released March 1998

Other health concerns related to

- Immune deficiencies/Autoimmunity
- Thyroid disorder
- Asthma has increased with ambient pollution levels
- Women’s health concerns
  - Endometriosis
  - Breast cancer
  - fibroids

Types of toxins

- Chemicals
- Metals

Plastics and polish

- Phthalates (DEPH, BBP, DBP and DEP)
  - Food packaging
  - Car parts
  - Toys
  - Blood bags
  - Nail polish
- Bisphenol A (BPA)
  - Plastics

Detergents and paints

- APES (alkyphenolic compounds)
  - Detergents
  - Personal products
    - Hair dye
    - Shaving cream
    - Cosmetics
    - spermicides
  - Latex paints

Persistent Organic Pollutants (POPS)

- Dioxins
  - In creating or burning of plastic
  - Bleaching process
  - Comes from chlorine
- PCBS (Polychlorinated biphenyls)
  - Production is banned – still found in the environment
- Pesticides &fungicides
- PVC (Polyvinyl chloride)
  - Children’s toys
  - Teething rings
  - flooring
Metals

- Lead – lead crystal, plumbing, PVC, batteries, old paint, tin cans
- Cadmium - batteries, plastics, cigarettes
- Mercury - fluorescent lights, pesticides, dental fillings
- Arsenic - drinking water

Routes of Exposure

- Skin
  - Personal products
- Respiratory
  - The air we breathe
- Ingestion
  - 90% of our exposure to PCBs and Dioxins comes from the food we put in our mouth
- Neonatal

Personal air

- A study looking at personal airspace over 24 hours indicated it was more polluted by chemicals than outdoor samples

Ingestion

- More than 3000 chemicals are deliberately added to food
- 90% of our exposure to PCBs comes from the food we eat

Animal Products

- Meat and diary consistently have the highest levels of "hormone disruptors"
- Animals are fed "growth enhancers"
  - Bovine growth hormone (BGH)
    - In 1940 it took 4 months to grow a 3 lb chicken in 1990 it took 6 weeks (1 ½ months)
- BGH causes utter infections therefore the cows are given higher doses of antibiotics
  - 25 million pounds a year of antibiotics are fed to livestock
- Animal feed is among the most heavily sprayed crops
- Animal feed contains rendered fat, chemicals accumulate in fat

Phthalates

- Comes from packaging
- Survey of foods in England
- Phthalates have been found in every sample of meat, fish, eggs milk and milk products
- Cheese had the highest concentration
- This was mostly leached into the products from their packaging
Contaminated food

- None of the food sources tested were free of contamination
- 63% of food contains; DDE (partial dechlorination of DDT)
  - Chlorinated pesticide
  - Banned in 1972
  - Still used in other countries
  - Volatile and moves through the wind

American beef

- Europeans today still ban American beef because of the hormones that the animals are fed
- Switzerland rejected thousands of lbs of US beef due to the presence of DES

Baby food

- The average baby consumes 600 jars of baby food in the first year of life
- 16 pesticides were found in 8 baby foods (applesauce, garden vegetable, pea/carrot blend, green beans, peaches, pears, plums, squash and sweet potato) tested from Gerber, Hainz and Beech-Nut

The grocery store

- 35% of all the foods we purchase in the supermarket have measurable pesticide residues
- 1-3% have residues above the tolerance level

Highest contaminants of Pesticides

- Foods showing the highest concentration of pesticides
  - Apples
  - Bell Peppers
  - Celery
  - Cherries
  - Grapes
  - Nectarines
  - Peaches
  - Pears
  - Potatoes
  - Raspberries
  - Spinach
  - Strawberries

Illegal pesticides

- A person eating the USDA’s recommendation of 5 servings of fruits and vegetables per day will eat illegal pesticides at least 75 times per year
An apple a day...

- A child who eats ¾ of an apple or a whole peach has a 1 in 4 chance of exceeding the safe daily intake for insecticides just from that one food.

Food additives

- Everyone should avoid because of known toxicity or because of insufficient testing:
  - Acesulfame K
  - Artificial colorings (Blue 1, Blue 2, Green 3, Red 3, yellow 6)
  - Red dye 3 has been linked to breast cancer – also in lipstick
  - Olestra
  - Potassium bromate
  - Saccharin
  - Sodium nitrate, sodium nitrite

Water

- 700+ chemicals are found in common drinking water.
- 1998 study of California drinking water indicated women in their first trimester who drank 5 or more glasses of cold tap water a day might be at higher risk of miscarriage.

