DES Action® VOICE

Inside

A Focus On Diethylstilbestrol

SUMMER 2015 #145

Can DES Exposure Lead to Obesity?

New research attempts to confirm link found in animal studies

By Virginia Pelley

More than one-third of Americans—or 78.6 million people—are obese, according to research published last year in the *Journal of American Medicine*. Unsurprisingly, uncovering the causes of obesity is a hot area of research. But as the DES-exposed are well aware of the health consequences of endocrine-disrupting chemicals, we're likely to watch with particular interest as scientists investigate a link between hormones and obesity.

Longtime DES research scientist Retha Newbold, Ph.D. published results of her studies on the effect of prenatal DES exposure on later weight gain in mice in 2005 and 2007. Researchers wanted to find out whether Newbold's results would be duplicated in humans, too—and they were.

Using data from the National Cancer Institute DES Follow-Up Study, researchers "evaluated the association between DES and adult obesity, weight gain from age 20 to midlife, central adiposity [fat stored in the body] and height among 2,871 prenatally exposed and 1,352 unexposed women between 23 and 52 years old [who have participated in the follow-up study since] 1994. DES exposure status was confirmed by prenatal medical record review," the authors wrote in their paper, titled "Prenatal diethylstilbestrol exposure and risk of obesity in adult women" and published in the *Journal of Developmental Origins of Health and Disease* in June.

Researchers took into account participants' smoking status (both their own and whether they were exposed to smoke in utero) and menopausal status as well as their education levels; these factors were considered when comparing the DES-exposed group with those who weren't exposed. They also noted in their discussion that DES has already been associated with several outcomes that might be related to higher obesity risk including lower birth weight, earlier menstruation, heart disease and diabetes.

"There is also evidence from agricultural research that DES promotes weight gain in animals," they pointed out.

"Our primary motivation for the study was because animal studies from Dr. Retha Newbold's lab appeared to show a large effect for perinatal DES exposure and later obesity in mice," says lead author and professor of epidemiology at the Boston University School of Public Health, Elizabeth Hatch, Ph.D. "Also, several researchers have theorized that prenatal exposure to endocrine-dis-

continued on page 3

Breast Cancer in DES Daughters

New study from DES France offers fresh insights

By Virginia Pelley

Our friends at sister organization Réseau DES France were kind enough to share an English translation of their study published in *Therapie*, the journal of the Société Française de Pharmacologie et de Thérapeutique, in June. With the aim of evaluating the risk of all cancers, but particularly breast cancer, in women exposed in utero to diethylstilbestrol (DES) in France, this new research provides further support for what previous studies of breast cancer in DES daughters in other countries have found: Prenatal exposure to DES brings with it an increased risk for breast cancer almost twice as high as that of unexposed women.

This study is particularly important because past research has produced differing conclusions about DES daughters' breast cancer risk, so this new information brings us closer to understanding why those conflicting results might have occurred.

"Two evaluations of the DES daughters' risk of breast cancer showed discordant results," study authors wrote in their introduction. "An American study [in 2006] by Palmer et al. comparing two cohorts, DES exposed and unexposed women, found a statistically significant increased rate at ages 40 years [and older]. A [2010] study by Verloop

continued on page 3

JOIN THE CONVERSATION

New Member Benefits!

Part of our upgrade to the DES Action USA website includes a new members-only area. As a member, you'll be able to log in to the Members Area for access to:

- **Rate Your Doc**—we've always offered lists of doctors that were recommended by other DES-exposed members. Now you can share your knowledge, and maybe spare some fellow members some pain, about the doctors in your area. Rate your doctor by entering his or her name, location and specialty, then add your comments: Is he or she knowledgeable about DES? Open to discussing options or fears? Tell your fellow members.
- **VOICE Newsletter**—current and historical. The VOICE is the most popular member benefit of DES Action. Now access all 36 years of newsletters and search for any topics or articles you need. The VOICE documents the history, the science and the personal stories of DES and all of us who were exposed.
- **Attorney List**—If you're interested in getting involved in possible future DES-related litigation, we offer a list of knowledgeable attorneys DES Action members have shared with us who might be able to help.
- **Exclusive Content**—an expanding collection of articles and videos accessible only to current DES members.

