MOTHER ENDOCRINE DISRUPTORS & INFERTILITY



PORTRAITS OF EXPOSURE: UNVEILING THE HIDDEN WORLD OF ENDOCRINE DISRUPTORS

Learn more about

- What's hidden in your cupboards?
- Nutrition's relationship with hormones
- Infertility & stigma in the media

The Beast within Beauty: A GUIDE TO AVOID TOXINS IN COSMETICS



ENVIRONMENT

LIFESTYLE

GENETICS

Meet the Editors

WELCOME TO OUR MAGAZINE



Tara Aiache Reynaud

Bonjour! I am 4th year Human Biology and Society Major at UCLA. I am continuing my studies to receive my Doctorate in Audiology at SDSU/UCSD's joint Doctoral program to become an Audiologist. Outside of school, my favorite hobby is scrapbooking. I love traveling, I enjoy cooking new foods, and I speak French fluently!



Sara Aoki

Hi everyone! I am a 4th year Human Biology and Society major with a minor in Environmental Studies/Geography at UCLA. On campus, I am involved in two labs focusing on feral cats research and schizophrenia. Outside of school, I love reading, hiking, and soccer!



Nare Arakelian

Hello! I am a 4th year Human Biology and Society major with a Brain and Behavioral Health minor at UCLA. I am involved in research at the Cannabis center as well the Carceral Ecologies lab. Outside of school, you'll likely find me eating sushi, reading at a coffee shop, or watching reality TV.

Hi! I'm Ryle and I care about inner beauty and health as well as exploring and researching. I am currently a 4th year Human Biology and Society undergraduate at UCLA and I research childhood ADHD within the Department of Clinical Psychology. When not in school, I prefer to spend time horseback riding, practicing Pilates, and writing fantasy stories.

Ryle Eskander



Brittney Hun

Hello Readers! I am a 4th year Human **Biology and Society** Major at UCLA and I hope to work in community health and preventative care. I am involved in the **BioCritical Studies** Lab studying how medical racism and police brutality is embedded in health care. Outside of school, I love to read, be outside, and cook with family!



Mother magazine is a periodical publication that is an informative, engaging, and well-rounded discussion on the relationship between endocrine disruptors (EDCs) and infertility. Through articles, interviews with experts, imagery, and activities, we want to paint a picture of what the reality of infertility looks like in a world ubiquitously inhabited by EDCs.



Editor's Note

MOTHER MAGAZINE



In this issue

Mother magazine incorporates biological information in the introductory section discussing their origins and current statuses, anatomical analyses of fertility, nutrition's relationship to hormones, and a discussion on how fertility is impacted by pesticides. For the sociological side, we are discussing the stigmas for both women and men regarding the identity of infertility, the determinants of health that affect infertility treatment, and the powerful influences that beauty standards have on the choices that women when buying potentially make carcinogenic cosmetics. We will illustrate this by intersecting elements of the biosocial into four portraits of different individuals (3 women and 1 man) dealing with some aspect of fertility. Although we mention women specifically in this issue, we want to acknowledge that anyone may have identities that are affected by the issues of infertility. The very limited research speaks mainly of cis-female but can be applied to anyone who identifies with these topics.

Images from Yukai Du

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When the Birds and the Bees Aren't Enough ...

By: Tara Aiache Reynaud

When the birds and the bees aren't enough, read more from *Mother* magazine.

The CDC defines **infertility** as "not being able to get pregnant or conceive after one year, or longer, of unprotected sex" (1), and explains that:

Infertility may result from one or several of these factors:

- A woman's ovary cannot deliver an egg.
- Fertilization cannot occur because a man's sperm cannot reach the egg.
- The man's sperm is immobile, abnormal, or has a low sperm count.
- Male infertility is mostly due to either the disruption of testicular or ejaculatory function, genetic disorders, hormonal disorders, or endocrine-disrupting chemicals found in the environment.
- Female infertility is mostly due to a disturbance of ovarian performance, exercising exorbitantly, improper hormone functions, "premature ovarian insufficiency, fallopian tube obstruction," and uterine abnormalities (1).



Image from BRO vector



Image referenced from Roberts E.

Infertility is a common issue within both men and women in the United States. "About 9% of men and about 11% of women of reproductive age in the U.S. have experienced fertility problems" (2). About ½ of infertility in couples is due to the man, ¼ is due to the woman, and the other ⅓ is a result of an unidentified issue (which can involve factors within the environment).



WHAT ARE EDCs?

Endocrine disrupting chemicals (EDCs) are a ubiquitous presence in our everyday lives, including chemicals that mimic the bodies' hormones and disturb signaling. In this edition of *Mother*, the main objective is to focus on the negative effects of EDCs on infertility on both a biological and social level.

By: Sara Aoki and Brittney Hun

Biologically, The Story Is Complex

There are multiple factors that can contribute to female infertility via environmental exposures, consumption of personal care or cosmetic products, cosmetic surgery, or transgenerational transmission (1). Many of these factors influence the amount of circulating estrogen, folliclestimulating hormone (FSH), or luteinizing hormone (LH) (2). Whether there is an increase or decrease in these hormones in the reproductive tract they can lead to diseases such as endometriosis, polycystic ovary syndrome (PCOS), ovarian aging, and primary ovarian insufficiency (POI) (3). The disruption in the hypothalamic-pituitary axis from environmental toxins such as phthalates and dioxins found in consumer products can manifest as reproductive tract/ovarian dysfunction since the deleterious effects of EDCs can contribute to the decline of available follicles (4).

There are many natural and synthetic compounds found in multiple pesticides (i.e., synthetic pyrethroids, organophosphates, carbamates, organochlorines) and plasticizers (i.e., phthalates and BPA) that have the ability to impact reproductive health by altering the structure and/or function of genes and proteins that facilitate normal ovarian and endometrial functions (5). Consuming pesticide residues on fruits and vegetables directly impacts fertility as well as those in direct contact with these chemicals (8). EDC exposure is also heavily influenced by social factors like racial and socioeconomic disparities, insufficient government support, and media-enforced cultural pressures (6) (7) (8). In fact, research has been done on the "mediating" role that endocrine disruptors may play between women of color and reproductive struggles (9). The routes of exposure are also variable for women and men depending on the environment they live in and their place of work. Furthermore, lawsuits within the past 10 years indicate the murky links between government agencies meant to regulate EDCs and private chemical companies (7) (10).

"EDC exposure is heavily influenced by social factors"

It is important to note the embedded forms of structural violence against minorities that contribute to EDC exposure and inhibit accessibility to efforts that could alleviate and mitigate its impacts (9). Moreover, there are public health research studies, social media campaigns, and general social stigma when it comes to feminine care that contributes to the inequitable pressures for women to adhere to these beauty standards (11) (12). There is also a social stigma around infertility in general for both women and men (13). Historically, a woman's role has been to procreate and take care of children. While there has been a movement away from this notion, these cultural ideals have persisted into modern society.