Personal products – skin absorption

- Pthalates, paraben, 4-MBC
  - Read the labels!
  - Go to safecosmetics.org and thinkbeforeyoupink.org

Symptoms of chemical toxicity

- Most common symptoms:
  - Sleep disturbance
  - Change in energy
  - Change in mood
  - Change in sexual interest
  - Change in temperature perception
  - Change in hair

Heavy metals

- 25% of the population suffers from heavy metal poising. Metals accumulate in the brain, kidney and immune system.
Metals

- Lead – solder on cans and pipes, pesticide sprays, lead crystal, house dust, glaze on pottery
- Cadmium – cigarettes, batteries, fossil fuels
- Aluminum – antacids and cookware (antiperspirant?)
- Mercury – dental fillings, fish, and pesticides
- Arsenic – drinking water, chicken

Signs of heavy metal toxicity

- Headache
- Fatigue
- Muscle pain
- Indigestion
- Tremors
- Constipation
- Anemia
- Pallor
- Dizziness
- Poor concentration

Detoxification mechanisms

- Directly excrete
  - Urine
  - Feces
  - Mucus membranes
- Primary organs to assist detoxification
  - Liver
  - Intestines
  - Kidneys

Liver detoxification

- The liver has highly evolved mechanisms to efficiently neutralize toxins
- The liver is highly dependent on nutritional cofactors for proper functioning
- The level and type of toxins increase when metabolic functions go awry which is typically a result of nutritional deficiencies

Livers role

- Filters the blood and removes large toxins
- Synthesizes and secretes bile for fat soluble toxins
  - Manufacture approx 1 quart daily
  - It is absorbed by fiber in the intestines and excreted

Bile excretion

- Any cause of impairment of bile flow can decrease detoxification ability
  - Gallstone
  - Alcohol
  - Hyperthyroidism
  - Pregnancy
- Assisted by methione and SAM
- Lipotropics promote bile flow
  - Choline
  - Methione
  - B6
  - Folic acid
  - B12
Phase 1 detoxification = cP450
- Neutralization of unwanted compounds
- Conversion to intermediate forms
  - These are more toxic because they are more metabolically active
- Activity based on genetics, exposure and nutrition

Symptoms of an under active cP450
- Caffeine intolerance
- Intolerance to chemicals and perfumes

Side effect of Phase 1 liver detoxification
- Phase 1 detoxification produces a free-radical.
- Glutathione is the main antioxidant

Nutrients for Phase 1
- Copper
- Magnesium
- Zinc
- Vitamin C
- Vitamins B2, B3, B6, B12
- Folic acid
- Flavonoids

Inducers of phase 1
- Brassica (indol 3 carbinol)
- Oranges
- Tangerines
- Caraway
- Dill

Inhibitors of phase 1
- Grapefruit juice
  - 8oz decreases activity by 30%
- Curcuma
- Antihistamines
- Quercetin
Phase 2 detoxification

- 6 pathways
  - Glutathione conjugation
  - Amino acid conjugation
  - Methylation
  - Sulfation
  - Acetylation
  - Glucuronidation

Glutathione conjugation

- Cysteine, glutamic acid, glycine
- Makes toxins water soluble so they can be excreted through the urine
- Glutathione is also an antioxidant
- Glutathione is a common deficiency
- 3 ways to get it
  - Diet; fresh fruit, vegetables, fish and meat
  - Synthesize it; vitamin C, NAC, glycine & methionine
  - IV; not well absorbed when taken by mouth

Amino Acid conjugation

- Need Glycine
- Need Protein

Methylation

- Move a methyl group onto the toxin
- Most methyl groups come from SAM
- Requires co-factors
  - Methionine
  - Choline
  - B12
  - Folic acid

Sulfation

- Conjugate with sulfur containing compounds
- Need
  - Cystine
  - Methionine
  - Molybdenum

Acetylation

- Method by which sulfa drugs are detoxified
- Requires
  - B5
  - Vitamin C
Glucuronidation

- Glucuronic acid

Test Liver Function

- Comprehensive Liver Detoxification Profile
  - Tests ability of all phases of liver detoxification
  - Blood and urine test

Assessing your exposure risk

- Do you consume a diet with over 30% animal fat?
- Do you dust/vacuum your home less than 2 x weekly?
- Do people walk on your carpets with shoes?
- Do you shower without turning on the bathroom exhaust fan?
- Do hang recently dry cleaned clothes in your closet?
- Do you eat non-organic food?
- Do you microwave food with plastic wrap or in plastic containers?

