



Breast Cancer Risk from Chemical Sunscreen Use:

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Professor Philippa Darbre is Professor Emeritus (Oncology), in the School of Biological Sciences, at the University of Reading. Her research interests centre on the molecular and cellular mechanisms of action of oestrogen and oestrogen-mimicking chemicals in human breast cancer cells, with a main focus on the ingredients contained in underarm cosmetics.

Q. Can you tell us what your recent research found and why this work is important?

Our recent work investigated whether four commonly used UV filters were present in breast tissue from 40 women who'd undergone mastectomies due to breast cancer diagnosis. We took measurements in 3 different locations across the breast to see if they were more heavily distributed at specific sites where breast cancer is most common. **We found one or more UV filters were measurable in 84% of tissue samples—at least one breast region for 95% of the women.** These UV filters have been shown to be oestrogenic, and their presence in human breast tissue suggests their potential to influence breast cancer development.

Q. The fact that they're there and not easy to get rid of is annoying, but are they a cause for concern?

The problem is that UV filters are known to be endocrine disrupting chemicals or EDCs, which can mimic natural oestrogen found in our bodies. Lifetime exposure to oestrogen is an established risk factor for breast cancer.

The UV filters, BP-3 (Oxybenzone), OMC, 4-MBC, HS (Homosalate) and OCT, are known EDCs and all possess oestrogenic properties. In separate studies, they have been shown to increase the growth of oestrogen-responsive human breast cancer cells when cultured under laboratory conditions (4, 5).

Furthermore, at levels we recently detected in human breast tissue, BP-3, OMC, and 4-MBC can increase proliferation, migration and invasive properties of human breast cancer cells grown in cell culture (6, 7). **This implies a potential for these UV filters to increase tumour spread. This is especially relevant for breast cancer, where tumour spread is the main cause of mortality.**

Q. So, should we avoid using sunscreen?

The oestrogenic activity of UV filters and their identification in breast tissue suggests they may have the potential to influence breast cancer development, so their regular use –from the application of a personal care product such as moisturiser or wearing impregnated clothing – should be avoided.

It's best to avoid the sun when it's hottest, cover up using a hat and cool long sleeves etc. However, if you cannot cover up, you could consider using an old-fashioned zinc oxide-based sunscreen

References

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7. Alamer, M. and Darbre, P. D. (2018). [Effects of exposure to six chemical ultraviolet filters commonly used in personal care products on motility of MCF-7 and MDA-MB-231 human breast cancer cells in vitro](#). Journal of Applied Toxicology 38(2): 148-159.

Further Reading: [Effects of exposure to six chemical ultraviolet filters commonly used in personal care products on motility of MCF-7 and MDA-MB-231 human breast cancer cells in vitro - PubMed \(nih.gov\)](#)

Benzophenone (BP)-1, BP-2, BP-3 (Oxybenzone), octylmethoxycinnamate (OMC), 4-methylbenzilidenecamphor and homosalate are added to personal care products to absorb ultraviolet light. Their presence in human milk and their oestrogenic activity suggests a potential to influence breast cancer development. As metastatic tumour spread is the main cause of breast cancer mortality, we have investigated the effects of these compounds on migration and invasion of human breast cancer cell lines. Increased motility of oestrogen-responsive MCF-7 human breast cancer cells was observed after long-term exposure (>20 weeks) to each of the six compounds.