

Hormones Disrupted

Language and Communication: Research QBT1

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Despite criticism and political debate, research proposes that environmental toxins and subsequent endocrine disruption causes adverse medical conditions in both animals and human beings including precocious puberty, gender ambiguity, breast cancer and even lower sperm count. Precocious puberty, in part, is caused by exposure to chemicals in the products we apply to our skin, in the air we breathe, and in the food we eat (Wolff et al. 2010). Similarly, there has been stunning evidence in the animal kingdom suggesting that gender ambiguity, or the lack of distinction between sexes, is caused by chemical exposure (Colborn, 1996). Can the same be assumed for human beings? It seems that everyone knows at least one person who has been affected by breast cancer these days. Could it be the estrogen-mocking chemicals plugging into our hormone receptors causing the great imbalance? (Brophy et al. 2012). Lower sperm count, to name another, has been studied and documented in both animals and human beings with a link to several chemical contaminants (Colborn, 1996). The research presented here is less about the pollution pumping from chimney stacks in the industrial park, less about the litter on the highway, and more about the products we purposely use every day – products that leech chemicals into our systems in unsuspecting ways while causing irreparable damage

Although discussions like these have been historically reserved for the “alternative” or “holistic” mindset, in the following pages, you will find a body of evidence, based on academic research that will continue as we connect the dots between modern chemicals, disease and nature. To that, turning the other cheek will no longer be an option.

Precocious Puberty

Sugar and spice and everything nice.

It is what little girls are made of – sugar and spice and everything nice. Only, the rotten truth of the matter doesn't smell so sweet. As defined by The International Society of Gynecological Endocrinology, "... the appearance of secondary sex characteristics before 8 years in girls (or menarche before the age of 9) and before 9 years in boys" (F. Massart et al.). We hear it all the time: awe-stricken chatter about the curves of little girls and how someone's niece started her period and how some mothers have to go bra shopping with their second graders. Some people think it's because of the hormones in the milk we drink or "that stuff" they give to chickens to grow them faster and plumper. There is other talk about genetically modified crop seed. The growing body of research suggests that our baby girls are starting puberty at an earlier and earlier age resulting, in part, to endocrine disruption (Kluger 2011). The glaring truth is that endocrine disruption can come from varied sources. Although the more rational explanation would be a direct ingestion of hormones given to the animals we eat and then later entering our systems, one should look more closely at the products that make us smell so sweet. From the first baby bath to the first pink-polished toes, the products that make girls so pretty are unintentionally holding them back while pushing them forward at an incredible rate.

If the thought of seeing your daughter in her first-grade class picture toting cleavage (you never saw until twenty) isn't bad enough, consider all the ill effects on the child. Not only are they more susceptible to teasing and feeling uncomfortable, starting puberty early can physically hurt. Researchers are concerned about puberty because puberty can stop a growing body in its tracks. The risks are innumerable but include problems with bone density as well as future risk for breast cancer. There are even drugs on the market that help to stop puberty so that the bones can grow to their intended length (Kluger 2011). Another known trigger for early puberty in girls is obesity; during the mentioned studies, BMI or Body Mass Index is taken into

consideration and has been studied independent of the chemical studies. Even without BMI, girls are affected by estrogen mimickers. Interesting as well, is the fact that boys are not affected in the same manner as girls in that endocrine disruption does not propel them into puberty (Wolff et al. 2010). Boys and men are not immune, however; they have their own distresses with reproductive development as it relates to chemical interference.

In a longitudinal study through the Mount Sinai School of Medicine in New York, 1,151 girls of varied ethnicities between the ages of 8 – 9, were tested in hopes of finding correlation between chemical exposure and early breast and pubic hair development. The chemical groups that were tested (phenols, phthalates, and phytoestrogens) are found in common household and personal care products such as sunscreen, lotion, mothballs, and room deodorizers. Interestingly, in the summer, and with Caucasian girls, the chemical Benzophenone-3 found in sunscreen, was present in higher amounts than with Hispanic and black participants. Another chemical, found in room sprays and moth balls, 2,5-Dichlorophenol, was lower in Caucasian participants. One other difference was the presence of daidzein and genistein, which are isoflavones found in soy products. These were found highest in Asian participants (Wolff et al. 2010). The takeaway from this study was the undeniable fact that our skin isn't armor; it absorbs into the body like ingestion and inhalation. Although it may seem too late to go back and rewrite history with ourselves or our children, there are developmental stages across the entire lifespan that are vulnerable to chemical exposure. Exposure to EDCs is more dangerous if it occurs during specific 'critical periods' of life, such as intrauterine, perinatal, juvenile or puberty periods, when organisms are more sensitive to hormonal disruption, compared to other periods. (Frye et al. 2012).

