HIGH SCHOOL EDITION
Journal of Student Research
Volume 13 Issue 3 (2024)

Unintended Consequences of Sunscreen: Exploring the Hidden Impacts

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ABSTRACT

Sunscreen is known for its importance in protecting our skin from the harmful rays that the sun emits. It has the capability to protect our skin from various diseases, such as cancer. However, the effectiveness and safety of certain sunscreen products have started becoming controversial. This is due to concerns of health risks and environmental effects that are caused due to certain toxins consisting in sunscreen. Oxybenzone (BP-3) and Octinoxate (OMC) are two main chemicals that are under review, as they have the potential to act as hormone disruptors. This topic has not been taken seriously due to lack of research. Therefore, it is essential that we start acknowledging all potential short term and long term risks associated with sunscreen, to ensure development of more effective products. This research is a secondary literature review, in which I gathered sources to explore both beneficial as well as harmful effects of sunscreen use. I was encountered with biased information as well as a limited amount of sample size, however I gained a better understanding of why it's important we further the research of this issue. Sunscreen has proven to have positive and negative impacts on society. Certain toxins in sunscreen have harmed coral reefs, affected the food pyramid, as well as affect the normal functions of hormones in our body. I would recommend spreading more public awareness about this topic, so that people are aware of some of the unintended consequences sunscreen may have.

Introduction

Sunscreen is widely known as its vital role in protecting skin cells from the damaging effects of UV radiation that the sun emits. While there are numerous benefits of using sunscreen, it is also crucial to acknowledge and investigate potential negative effects, as each individual may react differently to its components. The microbial interactions between ingredients consisting in sunscreen and pathogenic microorganisms could influence numerous virulent factors.

Intense exposure to UV radiation can weaken the skin barrier and create a higher likelihood of certain infectious diseases. Sunscreen serves as an effective method to reduce the risk associated with an excess amount of sun exposure. While sunscreen is beneficial for everyone, people with higher levels of melanin are naturally provided with some protection against the radiation. There are different levels of sun-exposure across the world, which have a significant impact on human evolution. An individual's geographic location, their practices to protect their skin from the sun, and the amount of sun exposure, are all factors that contribute to their overall skin health. Adapting various protective measures that work for each person, is crucial to ensure the health of a diverse population.

There have been many controversies on a certain ingredient that consists in sunscreen, called Oxybenzone (BP-3). Some studies have shown that this chemical compound has been linked to allergies, hormone disruptions, as well as cell damage. There have been numerous examples emphasizing the dangers of BP-3 on human health. For example, the U.S. Centers for Disease Control (CDC) discloses that 97% of Americans are contaminated by this ingredient. However current evidence is not sufficient enough to indicate that high levels

of BP-3 have adverse health effects. There have been many contradictions in studies as well as insufficient information to properly come to a conclusion that Oxybenxone is harmful.

Locally, sunscreen may have an impact on the environment, particularly in coastal areas. Certain ingredients such as oxybenzone have been linked to coral bleaching, and various other negative effects. Therefore, the legislature of the state of Hawaii passed a bill that prevented the distribution of sunscreen containing oxybenzone and octinoxate beginning in 2021 (State of Hawaii, 2020). This was to preserve Hawaii's marine ecosystem, as numerous studies showed the toxins that are polluting the waters. It is now against the law to distribute any type of sunscreen that contains those compounds without a prescription that was provided from a licensed healthcare provider.

Researching potential negative effects of sunscreen on society is crucial as it educates society and ensures public safety. Certain ingredients such as oxybenzone could have a huge risk on humans, as well as the environment. However due to the lack of research and awareness, this topic rarely gets brought up. Promoting the research of sunscreen and certain effects it could induce is significant in order to gain a better understanding of the numerous possible health risks.

Methodology

The goal of this research was to form a better understanding of potential harmful effects sunscreen may have on society. As new information comes into light of certain dangerous chemical compounds existing in sunscreen, it is crucial to start bringing more attention to this problem. This paper is a secondary literature review, in which I found numerous primary sources such as case studies and other research papers. While conducting my research, I began looking for sources that explain both the harmful as well as beneficial effects that are caused by sunscreen use. I made sure to find a diverse range of articles from around the world, to consider the different factors and perspectives that may be involved. This consisted of geographical locations, the use of sunscreen in a particular area, as well as certain restrictions kept in place. I had also focused on environmental impacts, as certain toxins had immense impacts on coral reefs and aquatic animals. Throughout my research, my main objective was to gather information on the different viewpoints of sunscreen use, in order to gain a better understanding of our current situation. Some scientists agree that certain sunscreens pose a threat, while others outright ignore the claims due to inadequate evidence. While locating sources I came across a lot of evidence pointing out certain symptoms that arise due to harmful chemical compounds, however not much is being done about this issue. Throughout my research paper I am advocating for the scientific community to address the research gaps surrounding certain toxins in sunscreen, as it is imperative that we work towards finding safer alternatives that are still effective.