And more! Update your mailing address, pay your membership dues or make a donation online.

DES Action USA on Facebook

Like DES Action USA on Facebook and follow us on Twitter to stay up-to-date on medical and environmental health news that affects you, your loved ones and the planet. Share your thoughts with an engaged and active community. There's a ton of information swirling online 24/7 that affects the DES population—don't let it pass you by!

Online Support Group for DES Daughters

Here is a safe place for discussing very personal issues that arise for DES Daughters. We live in the farthest reaches of the country but have developed a sense of community together, via our email listserv.

What we talk about is private—just between us—so we can feel free to raise questions on topics we aren't comfortable bringing up with others. What is amazing is the depth of knowledge in the responses.

It's a terrific resource for information and support from DES Daughters who wrestle with the effects of menopause, family relationships and medical diagnosis issues specific to DES exposure. To join the support group, send an email to: DESactionDaughters-subscribe @yahoogroups.com.

How to Log In

To log into the members area, go to www.DESAction.org and click on Members in the navigation bar. Enter the email address we have on file and the default password: desUSA2015. Once you are logged in, you can go to Your Account and change your password and update other information.

If you have any problems, email us at members@desaction.org or call us at 800-337-9288.

Find us on Facebook twitter

MISSION STATEMENT

The mission of DES Action USA is to identify, educate, empower and advocate for DES-exposed individuals.

Contacts

Sister Organizations

Australia

DES Action Australia, Inc.
PO Box 282
Camberwell 3124 Vic. Australia
info@desaction.org.au
www.desaction.org.au

DES Action NSW
14 Edmundson Close
Thornleigh NSW, 2120, Australia
C_devine@bigpond.net.au
www.desnsw.blogspot.com

France

Reseau DES France
1052 rue de la Ferme de Carboue
40000 Mont de Marsan, France
reseaudesfrance@wanadoo.fr
www.des-france.org/accueil/index.php

The Netherlands

DES Centrum
Wilhilminapark 25
Postbox 1173
3860 BD Nijkerk
voorlichting@descentrum.nl
www.descentrum.nl

DES Action VOICE

Published quarterly by:
DES Action USA
178 Columbus Avenue #237182
New York, NY 10023

ISSN 1522-0389

(800) DES-9288 (800) 337-9288
Email: info@desaction.org
www.desaction.org

Editorial Director and Social Media Manager.....Virginia Pelley
Membership and Operations Manager.....Kimberly Bliss
Communications Director.....Julie Livingston
Financial Manager.....Aundra Goodrum

MedShadow Foundation, Inc.
DES Action USA Group, LLC operates under the 501(c)3 status of MedShadow Foundation, Inc. DES Action is independent from any other organization.

MedShadow Foundation, Inc.
President.....Suzanne B. Robotti
Content Director.....Colleen Gardephe
Digital Director.....Deirdre Wyeth

Obesity

continued from page 1

rupting chemicals in general leads to epigenetic changes (changes in gene expression) that in turn are related to the propensity to become obese."

So many people were using Newbold's animal research to promote the possible connection between endocrine disruptors and obesity that they felt the study was worth repeating for further confirmation, she continues.

"It's possible that [DES exposure] could affect obesity through changes in endogenous [grown within an organism] hormone levels," Hatch says. "On the other hand, the findings of the study were somewhat equivocal; at most there was a very small effect."

Interestingly, the authors reported that the obesity effect appears to be a little stronger when participants had been exposed to DES in lower doses and if they were first exposed later during gestation. Unavoidable study biases might account for those counterintuitive results, they wrote. DES VOICE

DES France Study

continued from page 1

et al. comparing Netherlands DES daughters with the Dutch population found no increase of breast cancer. A hypothesis for these discordant results, besides differences in methods and age of cohorts, could be derived from differences in doses of DES prescribed in the Netherlands and in the United States. An evaluation suggested that the prescribed doses were generally lower in France than in the U.S. For cancers other than CCA [clear cell carcinoma] and breast cancer, there was no consistent evidence of excess risk in a National Cancer Institute (NCI) study."