Portraying the ubiquity of endocrine disruptors in cosmetics through the contemporary lens of a college student.

By: Nare Arakelian & Ryle Eskander

Filling the aisles of your local drug store or laid on the counter before a night out, makeup and personal care products play a central role in many of our daily lives.

Makeup and cosmetics can be used as a form of self expression, but a history of discrimination and current social media campaigns have also made it so these products are used to change certain appearances to align with the norm. We know products can help us feel more beautiful on the outside, but how do we protect our inner beauty?

In this section, we'll feature a college student who shares with us her morning routine, and then make a comment on the kinds of EDCs that can be found in the products that she and many other consumers are exposed to everyday. We'll also take a look at why EDC exposure in cosmetics and personal care products varies based on race so our readers can be more cautious and informed on the products they purchase.



Hello!

My name is Nia Jones and I am a 21-year-old college student at the University of California, Los Angeles. I am passionate about skincare, makeup, and finding great products on a budget. Please leave a comment below with any suggestions and don't forget to subscribe to my Youtube channel for more! This is a glimpse of what I've been using to get ready for a day in my life!

Get Ready With Me!

Fenty Skin Hydra Vizor Invisible Moisturizer Broad Spectrum SPF 30 Sunscreen with Niacinamide + Kalahari Melon \$32 from Sephora

First, I start off with the Fenty Skin Hydra sunscreen on my face and neck to prime my skin. It applies invisibly, doesn't leave any oily white residue, and keeps my skin hydrated throughout the day. I noticed this product was certified as 'Clean at Sephora[™]' and didn't involve any testing on animals, which made me feel more inclined to support this company.

> Image from Fenty Skin Hydra Vizor Invisible Moisturizer Broad Spectrum SPF 30 Sunscreen with Niacinamide + Kalahari Melon from GlamandGlowBeauty.com

Our Review:

Fenty's sunscreen utilizes the ingredient avobenzone as its UV filter making it a bit of a safer choice than some other sunscreens that contain metal oxides. A recent study showed that titanium and zinc dioxide, two common UV filters found in most sunscreens, protect by absorbing UV radiation rather than reflecting the rays. The evidence of their toxicity has been established when tested inside the body, though there are debates within the community regarding whether or not metal oxides in sunscreens can actually penetrate through the skin's surface (1). Therefore, some might take precautions and opt for a sunscreen that contains other substitutes for UV filters, like this one!

COVERGIRL Clean Makeup Foundation Tawny 165 \$6.38 from Walmart

I use this Covergirl foundation in the shade Tawny to give me a glowy base with a seamless application. I also love that it's a clean product and so easy on my wallet!

Our Review:

COVERGIRL

CLEAN

LIQUID FOUNDATION

165 TAWNY

30 ML/1 FL OZ LIO.

Image from COVERGIRL Clean Makeup Foundation Tawny 165 from Amazon.com

Unfortunately, 'clean' is the last thing that we would call this foundation. Its formulation contains endocrine disruptors such as propylparaben, methylparaben, and "fragrances." Parabens mimic our hormones and disrupt our internal reproductive processes. Methyl-, propyl- and butylparaben were noted to have caused ovarian dysfunction in rats by affecting their ability to produce eggs as well as interfering with naturally produced estrogen as a weakened molecule (2).

L'OREAL Lash Paradise™ Waterproof Mascara -*\$9.99 from Target*

Moving on to my eyes, I use L'OREAL's Voluminous Lash Paradise Mascara to make my eyelashes pop and last me through post-midterm crying sessions. It's also a great pick for anyone who works out during the day and doesn't want raccoon eyes!

Image from L'OREAL Lash Paradise Waterproof Mascara from Target.com



Our Review:

Uh oh! There's trouble in paradise with this waterproof mascara. This product contains per-and poly-fluoroalkyl substances (PFAs). Currently, PFAs are understudied in the field of female infertility but have been proven to "decrease testosterone and sperm quality" in men (3). However, limited research has been able to correlate that PFAs "alter hormone secretion, menstrual cyclicity, and fertility" (4). In fact, L'OREAL USA is currently being sued for not disclosing its use of PFAs in its mascara products! (5)

Covergirl Continuous Color Lipstick in shade 'It's Your Mauve' - *\$6.79 CVS Pharmacy*

To brighten up my look, I use this lipstick by Covergirl throughout the day. It's not too subtle and just rosy enough to keep me from looking washed out. I like that the formula is creamy and smooth for easy applications so I don't have to use a lip liner beforehand. This lipstick truly is the best of both worlds because it's moisturizing and pigmented.

Images from COVERGIRL Continuous Color LIpstick in Shade "It's Your Mauve" - from Amazon.com

OVERGIR

Our Review

Kiss this lipstick goodbye! Our analysis of this lipstick revealed that it contains propylparaben, a chemical that may be linked to diminished ovarian reserves and decreased fertility (6). Like most endocrine disruptors, more research is still needed to confirm these correlations; it's better to be safe than sorry when other alternatives exist.

Haircare

Styling

Typical paddle brushes are too harsh on relaxed hair so I use a gentle boar bristle brush. It distributes my hair's natural oils and is a great way to promote growth because it stimulates the scalp! Using nylon hair elastics is a painless method to prevent breakage when I need to tie my hair up to workout.

Image from Dark & Lovely Triple Nourished Hair Relaxer from Walmart.com



RIPLE NOURISHED

Helps Preserve Signs of Healthy Moisture, Strength, Softness, Shine, Body

No Lye. No Mess. Regular Relaxer *Silkening System

Dark & Lovely Triple Nourished Silkening Relaxer \$5.49 from Target

I have curly hair, so every 6-8 weeks I use this at-home Dark & Lovely Relaxer to smooth my frizz. It saves me time in the morning so I don't have to worry about taming it. I usually section my hair, apply the product, wait, and then wash it out. Once I get it dry, I flat iron it to keep my hair sleek and soft!

Need to slay your look as well as the beast within beauty? Self-expression through cosmetics shouldn't have to equal pain or the bioaccumulation of toxins from cosmetics. To balance some of the disparities that exist within the accessibility of 'clean' beauty products, we constructed a guide of suggestions that replaces some of Nia's most toxic products in her routine with healthier yet *affordable* alternatives!

ALTERNATIVES

IODITCH

PHYSICIANS FORMULA ORGANIC WEAR ALL NATURAL LIQUID FOUNDATION ELIXIR – \$13.60 FROM AMAZON

Don't want to break the bank but also want to avoid parabens and phthalates in products that you thought were 'clean'? Safer cosmetics shouldn't cost a fortune or sacrifice quality; that's why we suggest this organic liquid foundation elixir from Physician's Formula. For only \$13.60, this foundation contains organic coconut oil, collagen, squalene, and glycerin to keep your skin moisturized throughout the day. This product is recommended for combination skin and offers light coverage to balance your complexion with a dewy finish. Available in 12 shades.