Gender Ambiguity

The Lesbian, gay, bisexual, and transgender (LGBT) social movement.

With a respectful nod to homosexuality and the LGBT community, one should keep a watchful eye on the scientific studies that link endocrine disruption to reproduction problems in the animal kingdom. There is research that indicates a connection between environmental toxins and gender ambiguity, or an undefined gender role. The recent passing and re-passing of gay marriage laws and changes to the military protocol sets the stage for more awareness of and becoming of an ambiguous gender. Without insult, the line between naturally LGBT and chemically derived LGBT could become hazy. As stated in a 2008 article in the Ecologist publication entitled Ch-Ch-Ch-Changes:

Environmental toxins may be causing gender ambiguity in humans. Although many argue that gender, gender role, and sexual orientation are generally polarized by cultural mandates, rather than by how people feel about being male or female, scientists have warned that environmental pollution with synthetic hormone disrupters could cause large-scale dysfunction at the population level. (Frances, 2008)

Beyond the David Bowie reference in the article's title, research from another angle, proves that endocrine disruption during specific moments in development even affects gender-specific programming in the human brain (Frye et al. 2012). By that rationale, being born homosexual may not be the case for some. Consider a baby boy born with all working genitalia and a switch going off in the brain muddying the line between male and female sexuality. Although many factors contribute to one's sexual orientation or even preference, we cannot ignore the fact that hormone disruptors do just that.

A population at risk.

In one study, through the Technical University of Denmark, scientists studied the synergistic effects of varied pesticides in rats and their pups to determine if “safe” levels in unison could cause reproductive issues. Levels of pesticides were considered safe if they were at the NOAELs, or “no observable adverse effect level”. The experiments proved that when the chemicals were combined, they synergized and caused the malformation of reproductive organs, a grayer line of gender differentiation and fewer live births (P. R. Jacobsen et al.). In another study, through the Canadian Freshwater Institute, a striking correlation was found between synthetic chemicals found in birth control and hormone replacement pills and the development of female characteristics in the male fish reproductive organs. Synthetic hormones were introduced to fresh-water fish in a controlled study. Another notable proponent are that synthetic hormones are said to survive water treatment plants because they are designed to make it past the acid in the stomach during digestion for proper absorption (Powers, 2003). From alligators (Halweil 1999) to rats, hormone disruption in animals has been proven to cause gender ambiguity, and the effects on the human population, as a whole, could be devastating to our future (Colborn, 1996).

Breast Cancer Crisis

Hormone self-sabotage.

From girls to grown women, the volatile chemical trend continues to disrupt natural reproductive development from multiple directions. Research suggests that breast cancer increase over the last 3 decades is connected to estrogen-mocking chemicals plugging into hormone receptors causing gross imbalance in reproductive and adjacent body systems (Brophy

et al. 2012). From pesticides to common pollutants, even small amounts of ingested toxic chemicals can be mistaken by the body for actual hormones (Colborn, 1996).

One study through the Idaho State University more specifically breaks down ER+ and ER- breast cancer types and found correlation to specific toxins and their respective vulnerability to each cancer type. With these valuable findings and proper attention to the severity of the situation, specific breast cancer types can be treated effectively and perhaps avoided altogether. Those living in agricultural areas seem to be at highest risk to include ingesting pesticide and herbicide- treated produce as well as air-born toxins. Test areas are broken down by crop density, geographical humidity, precipitation, population and even meteorological phases in order to determine geographical variations (St-Hilaire et al. 2011). In the end, the test concluded that each cancer type should be treated specifically and that endocrine disruptors undoubtedly play a big role.

Another study performed by the Occupational and Environmental Health and Safety Research Group at the University of Stirling in Scotland, UK, focused on another means of chemical contact, occupational exposure. Primarily in the industrial and agricultural lines of work, chemicals walk right in the front door with the working adults of the house.. Not only are the workers exposed independently, but they bring it home for the rest of the family on their clothes and shoes. Overwhelming results suggest that exposure to cancer-causing chemicals and estrogen disrupters, for example cigarette smoke, plastics, canning, and farming increase the risk for developing breast cancer in post-menopausal years (Brophy et al. 2012). Again, it is important to consider multiple points of exposure both independent and in synergy.

More is less and less is more, more or less.

