Environmental influences on women’s health
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Over the years there has been a steady rise in women’s health conditions such as breast cancer, fibroids, endometriosis, miscarriage, and infertility. There also has been a rise in conditions such as fibromyalgia, chronic fatigue syndrome and hypothyroidism, which mostly affect women. Studies show that human exposure to chemicals in our environment such as pesticides, herbicides, insecticides, and manufacturing by-products, can cause these endocrine disrupting conditions.

An endocrine disruptor is any substance that alters normal hormone levels or activity in the body. Synthetic chemicals can disturb the normal activity of estrogens, androgens, thyroid and other hormones. [1] They do so by binding directly to hormone receptors, activating it and causing the chain of events as if the hormone itself were binding to the receptor.[1,2,3] The toxic chemical may also bind and occupy the receptor blocking normal hormonal activity, or it may interfere with proteins that regulate the activity of hormones.[1,2,3,4,5] These effects may be associated with the development of illness and disease.

We are exposed to endocrine disrupting compounds in our everyday life, often without knowing we are being exposed. Pesticide residues can be found on fruits and vegetables sitting in the store to be sold. [9] Animal products are tainted with dioxins and dioxin-like compounds and often have hormones and antibiotics added to them. [9] Certain fish have high levels of mercury and pesticides. [9,14] Chemicals used as plasticizers in flexible polyvinyl chloride products can harm the female reproductive system. Polyvinyl chloride products include tablecloths, shower curtains, soft-squeeze childrens toys, plastic medical equipment and plastic food wrappings. The plastic containers that food and condiments are stored in can leach out harmful chemicals. [10,26] Hormone disrupting compounds can be found in both well water and city water providing yet another means of exposure. [9] Toxic compounds are also inhaled or absorbed through the skin by contact with most household cleaning products, cosmetics, perfumes, dry cleaning, carpet, vinyl floors, copy machines, furniture glues, air fresheners, mattresses, shampoos, and the list goes on. [11,12]

Some of the most common endocrine disrupting compounds include dioxins, polychlorinated biphenyls, bisphenol-A, phthalates, pesticides, formaldehyde and heavy metals. All have been shown to cause adverse health effects in women. [2,3,15] There are many other chemicals, compounds and by-products in the environment that are considered toxins as well.

Dioxins are a byproduct produced by industrial incineration and combustion. They are produced by manufacturing of chlorine containing products such as pesticides, wood preservatives and the bleaching of paper. Dioxins persist in the environment for years and accumulate in the food chain. Dioxins decrease thyroid hormones, testosterone and have both estrogenic and anti-estrogenic effects. [26] Dioxins are linked to endometriosis and thyroid dysfunction in women, as well as increased rates of stillbirths [16,17, 18,19,20,21,35,37]

Polychlorinated biphenyls (PCB’s) are used as coolants, lubricants, and insulation for electrical equipment, in paints, plastics, dyes, wood and rubber. PCB’s accumulate in human adipose, the food chain, and found in rivers and lakes. PCB’s weaken the immune
system, affect neurological development, behave like estrogen and affect thyroid function in rats and humans. [22,23,35,36]

Bisphenol-A is a compound found in plastics. It is used in the manufacturing of compact disks, plastic bottles, the lining of metal food cans, and dental sealants. It leaches out of plastics into food and the environment. Bisphenol-A has estrogen-like effects on estrogen receptor positive breast cancer cells.[24]

Phthalates are additives to plastics to make them strong, soft, and flexible. Most supplements are packaged in plastics made with phthalates. It is used in carpet backing, paints, glues, insect repellants, hair spray, and nail polish. Phthalates are used in personal care products such as lotions, hair color, shampoo and deodorants. Phthalates are also used in the manufacture of enteric coated medications, like Asacol, for example. [39] Phthalates have hormone-disrupting effects and can suppress ovulation, estradiol production and contribute to polycystic ovarian syndrome. [26,27,10] In rats phthalates cause spontaneous abortion and birth defects. [37]

Harmful pesticides such as DDT and its metabolite DDE have been banned in this country but their effect still linger in our environment. DDT was an insecticide used in agriculture and for mosquitoes. It has estrogen effects and anti-androgen effects as well as effects on cognition. Pesticides have been linked to infertility, spontaneous abortion and breast cancer. [37,38] DDT still persists in the environment, accumulated in adipose tissue and in the food chain. [28,9,29,30,31]