Images from Physician's Formula Organic Wear Liquid Foundation Elixir from Amazon.com



WET N WILD MEGA LENGTH WATERPROOF MASCARA – TARGET \$3.19

Mega length *and* mega savings! For a third of the price of the L'Oreal mascara, you can use Wet n Wild's Mega Length Waterproof Mascara as an alternative that doesn't contain parabens, PFAs, or phthalates! Enriched with vitamin E to keep your lashes moisturized, this product is also cruelty-free and certified as 'clean' by Target's beauty department.

ECCOBELLA FLOWER COLOR LIPSTICK IN SHADE PEACH ROSE - \$21.95 ECCOBELLA

Finding a lipstick that doesn't contain lead, petroleum, artificial colors, or fragrances is no easy task. That's why this vegan FlowerColor lipstick from EccoBella is a diamond in the rough! This plant-based formula features cutins from flower petals, candelilla wax, jojoba oil, and calendula oil to keep your lips moisturized and vibrant. While at a higher price point than the Covergirl lipstick, this is a product that's well worth the investment because it can be used for a long time with peace of mind and supports a sustainably ethical company. Available in 10 shades and certified cruelty-free.



Image from EccoBella Flower Color Lipstick in Shade Peach Rose from EccoBella.com

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Mother 15



Image from Silk Elements Shea Butter Mild Relaxer from Sallybeauty.com

SILK ELEMENTS SHEA BUTTER MILD RELAXER: \$7.49 FROM SALLY BEAUTY

If you still want to keep your hair smooth and straight, this Silk Elements Relaxer packs a punch with shea butter, coconut oil, jojoba oil, and avocado oil to provide natural sources of moisture minus the phthalates. This product also comes in regular as well as coarse formulations depending on your hair's texture.



A SUMMARY OF COMMON EDCS IN COSMETICS

A "Cheat Sheet" For Your Next Shopping Trip!

Endocrine Disruptor	Where is it found?	Biological Effects	
Parabens	Has antimicrobial properties. Found in sunscreen, creams, and antiperspirants	Have been found in breast tumors and have aided their growth. Increased propylparaben concentration has been linked with lower antral follicle count and diminished ovarian reserve (6).	
Pthalates: Di-2- ethylhexylphthalate (DEP)	Used as plasticizers, solvents, and for fragrance. Commonly associated with hair relaxers	Experimental and epidemiological studies have shown that phthalates can disrupt the development of follicles and potentially lead to a decline in ovarian reserve and fertility (8).	
Per-and Polyfluoroalkyl substances (PFAs)	Water, grease, and dirt repellants found in cookware, mascara, concealer, and lip products	Detected in breast milk and umbilical cord blood in increasing amounts. Studies show that PFAs are linked to "irregular and long menstrual cycles and delayed onset of menarche in adolescent females." Rat studies also showed lower birth weights and delays in puberty (9).	
Aluminum salts	Antiperspirants	A metalloestrogen. Possibly linked to Alzheimer's and bone issues found in healthy and cancerous breast tissue (10). However, these aren't unnecessarily argued to be dangerous since these can't cross the skin's barrier.	
Triclosan	Antimicrobial agent found in hand soaps, toothpaste, and deodorants	Negatively affects progesterone production in luteal cells and disrupts ovarian function. Decreased "LH, FSH, progesterone, and gonadotrophin-releasing hormone" were detected when exposed to triclosan. Known to also affect the production of steroids in male rats (11).	
Benzophenone-3 / Oxybenzone	UV filter used in sunscreens and lotions	One study has shown that benzophenones can lead to an increased risk of endometriosis (12). It was also found to be significantly associated with decreased fertility in males (13). Outlawed in Hawaiian sunscreens because of their toxicity to coral reefs but currently deemed as 'safe' by the FDA (14).	

Recommendations: More research needs to be done on many of these chemicals, especially in relation to their effects on fertility. While the jury is still out, we would recommend checking the ingredients before you add a product to your basket and limiting your exposure to the chemicals listed above, especially if you are trying to start a family.

FROM MY HEAD TO MY UTERUS: RACIAL DISPARITIES IN PERSONAL CARE PRODUCTS

As we know, EDCs do not affect everyone equally. Race, socioeconomic status, and the environment all play a role in the personal care products consumed, the level of exposure to chemicals, and the biological consequences.

Studies have shown that exposure to EDCs such as phthalates and BPAs is greater in people of color than their White counterparts. In the U.S., non-Hispanic Black and Mexican American women of reproductive age have greater concentrations of phthalates found in many personal care products (15). This may shape the racial and ethnic disparities in reproductive health and fertility in addition to other determinants of health.





What's in your hair relaxer?

L'Oreal USA is being sued for undisclosed amounts of Di-2ethylhexylphthalate ("DEHP") in their Dark & Lovely hair relaxer products. DEP is associated with a multitude of reproductive health issues such as endometriosis, abnormalities in reproductive organs, infertility, and cancer. L'Oreal is accused of violating the Michigan **Consumer Protection Act** through deceptive business practices by selling 'adulterated' products and failing to warn its consumers of the EDCs that may be in their products (16).

THE BEAST WITHIN BEAUTY RACIAL DISPARITIES IN PERSONAL CARE PRODUCTS

Current global beauty standards dictate we glorify and consume Eurocentric ideas of femininity and beauty. One target of this system is the natural curly style of Black hair. Social norms and pressures push many Black women to use products, such as hair relaxers, that will straighten their hair in order to fit within the Eurocentric structure of acceptable beauty practices and appearances.

Hair relaxers, used by many Black women, contain endocrine disrupting chemicals such as phthalates that can easily be hidden under the guise of "fragrance" on ingredient labels (17).

Previous studies show an association between the use of hair relaxers and an increased risk of developing uterine leiomyomas, or tumors, that contribute to reproductive declines and hysterectomies (17).

Uterine fibroids are non-cancerous but can contribute to pregnancy complications and infertility, in addition to pain and bleeding (18). 80% of Black women experience fibroids at some point and have a higher risk of developing them with more severe symptoms than non-Black women (18).





But wait, there's more! Racial disparities in the use of feminine hygiene products also influence EDC exposure and their biological effects. Compared to White and Mexican American women, more Black women reported using vaginal douches, feminine sprays, and towelettes (19).

Though the link between endocrine disruptors and these products still requires more research, we can definitely say with more certainty that douching is biologically not good for you. If this comes as a surprise, don't fret. It's because these companies have been marketing it for decades as if it's a necessity.

Just look at the "love quiz" in a newspaper article on the next page, from the mid-1900s that convinces its readers of using Lysol as a douche to achieve 'freshness' and 'cleanness' to satisfy their husbands. (Heads up, they failed the quiz)!

Image from Summer's Eve Island Spring Douche Amazon.com



WHY DOES SHE SPEND THE EVENINGS ALONE?

