**Recent results on sunscreens --- questions and options**

We know that sunscreen is valuable for reducing the risk of skin cancer if we are going to be in the sun. But with the wide range of choices, what are the active ingredients and how do we select products that may be best for you? A recent article in the Journal of the American Medical Association brings attention to these questions. Researchers at UMass-Amherst and Baystate Medical Center are also studying the effects of chemicals in sunscreens that affect breast health.

**Are chemicals in sunscreen absorbed into our bodies?**

The authors recruited volunteers who were asked to apply over-the-counter sunscreens to represent use similar to what would be appropriate if you were at the beach and in the sun most of the day (4 applications each day over 75% of their bodies for 4 days). Blood was drawn at multiple times to determine if components in the sunscreen were absorbed into blood, and therefore, might reach other parts within our bodies. Of the chemicals in the sunscreens tested for, oxybenzone was found to be absorbed within 30 min and reached the highest levels in blood. Levels of oxybenzone dropped rapidly after applications were stopped. So oxybenzone is an effective sunscreen that protects from skin cancer, but can also be absorbed into our bodies. This underscores the benefit as well as questions about the potential for other effects of this and related chemicals. As a result, there is an ongoing debate regarding the use of products containing this class of chemicals.

**What is oxybenzone and is it a concern?**

Oxybenzone, also listed as benzophenone-3 on labels, is a chemical that absorbs light and protects the skin from the harmful effects of UV radiation. Most is excreted from our bodies within 1-2 days, and therefore, exposure to it is limited to the periods of use.

But oxybenzone is used in a variety of personal care products because it also protects products from breaking down when exposed to UV light during use or storage. As a result, oxybenzone is found at detectable levels in 97% of women, according to the National Health and Nutrition Examination Survey. It is also present in breast milk of nursing mothers as well as in blood of fetuses of pregnant women. So it is not just sunscreens that one needs to consider, but the host of personal care products we use. A short video entitled “Skin deep??” produced in collaboration with Girls Inc of the Pioneer Valley can be found on YouTube (<https://www.youtube.com/watch?v=qZK50kIvsLs&feature=youtu.be)> or at <http://bit.ly/GirlsIncSkinDeep>.

The overriding question is whether oxybenzone may cause harm. This is a much more difficult question. The FDA sets standards for exposure to oxybenzone, and the participants in the study had levels that exceed that threshold after a single day of sunscreen application. The FDA thresholds include a “safety factor” and are far below the point where there is any overt toxic effect in animal studies or cell-based experiments. Furthermore, the consequences likely varies among individuals. Oxybenzone was voted “contact allergen of the year” by the American Contact Dermatitis Society in 2014. Approximately 1% of people show an allergic skin reaction to oxybenzone. So a small number of people exhibit adverse effects at levels that have no apparent effect in the majority of people.

Nonetheless, at high levels, oxybenzone can mimic some activities of estrogen. And thus, there is some cause for concern that it could promote breast cancer. But estrogen is a normal hormone in a woman’s body, so it is not immediately clear whether oxybenzone may pose a significant risk. For premenopausal women, typical levels of benzophenone contribute minimally compared to the potent activity of the body’s own estrogens. However, for postmenopausal women where estrogen levels are much lower, exposure to additional estrogen-like chemicals might be of some concern. Even among postmenopausal women, it is likely that risk might be limited to a small number of individuals who are more susceptible to oxybenzone. Given the widespread use of sunscreens containing benzophenone, if there were a generalized risk, it would likely be more evident in the overall incidence of breast cancer.

**What are our options?**

It is not just sunscreens that you should consider. If you are concerned, you should look at all of your personal care products. It is usually listed in the ingredients as either oxybenzone or benzophenone-3.

For sunscreens, you can weigh the effectiveness of products. Depending on your needs, products containing oxybenzone may be best as it is likely used for a limited amount of time. Alternatively, there are a variety of sunscreens that do not contain oxybenzone. Products containing zinc oxide or titanium dioxide are generally regarded as safe and effective. Some alternative sunscreens may require more frequent applications. Therefore, you should read instructions carefully and use as directed to avoid a sunburn.

Links to references and information can be found at <http://pvlsi.org/featured-stories>.

Reference: JAMA. 2019 May 6. doi: 10.1001/jama.2019.5586. Effect of Sunscreen Application Under Maximal Use Conditions on Plasma Concentration of Sunscreen Active Ingredients: A Randomized Clinical Trial. Matta MK, Zusterzeel R, Pilli NR, Patel V, Volpe DA, Florian J, Oh L, Bashaw E, Zineh I, Sanabria C, Kemp S, Godfrey A, Adah S, Coelho S, Wang J, Furlong LA, Ganley C, Michele T, Strauss DG.

Links to the article by Matta et al. can be found at <https://jamanetwork.com/journals/jama/fullarticle/2733085> and the abstract is available on PubMed at <https://www.ncbi.nlm.nih.gov/pubmed/31058986>.

Link to the accompanying editorial with additional information: <https://jamanetwork.com/journals/jama/fullarticle/2733084>