In this study, conducted by Réseau DES France, funded by Agence Nationale de la Sécurité des Médicaments et des produits de santé (ANSM), the French drug agency, and supported by Mutualité Française, a national health insurer, researchers compared responses to a voluntary questionnaire of a cohort of 3,436 women exposed to DES during their mothers' pregnancies and 3,236 women who had not been exposed. Participant responses were accepted between April and September 2013.

Researchers found almost 200 (195) cancers in exposed women, 136 breast cancers and 59 in other areas, and 141 cancers in unexposed women (90 breast cancers, and 51 others). "Our results suggest a significant increase of breast cancer in prenatally DES exposed women when compared with unexposed women and with the general population," the authors wrote in their conclusion.

In an email to DES Action USA, lead researcher Professor Michel Tournaire commented, "We had hoped, as the doses taken by DES mothers were less than those prescribed in the U.S., that the risk would be less, but this hope was not confirmed."

Here are a few additional things to note about this study.

About the participants

The authors pointed out the DES-exposed women in their study were over-representative of women born between 1965 and 1974 and an underrepresentation of women born before 1955 and after 1975. "This … is due to the prescription period of DES in France, which began slowly during the '50s, and reached a peak at the end of the '60s and beginning of the '70s," researchers wrote. DES-exposed women got their periods at around the same age as the unexposed (13 years old), "but differed statistically on all other characteristics from unexposed women: Exposed women gave birth less often, were older at first birth and were treated more often for infertility," the authors wrote.

Genital tract differences and their relation to breast cancer results

Benign abnormalities in the vagina such as adenosis are considered independent markers of doses and timing of DES exposure, they wrote. A previous study of DES daughters found a significantly greater risk of breast cancer for women 40 and older when vaginal changes were present and less risk when they were absent. This new study did not include enough data to confirm these previous results, however.

Other types of cancer

Researchers found that incidences of cancer—when they excluded breast cancer—did not differ significantly between those exposed to DES and those with no history of exposure.

> "We had hoped, as the doses taken by DES mothers were less than those prescribed in the US, that the risk would be less, but this hope was not confirmed"

Selection bias

One difficulty facing DES researchers (as well as scientists in general) is that people with histories of health problems are more likely to volunteer to participate in voluntary medical surveys; it's natural that if you suffer from ill health, you'd be more interested in helping further medical research. Therefore, study results can skew toward disease and negative health effects, as they're more likely to be present in such a sample of people. The authors of this study designed several precautions to combat the chances that their results would be misleading.

"Breast cancer incidence being already high in the general population, the number of women affected exposed to DES in utero may become a serious public health concern," the authors wrote in their conclusion and noted the particular and crucial importance of vigilance in cancer monitoring for the DES-exposed. DES VOICE

New Ovarian Cell Study Insights Could Lead to Better Understanding of Reproductive Disorders

By Virginia Pelley

Researchers are closer to understanding some of the conditions that commonly lead to infertility, which as we know, affects DES daughters at a much higher rate than women who haven't been exposed.

Scientists at the National Institute of Environmental Health Sciences (NIEHS) have discovered the origin of a previously mysterious type of cell found in the ovaries, as well as a new understanding about how ovarian cells communicate with each other during the formation of ovarian follicles (where eggs mature). Researchers say that their findings, published in *Nature Communications* in April, might help them better identify and treat premature ovarian failure and polycystic ovarian syndrome (PCOS), both of which frequently lead to infertility.

DES daughters' risk of infertility is 2.4 times that of unexposed women, and rates for DES granddaughters are thus far unknown.