A. Because she keeps her home immaculate, <u>looks</u> as pretty as she can, and really loves her husband, BUT she neglects that one essential...<u>personal feminine hygiene.</u>

Q. Is this <u>really</u> important to married happiness?

A. Wives often lose the precious air of romance, doctors say, for lack of the intimate daintiness dependent on effective douching. For this, look to reliable "Lysol" brand disinfectant.

Q. Is "Lysol" safe and gentle as well as <u>extra</u> effective?

A. Yes, the <u>proven</u> germicidal efficiency of "Lysol" requires only a small quantity in a proper solution to destroy germs and odors, gives a fresh, clean, wholesome feeling, and restores every woman's confidence in her power to please.

Q. How about homemade douching solutions, such as salt and soda?

A. They have no comparison with the scientific formula of "Lysol" which has proved efficient in contact with organic matter. ALWAYS USE "LYSOL" in the douche, to help give the assurance that comes with perfect grooming... confidence in "romance appeal."

RACIAL DISPARITIES IN PERSONAL CARE PRODUCTS

Historically, there have been targeted advertising towards Black women particularly to set douching as a beauty standard because of odor discrimination, making them believe they need to use these products to smell better (20). Your vagina is not 'unclean' or 'dirty' and doesn't need its pH restored with fancy fragranced products. Most douches are fragranced, meaning they likely contain DEP, a lower weight phthalate. Additionally, higher concentrations of MEP, a metabolite of DEP, were associated with douching, and Black women had 48.4% higher MEP levels than White women (19). This shows that douching is a possible avenue of exposure to EDCs, and that it disproportionately burdens Black women.

What You Can Find In Your Cosmetics

В Ј О И М М К М Ү О Ѕ О В І В CXMWCWTRICLOSAN ZXVALUMINUMZPVP FHDCJOCSOUMDJGF BZYXCKWRAQLGOKA CMPKYRBCLPSVOHS MATWOHSNEBARAPE МНАЅОМNFНАВКВΥТ BENZOPHENONELUA WGOAGVKBDHHGORL WPLFMIZMQVBIPAA VHKVWPXALTZRNZH ΤΙΟΓΜΤΚΡΙΟυΧΥΤ С M GGLKNLDSSXMYCH G R W V O C F S X T M X H Z P

1. parabens

ns 2. phthalates

3. benzophenone **4.** pfas

aluminum

5. triclosan



Tampon Transparency: Put your trust in us!

What *Aren't* We Telling You?

While our tampons are indeed made of organic cotton, they are still treated with titanium dioxide to make them appear white as an alternative to bleach. Titanium dioxide is banned in the E.U. and is classified as a dioxin. Dioxins are known to be carcinogenic but titanium dioxide is associated with decreased fertility and ovarian failure in rat studies (21, 22). The medical field can't seem to agree on whether or not this is a safe chemical, so nothing has been done to stop us from adding this agent. You'll pay nearly double for our clever marketing schemes and aesthetically pleasing packaging instead of a safe product! THE BEAST WITHIN BEAUTY

Introducing... the Sham-Pon

Our Most Absorbent Tampon. Ever.

Made of 100% Organic Cotton to make you feel 'safer' about putting this inside your body! Free of rayon, bleach, and fragrances.



Image from Cotton Tampon from GirlStyle.com

By Brittney Hun



Dear Mother Magazine,

My name is Christine and I am a 31-year-old stay-at-home mom with а two-year-old daughter, Sutton. I currently live in a suburban area of Long Beach, which is a city in the southern part of Los Angeles county and home to the Port of Los Angeles. My husband works as a construction manager for the port, so I stay home to take care of our young daughter and hope to have a few more children along the way! She keeps me extremely busy around the house and my days are filled with playing with her, cleaning around the house, preparing meals, and adjusting to being a new mother. I hopefully plan to return back to work after we have children. more Sometimes. it can aet overwhelming, so to de-stress, I find myself cleaning a lot and taking long walks around the neighborhood. We are also looking into having more children, but are having trouble doing so, which is why I am reaching out to Mother magazine. Recently, I have been diagnosed with endometriosis and PCOS by my gynecologist.

Advice from a Reproductive Endocrinologist

They couldn't tell me the exact cause of it, which makes lifestyle changes difficult to navigate. I am still not entirely sure what either condition is, and was hoping you could help educate me and other folks with a uterus. I have a general understanding of the two diagnoses, and the big red flag for me is that both can cause infertility. From what I know both are common but debilitating. Endometriosis is а gynecological inflammatory disease where lesions surround the outside of the uterine cavity, where a baby is implanted and grown (1). Shortly after having Sutton I noticed pain down in my abdomen that did not subside. I dismissed it for about six months thinking it was your typical period pain even though it felt a little different. Unfortunately we are not taught the difference between "normal" pain and something concerning, and I personally have found it difficult to articulate the type of pain I feel (2).



When I was younger, and I first began menstruating I had terrible cramps that would sometimes cause me to leave school early and feel extremely drained. My primary care physician at the time placed me on birth control right away, although I was not yet sexually active. She said that the oral birth control pill I took could decrease the number of prostaglandins, which is a chemical that our bodies make to make the uterus contract (3). I took the "combination" pill that had both ethinyl estradiol and norethindrone as synthetic estrogens to prevent pregnancy and relieve my symptoms (3). I guess it partly worked for me because although I felt fewer contractions and my blood flow during my period decreased, I still experienced some other side effects such as blood clotting and frequent yeast infections (4). I became pretty dependent on the pill, and there were some phases of my life where I tried to wean off of it but the pain was still too much to bear, even for the week.

Once my husband and I wanted to start a family, I got off of the pill permanently and my pain persisted, but I ignored it then too. After having Sutton, we tried for an entire year but had no luck getting pregnant. We then went to my gynecologist where they did a general infertility test on both my husband and me. We took blood and urine tests to determine the amount of Luteinizing hormone (LH) and progesterone during my menstrual cycle to determine whether or not I was ovulating (5). But the determining factor for both my endometriosis and infertility was a laparoscopy since my gynecologist informed us that it can be used to find "cysts, scar tissue, fibroids, and infections" which is how they discovered the lesions surrounding my uterus (5).

It's frustrating that none of my doctors during my teenage years and pregnancy with Sutton noticed that I had an issue with my uterus. I had to look up on my own what my symptoms could potentially be. Luckily there were stories of women that had similar experiences to mine. There was even a helpful forum I found that noted that my endometriosis could have been caused by some of the cleaning products I use frequently around the house and even the area of my neighborhood where I live in. Do you think that this could be true? How can I know for sure?



Dear Reader,

We appreciate you reaching out to *Mother* magazine and I am sorry to hear about your recent issues with infertility, but you're just in luck. This is the endocrine disrupting edition of this magazine and hopefully we can provide you with some clarity regarding your fertility and endometriosis. My name is Dr. Anderson, a double-board-certified endocrinologist and gynecologist. This month, I am a guest writer for *Mother* magazine. There are a few things in your story that I feel will be helpful to discuss and dive deeper into. I will be taking an investigative and scientific approach to your fertility.

