Overview of what we’ll cover

• SENSITIVITY to chemicals.
  What has been proven.
  What has not been proven.
• Cases of several “typical” patients
• Warning signs
• TOXICITY to Chemicals
  – How your liver does its damnedest to get rid of foreign chemicals, like pesticides.

Sensitization

• Can be due to toxins like pesticides, or other kinds of chemicals
  – But also to “innocuous materials”
  – Ex: Dust, dog dander, pollens
• Once it occurs and progresses, may be extreme sensitivity to tiny exposures.
• Spreading sensitivity to “other” chemicals

Attitudes about Chem Sensitivity

• Most MDs would say: “Unproven.”
• Why?
  – Our scientific method depends on measuring
  – Examples: fatigue, headache
• Most patient symptoms not measurable
• Most affected people do not work in factories where many people are exposed to same chemical.

Proven medical conditions

• Occupational Asthma
  – Many people with same exposure
  – Able to control exposure and measure
    • Reaction comes soon after exposure
• Brain function Impairment
  – Very expensive
  – May be much delayed after exposure, so harder to establish cause and effect relationship.
• Sick Building Syndrome
  – Partially established

How Occup Asthma is Proven

• Suspicion: Several factory workers with asthma, exposed to a particular chemical, EX: Toluene Di-isocyanate (TDI)
• Pulmonary Function Tests (PFTs)
• Inhale small dose of TDI, check PFTs.
• Increase dose of TDI, check PFTs.
• If a low dose causes 20% drop in PFTs, Diagnosis of TDI sensitization asthma.
Occupational Asthma – I
Known chemical causes:
- Ethyl cyanoacrylate
- Methyl 2 cyanoacrylate
- Ethyl Methacrylate
- Methyl Methacrylate
- Ethoxy BPA diacrylate
- Formaldehyde
- Glutaraldehyde
- Aluminum
- Chromium comp’ds
- Cobalt
- Nickel compounds
- Palladium
- Platinum
- Tungsten Carbide
- Zinc Chloride fumes

Occupational Asthma II
Known chemical causes:
- Ethylene diamine
- Hexamethylene tetramine
- N,N-Dimethyl-1,propanediamine
- Triethylene tetramine
- EPO 60
- 4-Methylmorpholine
- P-Phenyline Diamine
- Trimethylhexanedia- mine + Isophoronon- diamine
- Piperazine dihydrochloride
- Ethanolamine
- N,N- dimethylethanolamine
- Triethanolamine

Occupational Asthma III
Known chemical causes:
- Chlorendic anhydride
- Hexahydropthalic anhydride
- Himic anhydride
- Maleic anhydride
- Methyltetrahdryophthalic anhydride
- Phthalic anhydride
- Trimellitic anhydride
- Pyromellitic anhydride
- Benzalkonium CI
- Chloramine T
- Toluene Diisocyanate
- Captolof
- PLUS
  - 71 occupations
  - 48 more chemicals
  - 4 large categories.

Occupational Asthma IV
QUESTIONS:
- If a chemical is not on the list, it can’t cause asthma. Correct?
- If a patient believes that a chemical known to cause asthma, like TDI, causes her some other kind of problem, like abdominal pain, it is likely to be “all in her head.” Correct?

Sensitization I: Major exposure
- Case: 53 year old woman from Cheyenne.
- Single blast from neighbor spraying shrubs
- Wiped off the moisture, went back to work
- That night, very bad case of “flu”
- 6 years later, still felt like she had the “flu”
  - Sick most of the time, unable to work
  - Very sensitive to a wide array of chemical exposures
- What would you have advised her to do?

“Classic” TDI Sensitization
- 45 year old male factory worker w/ asthma
- Work at factory for 13 years, no symptoms
- Then frequent “colds” and “viruses.”
  Then chest tightness much of the time.
  - At first better on weekends.
  - Then better only after days on vacation
- Eventually not able to walk by outside of the factory without getting asthma
“Classic” TDI Factory worker II

- Points:
  - Most workers in same factory do not develop symptoms. Why did this man?
  - Many sensitized patients have problems with DeTox mechanism. Did he?
  - **Staying on the job and in the exposure makes vulnerability to symptoms worse.**

Some Sx of Chem Sensitivity

- “Can’t think straight”
- Irritability
- Anxiety
- Depression
- Headache
- Fatigue
- Low Stamina
- Tight chest (not asthma)
- Stomach ache
- Nausea
- Diarrhea
- Constipation
- Insomnia
- Sleepiness
- Rashes
- Anger

Life for the Chemically Sensitive

- Life is a lot more constricted
- Get sick if you go to the mall or drop off your car for maintenance
- Get sick if you go to church – perfumes are made from a rich mix of chemicals
- Have to ask friends not to wear aftershave or perfumes
- May not be able to keep appointments
- Many or most people cannot work

Perspectives from seeing patients

- Pesticides sensitization not different
- A person sensitive to one chemical likely to become sensitive to other types.
- Once reactions begin, continued exposures lead to greater sensitivity.
- BUT Pesticides are more toxic than many other chemicals.
- Lower deTox ability seems associated with increased risk of Sensitization.

Do you influence your DeTox?

- Exercise
- Smoking
- Alcohol
- Tylenol (and others)
- Char-broiled foods
- Food choices
- Fiber in diet
- Nutritional deficiencies

Detoxification processes

- Basic problem: Fat soluble chemicals can’t be carried in blood
- Liver excretes some in bile, but “can” be re-absorbed
- Basic DeTox mechanism
  - Modify the molecule to make it water soluble
- Genetic DeTox variability known– small changes = less glutathione than usual.
DeTox Basics I
- IF chemical can’t be excreted in bile (need fiber in the diet to attach to):
  - In Phase I, liver cells attach an oxygen to the chemical, readying it for Phase II
  - In Phase II, another molecule (like glutathione) attached, so chemical is now water soluble.
  - Problem: often after phase I, the chemical is MORE toxic than before.