"We know that infertility and problems with pregnancy are more common among DES Daughters, but the reasons are not well documented," says Kari Christianson, former DES Action USA program director and current MedShadow Foundation board member. "Certainly the structure changes to the cervix, uterus and Fallopian tubes have been seen, but ovarian changes and lack of function have been harder to document in DES Daughters. In part, this may be due to the fact that PCOS and other ovarian problems are seen in unexposed women, too."

New info about function and formation

Intending to find out how organs form, researchers looked at ovarian systems in mice, including the ovarian follicle, which is the functioning unit of the ovary. Scientists knew where the follicle's eggs and one type of ovarian cell, granulosa, came from, but they didn't know the origin of the other type of cell that surrounds the egg in the follicle—theca cells. In this study, they discovered that theca cells develop both inside and outside the ovary.

"Theca cells are not only important for normal ovarian functions such as hormone production and development of the eggs, but they're also involved in ovarian diseases such as polycystic ovarian syndrome (PCOS)," says Humphrey Yao, Ph.D., head of the Reproductive Developmental Biology Group at the NIEHS and corresponding author of the study. "Finding out where theca cells come from and what controls their appearance will provide basic knowledge on ovarian development and a foundation to understand how ovarian diseases arise."

Knowing which cell types are affected in a diseased organ is crucial in understanding how a particular disease develops, Yao explains.

"The discovery of various cell sources of theca cells could help us identify the potential origins of diseases during different stages of development, therefore providing insight into the mechanisms of diseases and what the treatments might be," he says.

Yao and the other NIEHS researchers now also better understand how cells share information when eggs are forming.

"One of the potential causes of infertility is the miscommunication among different cell types in the ovary. The miscommunication could lead to imbalanced hormone production and aberrant formation of the follicles," Yao says. "Our study unveils that proper theca cell development requires a coordinate interaction among eggs, granulosa cells and theca cells. Defects in the interaction could affect theca cell differentiation, hormone production and consequent fertility problems."

It is hoped that as research continues and scientists learn more about how ovarian cells develop and communicate, DES granddaughters might suffer fewer issues with fertility than their mothers did—although breakthroughs are likely to take some time. DES VOICE

Risks for DES-exposed Daughters Compared to Non-DES-exposed Daughters

Outcome	Increased Risk
Clear cell adenocarcinoma	40 times higher
Neonatal death	8 times higher
Preterm delivery	4.7 times higher
Loss of second trimester pregnancy	3.8 times higher
Ectopic pregnancy	3.7 times higher
Stillbirth	2.4 times higher
Infertility	2.4 times higher
Early menopause	2.4 times higher
Cervical intraepithelial neoplasia	2.3 times higher
Breast cancer	1.8 times higher
First trimester miscarriage	1.6 times higher
Preeclampsia	1.4 times higher

(Table from the March 2012, Number 44 issue of *Linkage*, a publication of the NIH National Cancer Institute Division of Cancer Epidemiology and Genetics)

DES Research Proves Invaluable in Prostate Cancer Study

By Virginia Pelley

Rodent studies have supported the idea that prenatal exposure to estrogen plays a role in men's development of prostate cancer later in life, but until now, little was known about whether researchers would see the same effects in human tissue (a group or layer of cells). To help them find out, scientists at Brown University and Women and Infants Hospital used methodology gleaned from DES researchers.

"The doses we used were selected based on the rodent studies performed by Gail Prins, Ph.D., [in 2001] in which she [saw the development of] precancerous lesions in rodent prostate with early life exposures at these levels," says Kim Boekelheide, Ph.D., a professor of pathology at Brown University and one of the authors of the study, published in PLOS ONE in the spring and titled "Developmental Exposure to Estrogen Alters Differentiation and Epigenetic Programming in a Human Fetal Prostate Xenograft Model."

Referring to her DES research that Boekelheide cites, Prins says in her University of Illinois at Chicago biography Web page: "This work will serve as a model for what might be expected to occur in the prostate glands of sons of DES-exposed mothers. … Little is known about potential problems that may arise in DES-exposed sons, but it is important to note that the prostate gland and vagina arise from the same structure embryologically (urogenital sinus). Sons exposed in utero to DES between 1950 and 1970 are just now entering the age of 'natural' prostatic disease, and it will be of clinical importance to determine whether their disease profile is different or more aggressive. This research will also be used as a model for toxicological exposure to environmental and dietary estrogens, which is a major problem now confronting the scientific and medical community."