First, is the issue of endocrine disrupting chemicals (EDCs) that might be in the cleaning products that you are using. I noticed that you stress clean when you are staying home for long hours taking care of your daughter. This is a potential place of concern that may be contributing to your infertility, especially if you are using things in aerosol cans. The evidence is growing to suggest that certain household chemicals can increase exposure to EDCs which may affect behavior, development, and specifically in your case, reproduction (6).

I do not mean to cause any harm or worry for you and other readers since they are not the main ingredients in the cleaning products; the EDCs typically act as preservatives and fragrances. Something that calls for greater research is the combination of chemicals that are used to clean your home. Common toxicology reports are on air fresheners, mold removers, and common household cleaners that advertise as "antibacterial". Something with an antibacterial label has the potential to contain triclosan (7).



This is also something to note for Sutton as well since there are increasing studies that show that fertility issues surrounding EDCs can be epigenetic and transgenerational. I suggest reading labels and avoiding the products depicted in the diagrams on the following page (8). I will address your specific concerns in more

depth as well!

These are not all products that need to be thrown out completely, but you and your family should tread with caution. Women with higher levels of these exposures have a correlation with earlier menopause, but I apologize that the research still remains This largely unclear. may seem overwhelming, and I don't intend to create added stress, but being aware of these risks can grant you greater autonomy in the future. Many doctors are not addressing the invisible, everyday exposures that we face in our own homes.

These exposures have a correlation with earlier menopause, but I apologize that the research still remains largely unclear. If you use anything that involves a fragrance smell, these are the EDCs frequently found: hexyl cinnamaldehyde, geraniol. citronellol, 2-(4-tertbutylbenzyl) propionaldehyde (CAS no. 80-54-6), and benzyl benzoate (CAS no. 120-51-4) (7).

"Many of these chemical exposures are beyond our control...but we can educate ourselves about our day-today chemical exposures and become more aware of the plastics and other household products we use."



PCOS Symptoms Image from Cherokee Women's Health

PCOS is the most common endocrine disorder in reproductive age women, in addition to thyroid dysfunction, which can also impair your menstrual cycle and fertility (9). Low levels of thyroid can affect the release of the egg from your ovaries, so even if the list of endocrine disrupting chemicals is not directly affecting the uterus, the endocrine system of your body is intricately connected. That is also one of the dangers of doing in vitro fertilization (IVF) if you choose to extend your family. There is still a lack of published research on the safety of alternative reproductive technologies (ART). It important to is have proper markers surrounding your endocrine system if you choose to pursue IVF.

This list is by no means exhaustive, but I wanted to personalize it for you as much as possible.

We should also note that many of these exposures can affect the health of your future baby as well (transgenerationally). The precise mechanisms still remain unclear but studies show that the placenta is regulating the supply of nutrients from mother to fetus and is the source of hormonal signals that can affect both of your metabolisms (10).

One of my colleagues, Dr. Amber Cooper, Reproductive Endocrinology and Infertility subspecialist states that "many of these chemical exposures are beyond our control, because they are in soil, water, and air. But we can educate ourselves about our day-to-day chemical exposures and become more aware of the plastics and other household products we use." Again, I do not mean to concern you more, but being aware of the everyday exposures that have caused your discomfort might grant you more options to seek help or make lifestyle changes!

EVERYDAY EXPOSURES

development during ovarian aging, leading to a decrease in healthy follicles

for fertilization

Dioxins

Ethinyl Estradiol



Wholesomelicious & Ryle Eskander Contributors

HORMONE BALANCING SMOOTHIE

A healthier spin on the Chunky Monkey smoothie including ingredients that support hormone health!

1. Maca

Originating from South America, the Maca root is also known as Peruvian ginseng. Maca typically comes in powder form and is hypothesized to be beneficial for relieving the symptoms of menopause as well as increasing libido (2) (3).

2. Spinach

Dark leafy greens, like spinach, are a great source of fiber and also contain glutathione. This antioxidant "facilitates the liver in metabolizing estrogen and thus can relieve PMS and menopausal symptoms" (4).

3. Flax Seeds

Flax seeds offer a nutty flavor and are packed with omega-3 fatty acids. These acids are essential for hormone production. Studies have shown that flax seeds significantly decreased androgen levels in women with PCOS (5).

4. Cinnamon

Cinnamon has shown promising results as a supplement for women with PCOS because it has an "insulin-sensitizing effect and improve[s] menstrual cyclicity (6).

RECIPE

"Let health be thy medicine and medicine by thy health"

- 1.5 cups of plant-based milk
- 1/2 of a frozen banana
- 1-2 tbsp of peanut butter
- 2 tsp of maca powder
- 2 tsp cinnamon
- 2 tbsp flax seeds
- 1-2 tbsp cacao powder
- 1 heaping handful of spinach

Managing blood sugar spikes by eating a sustained diet full of protein, healthy fats, and fiber is an effective method to balance hormones and our body's sensitivity to them (7).

COOKING TO CONCEIVE

10 Foods to Increase Fertility For Both Men and Women

By Tara Aiache Reynaud



Can consuming specific meals actually increase your fertility? As a matter of fact, **yes it** *can!* It's essential to understand that no miracle diet can result in pregnancy overnight, but dietary and lifestyle preferences have a remarkable reproductive impact on both men and women. This includes hormone and stress amounts, blood circulation, overall health, and lifestyles which can increasingly play a part in fertility.

The Laurel Fertility Care site suggests 10 foods to include in your diet as part of a comprehensive dietary strategy to enhance fertility (1):

1. Beans and Lentils

Proteins that are high in fiber, can help improve ovulation. These legumes are an excellent source of folic acid, a vital component that aids in healthy embryo development.

2. Sunflower Seeds

Maintains proper sperm levels, increases sperm count and motility. These seeds are rich in vitamin E, zinc, folic acid, and selenium levels.

6. Greek Yogurt & Cheeses

Packed with calcium, probiotics, and vitamin D which can improve ovulation and boost fertility.

7. Salmon

Healthy fats that supply protein and omega-3. Salmon is a great source of vitamin D and selenium, both of which are crucial for increasing sperm counts and improving general health.

3. Fruit

Rich in anti-inflammatory and antioxidant nutrients. Contains vitamin C and folic acid that provide healthy fetal growth after conception.

4. Avocados

Full of vitamins K and B, potassium, and folate assists with vitamin absorption, blood pressure regulation, and red blood cell formation.

5.Quinon

Whole grains are an excellent source of protein, zinc, and folic acid while providing necessary amino acids that synthesize body protein and function.

8. Asparagus

A powerhouse food with incredible benefits for those trying to get pregnant. Contains folic acid, vitamins A, C, B, and K. Strong in zinc and selenium, which are substantial for men's reproductive health.