Assessing your exposure risk

- Do you use pesticides in your home or garden?
- Do your pets wear flea collars?
- Do you use clothes washing detergent?
- Does your car have a strong new car smell?
- Do you use air fresheners in your car or home?
- Do you use solvents or chemicals in your home work or hobbies?
- Do you park your car in a garage attached to your home?

Treatment

- Avoidance!!!
- Clean up your environment
- Make your home a safe oasis

Room by Room

The typical American home contains 63 hazardous chemical products

80% of most pesticide exposure occurs inside the home
### The Air

- Ventilate, ventilate, ventilate
- Indoor carbon monoxide poisoning is the second largest cause of non-intentional poisoning in the United States
- Plants that clean the air
  - Mass cane
  - Pot mum
  - Gerbera daisy
  - Wamedi
  - Ficus

### Smoking

- Cancer causing chemicals: styrene, toluene, xylenes, ethylbenzene, formaldehyde and 1,3-butadiene
- The source of ⅓ of personal exposure to Benzene
- Benzene is a bone marrow toxin, suspected in multiple myeloma and non-Hodgkin’s lymphoma
- The children of smokers dies of leukemia 2-4 x’s more often than children of parent who do not smoke

### Front Door

- Many outdoor contaminates enter the home on our shoes
  - Many come into the home and are not broken down as they depend on sunlight for biodegradation
- Take off your shoes
  - Wiping your feet twice on a good door mat – this may be 75-90 as effective as taking off your shoes
- Dust the front door weekly
- Change work clothes prior to entering the home

### Living Room

- Vacuum frequently floors and upholstered furniture
  - “dirt finding” vacuums – Hoover Panasonic, Sears
  - Kirby with “micron magic” removes 99.9% of dust particles
  - Use a HEPA vacuum cleaner
- Regularly clean ash from fireplaces
- Wipe window sills, baseboards and floors
- If your home was built before 1979 have your home tested for lead

### Bathroom

- Avoid personal products with phthalates, paraben, 4-MBC
- Avoid conventional air fresheners all contain p-dichlorobenzene which causes cancer in rats
  - Use an open box of baking soda
- Chloroform is released when chlorinated water is heated.
  - Filter your water at the main supply source to your house
  - Open a window and use a fan in the bathroom when showering or bathing

### Bedroom

- Remove plastic from dry cleaned clothes and let air out in garage for 1 week
  - Dry-cleaning uses a chemical perchloroethylene (PERC)
  - PERC exposure has been linked to menstrual disorders in women and infertility in men and women
  - One out of every 6,700 people who wear dry cleaned clothes at least once a week could be expected to get cancer from breathing the fumes from the PERC left in the fabric
**Kitchen**

- Avoid super-strength cleaners
  - Non toxic cleaning agents include baking soda, borax and vinegar
  - Purchase environmentally friendly cleaners; Seventh Generation or Dr Bronner’s castile soap
  - “Better” conventional cleaners (do not contain APES); PineSol, Murphy’s oil soap, soft scrub (without bleach) and Bon Ami (without bleach)
- Do not store chemical cleaners under the sink
  - Hot water pipes volatize the compounds into the air
- Filter your drinking water and have your water tested
- Use exhaust fan over gas stoves
- Use lead crystal sparingly. Test ceramics for lead

**Kitchen continued…**

- Avoid cooking food in plastic containers in the microwave
- Avoid styrofoam for fatty foods, alcohol or hot foods or beverages
- Avoid plastic cling wrap coming into direct contact with foods
- Remove foods from packaging once home from the grocery

**Kitchen continued…**

- Use a cheese slicer to take a thin section of the surface of cheese
- Discard the outer leaves of leafy vegetables
- Trim fat from meat and skin from poultry
- Eat fish known to contain lower amounts of Mercury
- Eat organic as much as possible
- Avoid food cans (also soda cans) lined with plastic (bisphenol A) which leaches into food
  - Average can leaches 6-7 micrograms into your food

**Laundry**

- Avoid soaps and detergents that contain nonyl phenol ethoxylates
  - Do not contain APES; Arm and Hammer, Country Save, Tide, and Wisk laundry detergents and Shout stain remover
- Use non chlorine bleach
- Close the door to the laundry room and leave the window open

**Office**

- Buy unbleached paper products or those that don’t use chlorine
- Look for Energy Star complaint hardware to reduce radiation exposure
- Air filter for the office
- Purchase non-toxic or used furniture to avoid off gassing

**Garage**

- Fuel combustion releases cadmium, mercury and benzene
- Minimize the use of your car
- Keep your garage door open for an hour after you pull in your car or park outside
- Do not store gasoline in your garage
**Outdoors**
- Avoid pesticides
- Use entry way mats
- Do not use pressure treated wood (railway or telephone posts) for landscaping
- Avoid areas that are freshly sprayed with pesticides
- When golfing keep your hands, tees and golf balls away from your mouth