Environmental toxins create false estrogen. Even in the smallest amounts, any estrogen or androgen disrupter can cause problems such as cancer, infertility or other reproduction disorders (Halweil 1999). The balancing game begins when estrogen and progesterone are in flux. Too much, or extra, of either can cause problems and symptoms during the menstruation years, during peri-menopause and during menopause (Kane, 2008). Because of the discomfort, and the advice of the medical community, it is widely acceptable to take synthetic hormones in hopes of relieving menopause symptoms, hot flashes, moodiness, night sweats, weight gain, and getting back to feeling normal. To recap, hormones are already at high levels because false hormones are clogging receptors. To balance things out, more hormones are prescribed. Can this be right? Not to mention, nutrient depletion may occur when taking any hormone replacement or birth control pill (Kane, 2008). A one-size-fits-all approach to prescribing these medications has been popular to date as insurance companies tend to not cover alternative or compounded (custom-blended) replacement hormones. Enter the increased breast cancer risk when adding more hormones to the already imbalanced system caused by chemical intrusion -- and it becomes unclear where the damage cycle ends or begins (Hulem, 2006).

Sperm Wanted

Pay closer attention to our earth family

Although boys seem to dodge precocious puberty even though they may be exposed to the same harmful chemicals as their female counterparts, their consequence rests within their reproductive organs. Connected to environmental toxins, low sperm count has been proven for

years in the animal kingdom (Colborn, 1996). In one study, led by the University of Missouri, 300 human males were tested concurrently for pesticide contamination and poor sperm quality. A strong correlation was found between the pesticide exposure, subsequent endocrine disruption and lower sperm counts. “The men most heavily exposed to atrazine, diazinon, and alachlor were 11, 17, and 30 times, respectively, more likely to have low sperm quality.” (Powers, 2003).

The contamination source is not positive in the research but is suspected to derive from chemicals that remain in drinking water even after it is treated. In a 2003 article in *World Watch Magazine*, author Shawn Powers writes:

Many public water supplies are cocktails of small amounts of antibiotics, hormones, veterinary medicines from livestock and pets, antacids, cholesterol-lowering drugs, codeine, anti-depressants, sunscreens, chemotherapy agents, pain relievers, caffeine, and potentially hundreds of other chemicals and metabolites.

Other research indicates that urban geographical regions, likely based on population density and the pollutions of the cities, see higher incidence of hormone disruption and the lowering of sperm count. Further, research strongly points to mimicking estrogen as the culprit (Halweil 1999). Caution, again, must be paid to the synergistic effects of layered chemicals that are “safe” at certain levels; findings indicate marked changes in male sexual organs when chemicals are combined (P. R. Jacobsen et al.). In one study, zebra fish were exposed to low doses of estrogen-mimicking chemicals over a long period of time. The point of the study was to see if endocrine disruption would cause problems in breeding. Still worth mentioning, the study focused primarily on male fertility, not sperm count or intermediate sex organs, and found that in

low amounts and over a long period of time, fertility and embryo survival was, indeed, affected by false estrogen (Spivey, 2004).

Today is a new day.

Because environmental contaminants cause a myriad of health problems, it is time to raise our awareness and take action. This can start first with ourselves and then expand outward to our community. As a population, we can prevent the rate of early puberty and all that goes with it by watching what we eat, breathe, and put on our skin. (Wolff et al. 2010). It would be advisable for us to continue exploring the possibility of gender ambiguity in human beings and the connection to environmental hazards if we don't want to experience a decline in procreation. (Colborn, 1996). It would also be advisable for us to evaluate chemicals that are suspects in causing breast cancer and utilize this for preventive actions. (Brophy et al. 2012). Additionally, lower sperm count is not a family affair; it affects everyone and everything. From the animal kingdom to our human family, something needs to change. (Colborn, 1996).

You are what you eat.

To recap, endocrine disruption can be caused by chemical contaminants mimicking hormones in both animals and human beings. This occurrence leads to an imbalance of the normal body function and creates problems in other body systems, primary the reproductive system. Although exact causation is unclear from case to case, contributing factors include hormones in milk and meat, BPA in plastics, DDT and more (Kluger 2011). As research persists, people begin to demand transparency in product labeling, attention is paid to what we

put on and in our bodies, and we lower our personal tolerance to chemical exposure we can begin to see a decline in the aforementioned hormone epidemics.

Have you heard of BPA-free plastic? Have you considered the way we cook and store food? Have you done research before choosing products for yourself and your children during the vulnerable stages of development? Do you buy organic food and products? Do you adequately protect yourself from occupational exposure? Do you adequately protect yourself and your fetus during pregnancy? Do you drink filtered water? The benefits far outweigh the cost. While we progress as a nation and as a world, we need to be keen to the fact that our technological advances could, in the end, be the demise of us all. We are experiencing, first hand, the consequences of our actions. Is this progress after all?