9. Walnuts

Regulates body, brain, and hormone functions with omega-3s and omega-6s. Men who eat walnuts on a regular basis will experience improved semen motility, quantity, and morphology.

10. Egg Yolks

Contain vitamin B, essential omega-3s, and folic acid which supports red blood cell growth and helps maintain embryo development after conception.

Takeaway:

Making healthy dietary and lifestyle choices can help your stress levels during your fertility journey. While these 10 foods are recommended as a natural way to boost your fertility, we encourage each couple to practice balance in their diets! (1)



COUPLE'S INFERTILITY

By Tara Aiache Reynaud

Image from Vecteezy

Reaching out to *Mother* magazine is a couple looking to share their personal story of hardships with infertility, specifically male infertility. This couple hopes to be the voice for others who struggle with similar misfortunes. This is Mr. and Mrs. Hernandez's infertility narrative:

Sierra Hernandez, 35 years old, is married to her husband, Carlos Hernandez, 36 years old. Sierra and Carlos have been married for 10 years, but both have been dedicated to their careers in order to develop a responsibly secure life.

Sierra was born into an American household where she was taught from a young age that to become successful in life, education is the foundation for a stable job, and once the time is right, she should start a family. Sierra has been working as an elementary school teacher for 8 years and is content with her job. Her husband, Carlos, was born into a Mexican family, where from a young age, he was also taught to work hard and save money.

Carlos has been working as a truck driver for Amazon for the last 3 years. Although Carlos isn't always home during the week, he earns a good amount of money that he is saving in hopes to start a family.

As a result, Sierra and Carlos have both been extremely successful with their jobs and they are at the age where they want to settle down and start a family. It has been a year and a half since they have been trying to conceive and unfortunately, it hasn't been working out.

THROUGH THE LENS OF A FERTILITY SPECIALIST

Therefore, they see a fertility specialist Permanente Kaiser called at Dr. Michelle Tran. Dr. Tran discloses that before any infertility tests are conducted, Sierra and Carlos must first attempt fertility awareness techniques in order to learn the best interval for Sierra to become pregnant.

Dr. Tran explains that "some couples find that they have been missing the most fertile days when trying to become pregnant" (1). Therefore, Dr. Tran suggests that Sierra keep track of her menstrual cycle and ovulating period so that the next time they return to the clinic, Dr. Tran will decide if they will need to continue with infertility tests. After a few months, Sierra and Carlos meet again with Dr. Tran who informs them that the next step is to consider infertility tests which include both their medical histories, getting a physical exam, blood or urine tests, and a semen analysis (1).

After Sierra meets with the obstetrician and Carlos meets with the urologist, they both see a reproductive endocrinologist who refers them back to Dr. Tran. After their appointment, Dr. Tran informs Carlos that he is infertile. His semen analysis report shows that the volume, sperm count, sperm morphology, and pH are all fine, but Carlos has decreased sperm count



Image from Surrogacy Centre India

"Low sperm motility means sperm can't move properly and may not be able to reach and fertilize an egg."

and low motility, which are both factors in their struggle to conceive (2).

Dr. Tran informs Sierra and Carlos that "many things contribute to infertility including sperm motility, which is the sperm's ability to move quickly and in a straight line" (3). Therefore, she tells Carlos that since he has low sperm motility, this means his sperm can't move properly and may not be able to reach and fertilize an egg (3).



Image from Ferticity IVF & Fertility Clinics.

"EDCs have proven to show a drastic reduction in sperm concentration, motility, and morphology."

Carlos does not take this distressing news well as not only is his masculinity bruised, but he also has disappointed Sierra by not giving her the family she always dreamed of having; (even though it is not entirely his fault, as both his genes and the environment play a part in his infertility).

Carlos listens as Dr. Tran mentions that one reason for having low sperm count and motility is due to EDCs which are found in the environment and possibly in Carlos's lifestyle choices. Some factors that can contribute to Carlo's infertility may result from smoking, drinking an excessive amount of alcohol, or even being prone to obesity. However, she reassures him that from his medical history and physical exam. neither of these reasons would be the cause of his infertility.



Therefore, Dr. Tran attempts to discuss of the more biological elements that can play a role in his infertility, such as exposure to EDCs found in environmental contaminants and chemicals, "which can be directly toxic to gametes (eggs and sperm), resulting in their decreased numbers and poor quality" (2).

She continues explaining that susceptibility to EDCs "may result in oxidative stress and endocrine system disturbance, which can have an impact on human reproduction and development" (4).

As both Sierra and Carlos are determined to learn about Carlos's infertility, Dr. continues Tran explaining that unfortunately, more research is being conducted on women's infertility and mentions that "the epidemiological data on sperm quality in relation to EDC exposure remains limited" (5).



However, she continues by noting that there are a number of animal, clinical, and epidemiological studies that have demonstrated the relationship between EDC exposure and malfunctions of the male reproductive system (specifically spermatogenesis, the production of sperm) (6).

These in vitro "animal studies have shown that **EDCs** (such as PCBs. pesticides, and phthalates) have strong reproductive toxicity through steroid hormone synthesis," since they can mimic reproductive hormones to impair sperm conditions, movement, and morphology (6).

Dr. Tran further explains that preclinical analyses have shown that BPA

endocrine-disrupting effects can block control potential pathways that spermatogenesis in the male reproductive system (4). She continues by bringing up organochlorine pesticides and PCBs found in air and food that have been proven to cause reductions in sperm concentration and formation (4).

Dr. Tran mentions that even parabens, "a class of preservatives are frequently employed in cosmetic, medicinal. and personal care products such as toothpaste, shampoos, shower gels. moisturizers, lubricants, makeup. and topical and parenteral pharmaceuticals" (4). Various in vitro and in vivo studies have shown the association between parabens and abnormal morphology of spermatozoa with high DNA damage, including extremely decreased levels of spermatozoa both motile and male testosterone levels (4).



EDCs Influence Across the Lifespan, Including Transgenerational Effects:

Environmental toxicants, such as EDCs, mimic the body's hormones and interacts with genetic susceptibility across the lifespan (green arrow) to cause infertility. Principally, "exposures during sensitive developmental windows can disrupt the body's programming and result in long-term metabolic dysfunction and infertility in both the exposed individual as well as future generations (black arrows)" (5). Dr. Tran continues by summarizing the World Health Organization's

variety of ways that a male's reproductive system may lead to infertility:

- 1. A hindrance in the reproductive tract from an injury or infection creating defective ejaculation of semen.
- Hormone disturbance from EDCs affects "testosterone that regulates sperm production" which can cause pituitary or testicular cancers.
- 3. Testicular deficiency to generate sperm.
- Abnormal structure, performance, and capacity of sperm (2).



Therefore, Dr. Tran concludes that unfortunately Carlos has been exposed to a variety of unavoidable EDCs throughout his lifestyle and environment. Many of these environmental toxins are persistent and have shown a decreasing trend in male fertility by lowering sperm counts and sperm quality (4). As a result, she adds that it is difficult to track the exact reason for his infertility as there are many genetic and environmental factors at play.