**Pets**
- Avoid flea shampoos and collars
- Do not return to home for 24 hours after flea treatment to carpet

**Detoxification**
- Many chemicals are resistant to our body’s natural detoxification metabolism
- Dioxins need 7 years to reduce their concentration in humans by 1/2
- Many tend to be stored in our body’s fat cells
- Fat samples taken many years apart show there is no reduction in levels of chemicals like PCBs over time
- Studies have shown that body levels of toxic chemicals can be reduced through deliberate detoxification procedures

**Protein**
- Metabolism of toxic chemicals and drugs has been shown to be impaired by protein deprivation.
- Decreased protein = decreased liver activity = increased half life of toxins

**Fiber for colon health**
- Binds bile for excretion thus removing toxins more efficiently
- Regularity of bowel movements, you need to have at least 1 BM daily while detoxing
- Decreases transit time and toxins are removed more quickly

**Food; AVOID**
- Sugar - increased consumption of sugar decreases the clearance rate of chemicals for the liver
- Alcohol
- Caffeine
- Salt
- Artificial sweeteners
- Chemical additives
- Processed foods
- Refined carbohydrates
- Non-organic produce
**Food to eat**
- Whole grains
- High fiber foods
- Foods that will spoil
- Organic
- Low fat Meats & poultry
- Fish

**Broccoli, Cauliflower, Brussel Sprouts**
- Brassicas
  - Broccoli sprouts have 20-50x the anti cancer potency
  - Stimulate phase 2 and glutathione

**Water!!!**
- Drink 5-6 daily
- Flushes toxins
- Keeps nutrients in solution for increased availability

**Exercise**
- Exercise daily until you sweat
- Sweating will help the removal of toxins

**Fasting**
- Depletes glutathione in 24 hours from Protein deprivation
- Causes Blood sugar imbalances
- Down regulates metabolism
- Taiwanese study showed a fast does not increase excretion of chemicals it only increases mobilization
  - Moves the substances around but does not get them out
- Note; dieting and weight loss releases fat soluble chemicals. Any diet should be accompanied with optimizing increased excretion

**Saunas**
- 130 degrees F
- Sweat releases toxins
- Prolonged saunas over 1 hour at a low temperature increase the excretion of fatty acids through the skin
- Study showed post treatment PCBs were reduced 42% in the blood and 30% in the fat
- Contraindicated
  - Pregnant women
  - Young children
  - Adults with heart disease
  - Seizure disorder
Herbs to assist in detoxification

- Bupleurum
- Dandelion root (Taraxicum)
- Milk thistle (Silybum marianum)
  - Protects the liver
  - Enhances detoxification process
  - Antioxidant; increases synthesis of glutathione
  - Rate of liver tissue regeneration
- Turmeric (Curcumin)
  - Stimulates phase 2
  - Antioxidant
- Burdock

Vitamins

- B carotene
  - Quenches singlet oxygen species
- Vitamin A
  - Deficiency increases binding of chemicals
- Vitamin C
  - Antioxidant
  - Scavenges free radicals
  - Decreases toxicity of compounds

Vitamins

- B1 Thiamin
  - Used in phase 2
  - Needed to restore glutathione
- B2 Riboflavin
  - Phase 1
  - Glutathione
- Niacin
  - Phase 1
- B6
  - 60% of chemically sensitive patients are low

Minerals

- Selenium
  - Required for glutathione
  - Phase 2
- Zinc
  - If deficient will decrease enzyme function
  - Needed for glutathione
- Magnesium
  - Deficiency found in 45% of chemically sensitive patients
  - Phase 1 detoxification

Nutrients

- Glutathione
  - For conjugation and phase 2
  - Quenches peroxide molecules in the body
  - Not well absorbed orally
  - To increase: NAC, cysteine, Vit A & E
- CoQ10
- Alpha lipoic acid
  - Antioxidant for both water and fat soluble free radicals
  - Chelates mercury, arsenic, cadmium and iron

Other considerations

- Colonics
- Chelation- test first! It is estimated 30% of Americans have some heavy metal toxicity
  - IV vitamin C
  - DMPS
  - EDTA
  - Metal free
  - Algae
  - Cilantro
Detoxification Benefits

- Studies have shown that reduced levels of body chemicals have resulted in subtle behavioral changes, such as improvement in mental abilities, memory and personality
- Decreased risk of toxin related illnesses

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