Estrogen's effects

Boekelheide and his team used estradiol (a form of estrogen used to treat hot flashes, vaginal dryness and irritation due to menopause) in their study of human tissue to look for lingering effects from prenatal estrogen exposure.

"Our studies also built on the important work from the 1980s and 1990s of Dr. Gerald Cunha, in which he examined the effects of DES on human fetal prostate xenotransplants [which is a graft of tissue from one species to another]," Boekelheide says. "Using molecular techniques unavailable to Dr. Cunha 25 years ago, we identified estradiol-induced alterations in gene expression and DNA methylation, indicating that these early-life estrogenizing exposures were reprogramming the developing prostate."

In other words, researchers did see changes in the way genes transmit information to proteins (i.e., gene expression), but the consequences of the reprogramming they observed were modest, meaning they didn't appear to show a significantly increased risk of prostate cancer, Boekelheide says.

"We saw the induction of epithelial hyperplasia [increased cell production in a normal tissue], but did not see the development of more advanced precancerous lesions," Boekelheide explains. "This more modest response to estradiol in developing human prostate compared to developing rodent prostate may be related to slower rates of proliferation, and a more prolonged window of developmental differentiation in humans.

"One possible way to think about this is that prostate cancer in humans is a disease late in life (usually in men over 60), and while there may well be a developmental impact on human prostate cancer, it likely takes a long time to manifest itself," he continues. "In this context, our longest experiments included an observation window of just a little over a year, so we are only capturing a narrow time window of the natural history of this disease."

"Sons exposed in utero to DES between 1950 and 1970 are just now entering the age of 'natural' prostatic disease, and it will be of clinical importance to determine whether their disease profile is different or more aggressive"

In their conclusion, the authors wrote that this research "provides new avenues for exploring the prostate carcinogenic sequence and underscores the importance of using human tissues to study early-life estrogen exposures of the prostate."

DES VOICE

Victims of Birth Defect Drug Thalidomide Get Payout

By Virginia Pelley

Like DES, thalidomide was given to pregnant women in the mid- to late-1950s to reduce morning sickness. Also like DES, the drug caused terrible harm.

Victims in Canada received some good news in March regarding compensation from thalidomide's maker, Chemie Gruenenthal. But if you're not familiar with the drug, here's some background information about thalidomide.

From the late 1950s until the early 1960s, doctors in Canada, Europe, Asia and Australia prescribed the sedative to pregnant women to quell the nausea of morning sickness. How thalidomide works in the body is complicated, but it is understood to slide in between subunits of DNA molecules. It interferes with the production of certain proteins and also with the formation of new blood vessels, according to an article Trent D. Stephens, Ph.D. wrote for The Thalidomide Victims Association of Canada. Stemming the growth of these new vessels, Stephens wrote, is thought to contribute to the malformations and inadequate growth of the limbs.

In 1958 a German newspaper article linked a spate of birth defects—including missing or hypoplasia (excessive cell growth) of arms, muscle defects and malformations of internal organs—to mothers' use of the drug. An estimated 10,000 babies were born with birth defects because of thalidomide worldwide, according to the BBC. Chemie Gruenenthal withdrew thalidomide from the market in the early 1960s, and in 1971, the company agreed to put $28 million in a fund for victims to pay for their care. When the money ran out, the German government stepped in to offer compensation for those affected in Germany, but victims in many other countries have received nothing. Victims worldwide didn't receive an apology for the harm the drug caused until 2012, *Newsweek* pointed out.

The monetary compensation isn't merely punitive: Dealing with the many health complications thalidomide created for victims is expensive.