Sierra looks at Carlos with teary eyes and grabs Carlos's hand and Dr. Tran attempts to calm Carlos as he is almost on the verge of tears knowing that he might not be able to give Sierra the big family she always dreamed of having. She clarifies that it is not Carlos's fault for being infertile and in fact, mentions that the American Society of Reproductive Medicine estimates that although a third of U.S. infertility cases are unexplained the majority of male infertility is due to having few or no sperm (7).

Carlos feels a heavy burden as he attempts to absorb what Dr. Tran has been saying, but at this point, Carlos

cannot bear to hear another word. He zones out and analyzes the solemnity of this situation. He cannot understand why this is happening to him. He always wanted to become a father and make Sierra wife. the happiest Being psychologically shocked, Carlos Dr. Tran and requests apologizes to that Sierra drive him home. Throughout the car ride home, Carlos makes a checklist in his mind to research more about the direct link between EDCs and infertility, and the media stigma between male and female infertility.

After a couple of months goes by, Carlos reaches out to *Mother* magazine to share his infertility update. He mentions that after doing a lot of research about the media portrayals of male infertility, he decides to create his own webpage as a men's infertility support group. Carlos's webpage is a safe space for men to vulnerably share their experiences and feelings about their infertility and masculinity. Go check out a snapshot of his website on the next page!

Carlos's Webpage/ Blog

Couple's Infertility

Man-to-Man

Q An Infertility Support Group



Carlos Hernandez

My wife and I have had difficulty conceiving for the last 2 years and Honestly. I have been having the most burdensome and challenging time. I never would have thought I would be infertile. I always dreamed of having a big family with my wife— it's all she ever wanted. I feel like I let her down.

Davide Sarti



Carlos, you need to know that you are not alone in this struggle. Your wife clearly cares about you and is here to support you and your relationship. It is important to comprehend that most men "perceive infertility as a particular threat to conventional views of masculinity," and although there is some evidence to support this, there is limited "research into the social construction of male infertility" (1). Although, the issue arrises from media portrayals that contribute to inadequacy of infertility, remember that you are never alone. It's okay to be scared for things we cannot control, but we should grow from our experiences!



Robin Saito

I have been living near the 405 freeway for the last 40 years and I have discussed with a number of fertility specialists who have concluded that EDC exposures have been unequally allocated depending on a number of factors including "race, gender, class, age, and disability" (2). As a result, many marginalized communities, like the one I live in, face more adversity from environmental poverty that exposures and to decreases their ability reproduce.

Therefore, contrary to some women that are vocal about their infertility. I have been ashamed and restricted from sharing my story. This is because in the media. "infertility and masculinity are represented and constructed where men cannot show vulnerability or threat from forces outside their control" [1].

By Tara Aiache Reynaud

X



Olivé Laurent

I rarely go to the doctor because I want people to think I am a strong and capable man who can do things on my own, but the truth is I don't know how I would survive without my wife. That is why when we found out I was infertile. I felt useless. I hate admitting I need help— it makes me powerless and vulnerable.



Hi Olivé. thank you for sharing. What you are referring to is called hegemonic masculinity. which suggests that men are offered a highly restricted set of options in terms of perceiving and representing their bodies and their health" (1). This "includes the denial of weakness or

includes the denial of weakness or vulnerability. emotional and physical control, the appearance of being strong and robust, dismissal of help, and the display of aggressive behavior and physical dominance" [1]. My advice: it's okay to be you. Ignore the media representations of infertility and maybe talk to your wife about other alternatives if you both still want kids.



The Endocrine Fertility Clinic

By Brittney Hun

The Endocrine Fertility Clinic is dedicated to educating you on your endocrine and reproductive system! We want to empower those with a uterus to be proactive about their healthcare and fertility! Open and affirming to folks from all walks of life. We are aware that seeking assisted reproductive technologies (ART) are a socioeconomic privilege and the Endocrine Fertility Clinic wants to help you on your journey.

In Vitro Fertilization (IVF)

In-vitro fertilization is frequently used as a first line of therapy for infertility but that is not the only thing our clinic does. While we do have world-class fertility specialists we also have primary care physicians on hand to keep track of your case and make sure you are healthy in other aspects of your life as well. We are aware of the risks of injecting more hormones into your body that can disrupt other systems.

Endocrine Education

The ovary is an endocrine organ, ovulation is an endocrine-mediated process, and common mechanisms of EDC toxicities include decreased hormone synthesis and antagonism of hormone receptors (1). EDCs can disrupt the processes of ovulation, and the exposures can occur at many different levels. We want the patients at our clinic to know why they are infertile and how to possibly reverse it.

Other Theraputic Options

Medications to induce ovulation would be another option for our patients. These medications are typically the first line of therapy for those with PCOS and endometrial conditions (2). This pharmaceutical option may also be able to increase egg production, but we may discuss other options for patients as well. We are interested in whole health care!





DOWN

1. A common cause among both women and men; not being able to get pregnant or conceive after one year, or longer, of unprotected sex.

2. An infertility risk factor.

3. A South American root known to relieve postmenopausal symptoms and increase libido.

4. Substances produced and transported throughout an organism to signal cells and tissues into action.

7. A UV filter used in sunscreens and lotions.

8. A hormone that plays an important role in the sexual development and regulation of the female reproductive system.

9. Found in plastic water bottles or food can linings and can potentially interfere with the hypothalamic-pituitary-ovarian axis.12. An infamously toxic metal found in lipstick.

13. The sperm's ability to move quickly and in a straight line which can affect fertilization if the sperm cannot reach the egg.

ACROSS

5. A label used to mask the presence of phthalates in cosmetics.

6. A form of violence against minorities that contributes to EDC exposure and inhibits accessibility to efforts that could alleviate and mitigate its impacts.

8. A common disease where the uterine lining grows on the ovaries, fallopian tubes, or small intestine.

10. The male reproductive gamete (formed in the testicle) that unites with an egg to form an embryo.

11. An antioxidant found in dark leafy greens that helps the liver metabolize estrogen.

14. Found in breast tumors and have aided their growth.15. Non-cancerous but can contribute to pregnancy complications and infertility, in addition to pain and bleeding.

Mother | 38



Mother's Sara Lacy mediated a conversation between agricultural worker, Andrea Lopez, and fertility expert, Steve Anki. They discussed Andrea's life as an agricultural worker, current understanding of pesticides, fertility troubles, and the relationship between infertility and exposure to endocrine disruptors like EDCs.

SARA LACY: Hello. Thank you to both Steve and Andrea for coming to our show today. Hopefully we can shed some light fertility and pesticides. Why don't you both start us off with a brief introduction about your expertise and experience.

STEVE ANKI: Hi Sara, thank you. My name is Steve Anki, and I have spent the past 20 years researching the influence of endocrine disruptors, like pesticides, on reproduction. Happy to be here.