Formaldehyde is a compound originally used in homes in the 1970’s as a form of insulation. The fumes caused depression, fatigue, poor memory, headaches, asthma, cough, skin rashes, and much more. [12] Formaldehyde is no longer used in insulation but is found in shampoo, conditioners, cosmetics, construction materials, cleaning supplies, carpet, paper products, plastics, and the list goes on. [12,32] It has been linked to reduced fertility, spontaneous abortion, and endometriosis. [21,33,34]

Various heavy metals can be considered endocrine disruptors and are linked to many women’s health conditions. Exposure to low levels of cadmium is associated with an increased risk of osteoporosis and fractures. [40,41] Low-to-moderate lead exposures may increase the risk for spontaneous abortion. [42,43] There is also a link between mercury, manganese and lead exposure and reduced fertility. [44,45]

A recent study by Darbe PD, in the Journal of Applied Toxicology 2004;24(1), found a high concentration of parabens in human breast tumors. This is significant due the amount of parabens and methylparabens women are exposed to each day. Parabens are used as preservatives in thousands of cosmetics, food and pharmaceutical products including hormonal creams. Parabens are known endocrine disruptors.

EVALUATION

Evaluating whether or not a patient’s health condition is due to environmental exposure begins in the office with an in-depth exposure history. Start by making a timeline of the patient’s symptoms, were they were living and working during these symptoms and when they last felt well. An in-depth history of residence, occupation, hobbies and lifestyle can help narrow down what they may have been exposed to over time. Testing can provide valuable information on recent exposure as well as retention of compounds in the body. Testing for heavy metals, pesticides, solvents, phthalates and other compounds is available from various labs.
AVOIDANCE

It is important to be familiar with the link between women’s health conditions and environmental toxins, in order to educate patient’s in ways to minimize exposure to these compounds. Avoiding endocrine disrupting compounds begins simply with choices made at home and at the store.

1. Buy organic fruits and vegetables grown without pesticides, herbicides, synthetic fertilizer or hormones.
2. Buy fresh/frozen fruits and vegetables when possible, avoiding canned foods.
3. Buy organic hormone free meats, eggs, and dairy products and avoid eating the fat of the animal.
4. Buy grass fed and lower fat animal products.
5. Eat fish low in mercury and fat since toxins accumulate in the fat of fish.
6. Avoid: tilefish, tuna, swordfish, shark, king mackerel, red snapper, orange roughy, moonfish, bass, marlin, and trout.
7. Drink filtered water out of glass jars or cups instead of plastic bottles.
8. Buy natural chemical and fragrance free soaps, detergents, and cleaning supplies.
10. When remodeling look into earth friendly or ‘green’ building supplies.
11. Remove shoes when entering the house to prevent tracking residues into the house.
12. Use a high quality air purifier in the home.
13. Use natural/organic cosmetics and grooming products free of phthalates and parabens.
14. Use a non-toxic ‘green’ dry cleaners.
15. Avoid plastics as much as possible.
   a. Store food in glass or ceramic containers.
   b. Do not heat food in plastic containers or with plastic wrap over the top.
   c. Buy condiments in glass containers instead of plastic.
   d. Use an organic fiber shower curtain instead of plastic.
   e. Carry cloth bags in your car for groceries instead of plastic bags.
   f. Replace vinyl miniblinds with linen curtains
   g. Use metal hangers instead of plastic.

TAKE ACTION

It is important to educate others and ourselves about the links between environmental toxins and women’s health. It is as equally important to get politically involved in local and national organizations to help put an end to the manufacture and use of toxic compounds. Physicians for Social Responsibility, www.psr.org, is one group committed to informing practitioners and the public about endocrine disrupting compounds. Many states have environmental organizations such as, The Oregon Environmental Council; that has lectures for health care providers and the public.
When educating patients on how to avoid endocrine disrupting compounds many physicians find it difficult to prescribe supplements that come in plastic containers and creams that contain parabens. There are a few companies that only use glass containers for their supplements and a few looking for alternatives to parabens. I encourage doctors to speak to the nutraceutical companies about their concerns so our profession can be the leader in removing these compounds from the environment.

Recommended Reading
1. *Our Stolen Future* by Theo Colburn
2. *Having Faith and Living Downstream* by Sandra Steingraber
3. *Multiple Chemical Sensitivity* by Pamela Gibson

Recommended Websites
- www.chefforhealth.org
- www.nottoopretty.org
- www.noharm.org
- www.healthytomorrow.org
- www.thegreenguide.org

References
33. Rogers S. *Toxic or Tired.* Prestige Publ. 1990
34. Rogers S. *The E.I. Syndrome.* Prestige Publ. 1998