Frederick Dove, a thalidomide baby, wrote for the BBC, "For the survivors, decades of coping with stunted, twisted or missing limbs has meant greater wear and tear on remaining joints and muscles, and virtually guaranteed the premature onset of arthritis and chronic pain. Many who managed to go out and work have already been forced into early retirement, while others who used to rely on their parents for everyday care can no longer do so. Every year, more and more are becoming totally dependent on other

continued next page

Is Thalidomide Rearing Its Ugly Head in the US?

If you thought birth defects due to thalidomide exposure were ancient history, think again. Doctors in Brazil began prescribing thalidomide to men to treat leprosy in 1965, and the drug's misuse is still causing birth defects today, according to an alarming 2013 report by the BBC.

Canada began prescribing thalidomide only for people over 65 years old suffering from multiple myeloma in 2010. Presumably, this is to keep women of childbirth age away from the drug, but as the BBC story about Brazil's new generation of thalidomide victims pointed out, many patients were not warned about the drug's harmful effects and sometimes women took their husbands' thalidomide off-label, resulting in terrible consequences for their babies.

According to the Thalidomide Victims Association of Canada, the drug was never licensed for distribution in the United States back then, but 2.5 million samples of Thalidomide were distributed by doctors here. Therefore, the precise number of U.S. victims isn't known, but there are 17 known cases of defects thought to be the result of thalidomide exposure.

Since 1998, thalidomide has been licensed for use in the U.S. in treating complications related to leprosy as well, and as of Oct. 26, 2006, it is also prescribed to treat cases of multiple myeloma, according to the Thalidomide Victims Association of Canada. Also alarming: Pharmaceutical company Mylan is suing Celgene, the U.S. maker of thalidomide, for blocking generic versions of the drug from being produced. In January, a judge said the case could go to trial.

Generic versions prescribed under different names have the potential to further confuse patients, who might already not be given enough information about thalidomide's side effects. We'll update you as the case unfolds. DES VOICE

family members, on social benefits or health insurance payouts—or on charity."

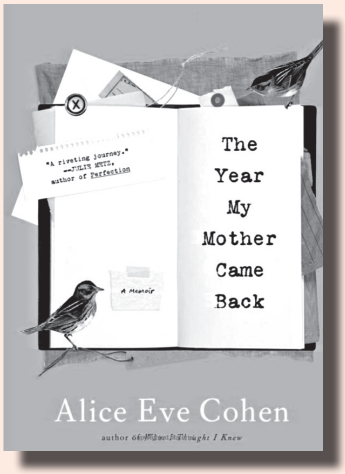
Although thalidomide survivors were told in March that the government would pay out up to $180 million for their continued care, victims reportedly are growing nervous that the government isn't answering questions about specifics, such as how much each person can expect to receive.

Health Canada paid each of the 95 remaining survivors $125,000 and promised a tax-free annual payment to offset medical costs, the *Toronto Sun* reported, but Thalidomide Victims' Association of Canada executive director Mercedes Benegbi told the paper that the amount is half of what the victims had requested.

"We don't feel they understand this crisis situation," Benegbi says. "We started our campaign a year ago with 97 survivors. Today we have 94."

DES VOICE

Alice Eve Cohen, Author and DES Daughter, Shares an Excerpt of Her New Book with DES Action



Please enjoy this segment of Alice Eve Cohen's memoir, THE YEAR MY MOTHER CAME BACK, taken from Chapter 4. In it, Cohen describes ruminating about the DES exposure that has affected her mother's life, her own life and her daughter's life.

Flipping through magazines in the waiting room, I come across an article about the increased risk of breast cancer for women who took Hormone Replacement Therapy. Blah! I was on HRT for fourteen years. And that's just the latest chapter of my epic hormonal odyssey. I could write a book. My life, seen through estrogen-colored glasses. …

BABY BOOMER ACTIVIST

When I was thirty, I joined a class-action lawsuit, which collectively attempted to sue Eli Lilly's ass (Lilly only experienced a small pinch.) I collected a small out-of-court settlement for my infertility. I wrote a play about DES. My cervix became world-famous—videotaped for medical students because my weird cells illustrated the classic DES abnormalities.