ANDREA LOPEZ: My name is Andrea Lopez, and I am employed by Nut-Butter Farms in Salinas Valley, California. ANDREA (cont): I am employed as a picker, which means I pick prunes, and apply pesticides to all of our produce.

SARA: Andrea, you mentioned you were struggling with fertility troubles. Can you tell us a little bit more about that?

ANDREA: Yeah, I have been trying to get pregnant for several years now. My husband and I have no idea what is going on. We've been looking into options like IVF, but we can't afford their high fees. I was worried that my job might be impacting my chances at getting pregnant so I tried to do my own research on fertility. I got lost and overwhelmed when trying to navigate all of the information that is available online. I have no idea where to get the information I need to understand why we are having a hard time conceiving.

Ask an Expert

SARA: Steve, do you have any advice for Andrea?

STEVE: Yes, I do. Before we dive into infertility, can you tell me a little bit more about your day to day life?

ANDREA: Yes. My day starts at 6:30AM. This season we are harvesting strawberries, so I spend my morning handling the strawberries and packing them into boxes. Then, after our 10:30AM lunch break, I spend the next 5 hours in the fields until dinner time when I can relax at home.

STEVE: What kind of position and activities do you have in the fields?

ANDREA: Well, each worker has a specialized role, but my job is to spray the crops with pesticides.

STEVE: And your uniform? Do you normally wear proper protective gear?

ANDREA: Yes... although it gets very hot in Salinas wearing all of the gear. Due to climate change and rising temperatures, the number of days where temperatures exceed workplace safety limits is rising. And even when temperatures are lower, wearing all of the gear gets stifling. In between rounds of spraying, I take off my gloves in order to wipe the sweat from my face.

STEVE: Okay, I am going to stop you there. From what you've been saying, I am getting a much better idea of why you have been having difficulty conceiving. Your daily exposure to pesticides can directly impact your fertility



STEVE (cont.): Past research by Dr. Joseph Pizzorno established that environmental toxins, like pesticides, contribute to infertility by impairing the endocrine system, harming both male and female reproductive systems, and damaging fetal formation (1).

SARA: Steve, just to clarify, pesticides are considered endocrine disruptors? Could you educate the audience about the mechanics behind pesticides and infertility?

STEVE: Certainly. Yes. pesticides are considered endocrine disruptors because they directly influence your body's hormones. Your hormones are responsible for signaling and coordination between different parts of your body. For this scenario, we are focusing on how pesticides impact the hormones that are related to reproduction and fertility. Pesticides impact reproduction through several different avenues. The first is through disrupting hormone synthesis, transport, and binding activity (2). This study found that the pesticide fenarimol decreased the number of follicles in rats, reducing fertility (3). DDT also impacts rat menstrual cycles (3). Methoxychlor, a different pesticide, obstructs follicular development and estrogen receptors (4). Thus, there are a number of different ways that pesticides can impact your reproductive system.

Ask an Expert

SARA: Steve, a number of the studies you cited are animal studies. How can we apply information about animals to humans?

STEVE: That is a great question, Sara. Animal models can be very powerful tools for understanding the impact of EDCs on the human body. We are so biologically similar, that many animals like rats or fish are considered indicators that can predict the impact of EDCs on humans (5).

SARA: Which pesticides should Andrea be most cognizant of?

STEVE: The most harmful ones are chlorinated pesticides and organophosphate pesticides and herbicides (1).

SARA: Andrea, did you have any idea about this information? Are pesticide health risks properly communicated to you in your workplace?

ANDREA: For the most part, no. Many of the other pickers are undocumented and the majority of workers are not fluent in English. Most of the information given to us is in English which makes it very hard for everyone to understand. I am lucky that I am fluent in English and can understand the safety instructions but had no idea about the link between infertility and pesticides. Many of the other women who work with me would be shocked to hear this.

STEVE: Do you have access to adequate health care?

ANDREA: This varies on a case-by-case basis.



ANDREA (cont.): Personally, I do and am very lucky to be in this position. But, because so many of the people I work with are undocumented, they are hesitant to seek out health care. The absence of quality health care coupled with insufficient safety information leaves many people vulnerable.

SARA: I actually have some statistics here to give our audience a deeper understanding of how societal factors shape pesticide exposure. An estimated 34 of all folks working in the agricultural industry are born outside of the US (6). 71% of these people cannot speak English well (6). 50% of these workers are not authorized to work here legally (6). If workers are not able to fluently speak English, how can we properly educate them about health risks associated with their occupation? There needs to be a way for folks to access information in an understandable way and seek medical treatment without fear of deportation. Pesticide safety is such a significant issue that it was recently the subject of a major lawsuit. Andrea, do you know anything about this lawsuit?

ANDREA: Yes, I do actually. I am a member of one of the farmworker unions that was represented by Center for Food Safety, Center for Biological Diversity against the US Environmental Protection Agency (7).

Ask an Expert

ANDREA (cont.): The lawsuit was filed because the EPA failed to properly test sulfoxaflor before approving the pesticide (7). The judge found that the EPA violated federal acts (7). This was very disheartening to hear as a worker. We count on the EPA to strictly monitor all pesticides before they hit the market because we, along with millions of others, are directly impacted by their decisions. This history of inadequate testing and neglecting our safety is part of a larger narrative addressing the social factors that influence health and safety, particularly for lowincome minority communities.

SARA: Andrea, you said that so well. Your experiences coupled with Steve's understanding of the biology behind fertility has crafted this comprehensive story of social and biological forces that contribute to infertility. One last thing before we end, Steve, do you have any advice for our listeners and Andrea for ways to reduce pesticide exposure?

STEVE: That is a great question. There are several small but significant changes you can make that will drastically reduce your exposure. The first is to buy organic fruits and vegetables if you are able to. A Harvard Study found that consuming pesticide residues on fruits and vegetables directly impacts fertility (8). Additionally, it is very important to wash your fruits and vegetables to get rid of as much of those residues as you can (9).



ANDREA: It is also important for people to continue advocating and voting for additional protective measures to protect agricultural workers. Currently, the Agricultural Worker Protection Standard is the most important federal measure for agricultural workers, and it took years of advocating for it to be reinforced with additional guidelines to adequately protect workers (10). We would appreciate your support in whatever form that may be - voting, advocating, and calling upon your elected officials for stricter enforcement of pesticide regulations.

SARA: Thank you so much to both of our guests Andrea and Steve. It was a pleasure having you on our show, and if you want to learn more about EDCs and their direct impact on male and female fertility please check out the rest of our magazine.



Crossword Answer Key



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MOTHER ENDOCRINE DISRUPTORS & INFERTILITY

Thank you for reading our magazine!

Hope you learned more about EDCs and their impacts on our bodies.

> Tara Aiache Reynaud Ryle Eskander Brittney Hun Sara Aoki Nare Arakelian

Professor Rensel SOCGEN 108 CAPSTONE WINTER 2023



ENVIRONMENT

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