Chemicals and Reproductive Health

What’s the Connection?

Charlotte Brody, RN

BlueGreen Alliance
Endocrine-Disrupting Chemicals

An Endocrine Society Scientific Statement
Two Ways to Make Hormones
<table>
<thead>
<tr>
<th>In a human body</th>
<th>In a factory</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Estrogens</td>
<td>• Atrazine</td>
</tr>
<tr>
<td>• Testosterone</td>
<td>• Bisphenol A</td>
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<tr>
<td>• Adrenaline</td>
<td>• DDT</td>
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<tr>
<td>• Insulin</td>
<td>• DES</td>
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<tr>
<td>• Thyroid</td>
<td>• Dioxins</td>
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<tr>
<td>• Progesterone</td>
<td>• PBB</td>
</tr>
<tr>
<td>• LH</td>
<td>• PCB</td>
</tr>
<tr>
<td>• FSH</td>
<td>• Phthalates</td>
</tr>
</tbody>
</table>
Outdated Scientific Frameworks Miss:

- Low dose effects
- Mixtures
- Synergies
- Timing
- Sensitivities and other differences between people
- Long delays between exposures and visible effects, including multigenerational effects

![S-Curve Diagram](attachment:image.png)

*Neat but wrong*
Hormones: Tiny doses control communication and coordination of body tissues

- Natural estrogen in women of reproductive years
- Synthetic estrogen in women using birth control pills
- Synthetic progestin in women using birth control pills*
- BPA in women

Levels (parts per trillion) 0 100 200 300 400 500 600 700 800 900 1000 4010

*Levels of 3-keto-desogestrel, the metabolite of desogestrel.

300 ppt in a 143 lb. woman is equivalent to .000000000002 of one plain M &M candy
Long Delays

Women exposed to relatively high levels of DDT prior to mid-adolescence are 5 times more likely to develop breast cancer.

Cohn, BA, MS Wolff, PM Cirillo and RI Sholtz. 2007. DDT and breast cancer in young women: New data on the significance of age at exposure. Environmental Health Perspectives doi:10.1289/ehp.10260
Multigenerational Effects: Diethylstilbestrol (DES)

Exposure to DES in the womb

- Deformed uterus
- Impaired fertility
- Increased risk of miscarriage
- Premature labor & birth

Third Generation Effects

- Fibroids
- Cancer of the Vagina and Cervix
- Cancer of the Breast and Uterus
Synergies and Mixtures can add up to harm

+ + + = harm
Clinical and Translational Impacts

Endocrine-Disrupting Chemicals

An Endocrine Society Scientific Statement
Wildlife Tragedies

Florida Panther
And a similar problem in baby boys

- Low birth weight
- Hypospadias
- Cryptorchidism
- Low Testosterone
- Low Sperm Counts
- More Female than Males
- Testicular Cancer

Human Tragedies: DBCP

Harmful to workers who made it and the workers who used it

Jury Awards Millions to Farmers Sterilized by Pesticides

A California jury yesterday awarded $3.3 million to six Nicaraguan farm workers sterilized by pesticides made by Dow Chemical and used at Dole's banana plantations.

The plaintiffs alleged that Dow and Amvac, another chemical company, hid information about the dangers of dibromo chloropropane, or DBCP: high exposures left lab animals organ-damaged, sterile and prone to birth defects. The Occupational Health and Safety Administration sets DBCP's occupational exposure limit at one part per billion per workday; during the 1970's and 1980's, the plaintiffs reportedly inhaled DPCP vapors and wore clothing soaked by water dropping from DBCP-treated trees.
Women are having a harder time getting pregnant.

And this problem is true for all age groups.
More infertility treatment among women in plastics industry

Cases of infertility treatment out of 27,445 person years*

Relative risk = 1.23

Plastics workers

Expected for general population

* "Person years" is the sum of the number of years that each person in the study was under observation

It has been hypothesized that the significant increase of the incidence of breast cancer in the industrialized world observed during the last 50 years may be due to exposure to hormonally active chemicals, particularly xenoestrogens. A similar increase in the incidence of testicular cancer and malformations of the male genital tract and decreased quantity and quality of human sperm have been observed during the same half century, again suggesting a link to the introduction of these chemicals into the environment.
It’s Not Just Cancer

The CDC estimates that from 1980 to 2005 the incidence of diagnosed diabetes increased 124%
Young women may be losing their health and their right to choose to become mothers

- 30% more babies are being born premature
- 25 to 50% of women have fibroids
- 10 to 15% suffer from endometriosis
- Girls are developing breasts and starting their periods earlier
- Breast cancer went up 40% between 1973 and 1998
Young men may grow up to be half the man their fathers were.

- Sperm counts are down 50% over 50 years compared with 30 years ago:
  - 46% more men get testicular cancer
  - 76% more men get prostate cancer

The Disease Burden is worse for Blacks, Latinos and Native Americans

- African American men are twice as likely to have prostate cancer as Caucasian men.

- African American women are twice as likely to die from cervical cancer than white women.

- American Indians, Alaska natives, African Americans and Hispanics are at least twice as likely to have diabetes than whites.

From the Endocrine Society Report and the CDC’s Office of Minority Health and Health Disparities
http://www.cdc.gov/omhd
Fewer boys being born

Sarnia
Ontario
Aamjiwnaang
decline from
50% to 35%
in male births

CA Mackenzie et al,
Declining Sex Ratio in a
First Nation Community,
Environmental Health Perspectives, 2005
Boys More Passive and Girls More Aggressive

Jo M. Braun, et al., “Prenatal Bisphenol A Exposure and Early Childhood Behavior,” Environmental Health Perspectives, October 6, 2009
Bisphenol A in 92.6% of 2,517 NHANES participants 6 years old and older in 2003-2004
In the absence of direct information regarding cause and effect, the precautionary principle is critical to enhancing reproductive and endocrine health.

As endocrinologists, we suggest that The Endocrine Society actively engages in lobbying for regulation seeking to decrease human exposure to the many endocrine-disrupting agents.
What can we do while we’re waiting for elected officials to act?
Environmental Health Assessment Form

Every day, we eat, drink, breathe, and touch chemicals that exist around us. This assessment will help you identify some of your exposure to common chemicals. Planned Parenthood GREEN CHOICES and our staff will then give you the information you need to make choices for better health and a greener environment — for yourself, your family, and your community.

Name__________________

Productos De Limpieza

Todos los días comemos, bebemos, respiramos y tocamos sustancias químicas a nuestro alrededor. Estas sustancias químicas pueden afectar nuestra salud.

Plastic

Everyday, we eat, drink, breathe, and touch chemicals that exist around us. The chemicals can affect our health. Planned Parenthood GREEN CHOICES will give you the information you need to make choices for better health and a greener environment — for yourself, your family, and your community.
Lessen stressors to create resiliency and decrease disease

Adapted from T. Schettler’s modification of Hubbs-Tait et al. “Psychological science in the public interest”
Lower exposures we can lower

Figure 2. Serum cotinine levels tracking exposure to secondhand smoke in the non-smoking U.S. population

Executive Summary, CDC's Third National Report on Human Exposure to Environmental Chemicals, 2005
Thanks.

cbrody@bluegreenalliance.org