THE INFERTILE ERA

From age 30 to 44, I was prescribed HRT to treat low estrogen, which, as it turned out, I didn't need. (Exhibit C: my unexpected pregnancy with Eliana, fourteen years after being told that my estrogen was so low I could never, ever, ever, ever, EVER become pregnant.)

ITSY BITSY BABY

Once upon a time, long, long ago (circa 1999), when Eliana was but a wee zygote, she was exposed to the synthetic hormones I was taking, and continued to take for the first two trimesters.

Does this sound familiar?

Is this some kind of a family curse? Family legacy? Family joke?

Life-long exposure to synthetic hormones may have caused my breast cancer.

My mother's breast cancer may have been caused by DES.

These strange symmetries lead to strange asymmetries.

When my radiation treatment is over, I'll take an estrogen-blocker for five years, which is ironic, if not funny, if not hysterical—from the Greek, hustera, which means 'womb', which is etymologically ironic.

After a lifetime of being pumped with estrogen drugs, my natural estrogen is going to be blocked for the next five years with yet another synthetic estrogen. I am a magnet for medical ironies.

This makes me really mad. If I get any madder, I'll become a madwoman. I might become completely husterical. I bet I'm the only woman in history (hystery) to have sued for both infertility and fertility.

Oh, God, how I wish I hadn't inadvertently drugged and dragged Eliana into this, before she was born.

Oh, God, how my mother wished she hadn't inadvertently drugged and dragged me into this, before I was born.

Oh, God, how I wish my multi-generational maternal legacy didn't have such painful symmetries.

Oh, God, how I wish Eliana didn't have such painful asymmetry.

DES Action® VOICE

Non Profit Org.
U.S. Postage
PAID
Columbus, OH
Permit No. 2609

DES Action USA
178 Columbus Avenue #237182
New York, NY 10023

www.desaction.org

Return Service Requested

Have You Logged In Yet?
Visit members.desaction.org to ensure your access to special benefits

How DES Exposure Affects Your Hormones: Study

By Virginia Pelley

Pointing out in their introduction that diethylstilbestrol is a potent endocrine disruptor, the authors of a study published in the *Journal of Developmental Origins of Health and Disease* in June wrote, "Prenatal DES exposure has been associated with reproductive disorders in women, but little is known about its effects on endogenous hormones [hormones produced within the body's cells]." Studying these effects is crucial, as researchers at the National Cancer Institute (NCI) are actively studying how the body's own hormone production may be related to the risk for breast, endometrial and ovarian cancer, reproductive issues that affect the DES-exposed in greater numbers.

"We were interested in whether hormone concentrations were different in women who were exposed to DES in utero, partly to determine whether hormonal differences explained any of the long-term effects of DES on health in these women," says co-author Rebecca Troisi, M.A., Sc.D., staff scientist at the National Cancer Institute and one of the principal investigators of the DES Follow-Up Study.

The researchers looked for an association between prenatal DES exposure and reproductive hormones among women of the Harvard Study of Moods and Cycles (HSMC), a longitudinal study of premenopausal women 36-to-45-years old from Massachusetts. What they found was that prenatal DES exposure appears to alter concentrations of FSH (follicle stimulating hormones), estradiol and inhibin B among women of late reproductive age.

Estradiol is one of the types of estrogen, or sex hormones, produced by the ovaries. Inhibin B is a hormone produced by granulosa cells in the ovaries and is involved in regulatory functions of ovarian follicle development.

"We found that prenatally exposed women had lower estradiol and inhibin B concentrations than unexposed women, and higher follicle stimulating hormone concentrations (FSH). Inhibin B is involved in regulating the menstrual cycle and inhibits the secretion of FSH. As inhibin B decreases in late reproductive age, FSH rises as a harbinger of menopause," Troisi explains.

"This was important research, not just in regard to the DES daughters, but because it provides evidence that prenatal exposures may affect hormone metabolism even decades later," Troisi says.

In addition, this study helps provide important data to NCI researchers seeking to better understand how we develop reproductive cancers. DES VOICE