DeTox Basics II
- Phase I can run slowly, but less often than Phase II running slowly.
  - SO: if phase I is running fast, and phase II is running slowly, may get a “Pile-up” of more toxic molecules, and damage cells and tissues.
  - Therefore: Want Phase II running well, and then Phase I to keep up.

DeTox Basics III – Why a slow Phase II?
- Not enough signals to run fast
- Needed Molecules used up - heavy load
- Not enough raw materials in diet
- Lack of nutrients needed for cell enzymes
- Lack of energy to support enzyme function
- Genetic defects in making attachment molecules, like glutathione

DeTox IV – What speeds up Phase II? You want these:
- Broccoli, Brussels Sprouts, Cabbage
- Orange and Tangerine (whole fruit)
- Turmeric (Curry), Dill Seed, Caraway seed
- Adequate levels of protein, plus
  - Vitamin C,
  - Vitamin B complex.
  - Minerals, particularly Magnesium, Zinc, Copper and Selenium.
- Exercise (helps mitochondria produce energy)

DeTox V  What slows up Phase II? Want to avoid these.
- Alcohol (in excess)“uses up” glutathione
- Tobacco (particularly smoke)
  - Have to deTox nicotine
  - Have to deTox toxic chemicals created.
- Tylenol (Acetamenophen or APAP)
  - (more than 1-2 a day regularly)
  - Requires a glutathione molecule for every Tylenol molecule.

DeTox VI  What slows up Phase I? Don’t want this if Phase II working:
- Antihistamines
- Librium, Valium
- Grapefruit (30% slower)
- Aging (can’t avoid, so have to be sure to meet nutrient needs)
**DeTox VII – What speeds up Phase I?**

- Vitamin C
- Vitamin B1, B3
- High Protein Diet.
- Broccoli, Cabbage
- Brussels Sprouts
- Oranges, Tangerines
- Caraway, Dill seeds
- Char-broiled meats
- Alcohol
- Nicotine
- Exhaust gases
- Paint Fumes
- Dioxin
- Carbon Tetrachloride
- Pesticides

**DeTox VIII – Summary: what you want**

- Fiber in Diet: bran, psyllium seed husks, fruits and vegetables. Absorb toxins in bile.
- Exercise: keep the energy generation up
- Vitamin C 500 to 1000 twice a day
- Multi-Vitamin/Mineral, with 300% or more of B complex, plus Zinc 15-20 mg, Copper 1-2 mg, Selenium 200 mcg, Magnesium citrate 400-800 mg in two doses.
- +/- Milk thistle (silymarin) 200 mg twice a day, helps liver function.

**DeTox IX – What to avoid:**

- Larger amounts of Alcohol
- Regular use of tobacco
- Regular heavy daily use of Tylenol (acetaminophen)
- Foods with little beside calories
  - (white flour products like pasta or bread)
  - white rice or white potatoes, refined sugar
- “Unnecessary” chemicals at home (stored paints, fuels, pesticides)

**How would you know you’re at particular risk?**

- Parent or sibling with sensitivities.
- Personal reactions to “other” chemicals like perfumes, fresh paint, road tar
- (possibly) Unexplained symptoms that come and go
- Known recent carbon monoxide exposure
- Recurrent symptoms at work, particularly if better on weekends, or on vacation

**Vulnerability increase I**

- Case: 29 year old Chinese woman, graduate student in chemistry.
- 18 months work at lab at CSU
- Steady worsening of symptoms at work.
- Lived in a (cheap?) basement apartment
  - Furnace in closet off bedroom.
- Carbon Monoxide ties up part of the DeTox mechanism.
- Phase I DeTox molecule very similar to hemoglobin.

**Big exposure? What to do:**

- Wash off immediately, and change out of any clothes which were affected.
  - Minimizing exposure more important than modesty.
- IV Vitamin C 20-30 grams.
  - If not possible, Vitamin C by mouth 4000 every 3 hours for 3-5 days.
- Medical oxygen at 4 L/minute for 3-4 hrs.
- If possible, IV Glutathione
Treating chemical sensitivities I

• Decrease “Total Load.”

• Remove unnecessary chemicals at home
  – Non-chemical cleaning agents, etc.
  – Store paint outside the house
  – Don’t sleep in bedroom above the garage

• Minimize avoidable chemical exposures at work and activities

• Avoid/limit household mold exposure

Treating Chemical Sensitivities II

• “Medical” measures:
  – No Drugs available.
  – Medical Oxygen
  – IM/IV/special forms of Glutathione.
  – High concentration SL Hydroxocobalamin
  – Intra-nasal Selenium, Strontium
  – Special allergy treatment (LDA)

Re-Cap

• Most chemical sensitivity not recognized by medical profession. Not measurable, so minimally researched.

• Impaired ability to DeTox often associated with risk of sensitization
  – Vulnerability may be partly genetic

• You can significantly influence your DeTox capabilities

Recap II

• Sensitization: No typical symptom pattern.
  – Avoidance and intentional challenge best way to establish correlation.

• Avoidance best way to avoid sensitization

• Avoidance of all exposures best treatment.

• Medical interventions only partially help

If you suspect you are sensitized or have a defect in your DeTox ability

• Small number of physicians in the country
  – American Academy of Environmental Medicine. www.aemonline.org

• Over the phone no charge 10 min consult:

• Dr. Ken Gerdes 719-597-6075