

XENOBIOTICS AND DISEASE

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Our understanding of the interaction of the environment and our health keeps improving as we keep asking questions and probing into the whys and hows. Another term in the lexicon is the concept of xenobiotics.

Definition.

A good working definition is taken right from the excellent review on the subject by Štefanac et al¹: “compounds of synthetic origin, usually used for domestic, agricultural, and industrial purposes; in the environment, they are present in micropollutant concentrations and high concentrations (using ng/L to µg/L units).”

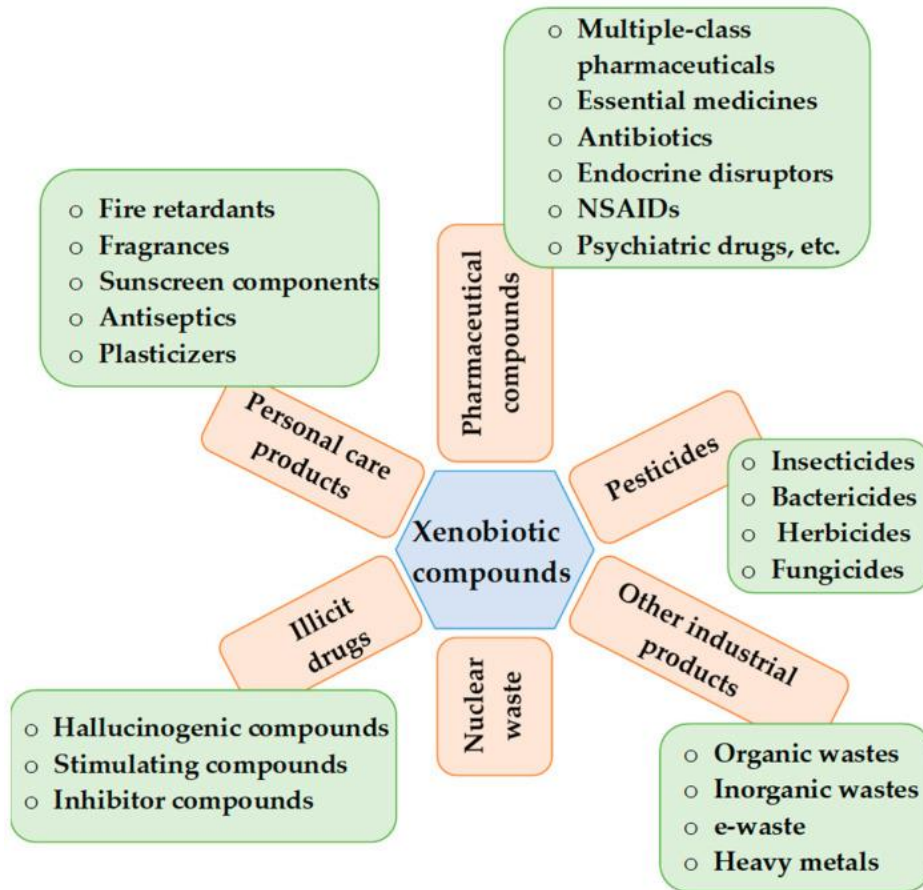


Fig taken from Štefanac

This encompasses a whole panoply of chemicals that we use, including antibiotics. Whether we voluntarily ingest a product, or it gets into our system through inhalation, the food chain, drinking water from the aquifer, or as a hair product matters not. What makes the ultimate difference is our ability to handle the product and or any lingering or residual side effects, predictable or not.

Pathology.

The major problem with xenobiotics stems from the limited ability of living organisms to properly proceed with effective degradation. Partial degradation is insufficient and may even be more harmful^{2,3}. Of particular concern to us is a group of personal care products and hair straighteners

that African American females use to maintain curls. The chronic use of hair relaxers comes with a plethora of health issues⁴. The data started coming out timidly in the 1990s and have recently exploded. The Black Women's Health Study from the Boston University Slone Epidemiology Center was started in 1995 and has enrolled 59,000 African American women (<https://www.bu.edu/bwhs/>). It first allowed the observation of the discrepancy in the onset of puberty between young African American girls compared to their white counterparts⁵. We would have to wait fourteen years later to make the association between exposure to hair products containing female hormones and the early onset of puberty⁶. Breast and uterine cancer are especially targeted by hair products.

Cancer.

An association between breast cancer and the use of hair products keeps coming up with alarming regularity^{7,8}. Both hair dye and hair relaxers have a deleterious effect where frequency, as well as duration of exposure, increase the risk of cancer. The presence of ingredients capable of hormonal activities seems to be the determining factor^{9,10,11}. African American women are known to have aggressive breast cancer and, unfortunately, tend to have it at a more advanced stage by the time the diagnosis is made^{12,13}. Finding any risk factor and eliminating it is a worthwhile endeavor.

A seminal longitudinal study, the Sister Study (sisterstudy.niehs.nih.gov), an NIH-sponsored study that enrolled more than 50,000 women from 2003 to 2009 seeking to find ways to prevent breast cancer, released a paper in the Journal of the National Cancer Institute in December 2022 and it clearly showed that among African American women who use hair relaxers, the rate of uterine cancer is twofold¹⁴!

Other interesting findings.

Wise et al. found an increased risk of fibroid uterus with the duration and frequency of hair relaxers' use¹⁵. Helm et al. did an exhaustive review¹⁶ of the chemicals commonly found hair care products and this quotation warrants our attention: "Assessing exposures to EDCs (Endocrine Disrupting Chemicals) and asthma-associated chemicals for Black women is important given the higher incidence of hormone-mediated diseases and higher prevalence of asthma...in Black women and children. When considering conditions potentially impacted by EDCs, U. S. Black women have higher rates of obesity ...diabetes ... and pre-term birth ...than U.S. White women." In addition, the review bears out that the chemical composition of such consumer products varies from one another, and very often, the complete list of chemicals included in the products is not listed.

Conclusion.

The above data make it clear that discrepancy in exposure to xenobiotics does contribute to different risk levels between African Americans and Caucasians.

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