Related Literature

UV Light Causes Thymine Dimers

Primarily, it is important to gain a better understanding on how sunscreen interacts with our skin. When UV light hits our skin, it could mess with thymine, which is our building blocks of our DNA. This could cause thymine bases to stick together, forming a thymine dimer. The formation of thymine dimers damages the DNA structure, making it harder for our cells to read the DNA properly. A case study was created in order to investigate the effects sunscreen has on thymine dimers. The results had stated, "when sunscreen application was omitted even once prior to irradiation, a statistically significant increase in thymine dimer formation was apparent. At 48 hours after irradiation of unprotected skin, 50% of epidermal dimers present 24 hours after irradiation had been removed; at 72 hours, more than 75% were gone"(Mahross, et al. 2022) The study goes on to

explain why regular application of sunscreen is crucial in order to prevent any damage to our DNA. It is important to understand the different types of UV radiations: UVA, UVB, and UVC. UVB radiation is mostly responsible for any direct damage to our DNA, whereas UVA radiation indirectly contributes to DNA damage. UV-C radiation has the highest energy in the UV radiation spectrum. Sun Protection Factor, also known as SPF, is a measure of how well the sunscreen protects the skin against UV-B rays. The SPF number indicates how much radiation is required to create sunburns on unprotected skin. SPF levels vary per person, to determine which rating works best, you would have to multiply the rating by the amount of time it takes for your skin to start burning from the sun. For example, if it takes 10 minutes for you sun to start reddening, without any sun protection, SPF 15 would protect your skin for about 150 minutes ---> (10 * 15 = 150). SPF 30 would provide 300 minutes (10 * 30 = 300), and so on. As mentioned, each person reacts differently to sunscreen, therefore finding a sunscreen that matches your situation is crucial. Melanoma, one of the most serious types of skin cancer, arises from UV rays damaging the DNA present in our skin cells. This is a serious threat, which is why the importance of wearing sunscreen has been getting a lot more awareness these past few years.

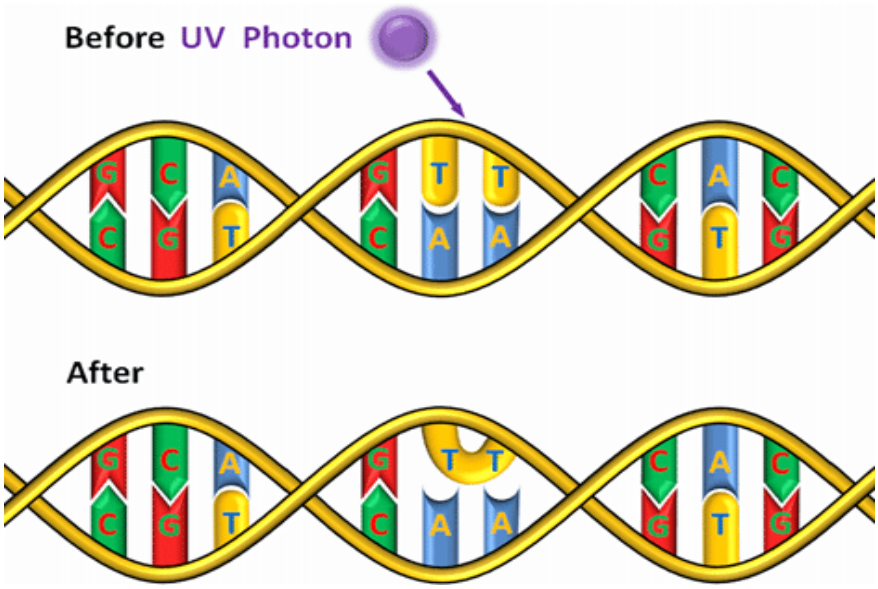

Figure 1. Formation of Thymine Dimers due to the interaction between DNA and UV Photons. (Schmid, et al. 2017)

Local Adaption of Sun-Exposure

Sun-exposure is a crucial factor in the study of human evolution. Studies have shown that sun-exposure has had a huge impact shaping genomic variation, worldwide. Results have proven that some genetic changes in humans are influenced by sun exposure, and have a role in helping humans adapt to their environment (Kita & Fraser, 2016). Over time people are known to adapt to their surroundings. If located in an area with high levels of sun exposure, people generally start to adapt habits to protect themselves from the harmful effects of the sun. One example of this is the production of melanin. Exposure to sunlight stimulates melanocytes, which are the cells that are responsible for producing melanin. The more melanin produced, determines the darkness of the skin tone, which provides some levels of natural protection against UV radiation. This is due to the melanins ability to serve as a barrier that scatters ultraviolet radiation caused by the sun. Epidemiological data has proven that, “subjects with White skin are 70 times more likely to develop skin cancer than subjects with black skin” (Brenner & Hearing, 2008). As discussed earlier, Melanoma is a type of skin cancer, however an individual's

risk can be determined by many different factors, such as skin color. The American Cancer Society explains this factor by stating, “Having lighter skin color is a major risk factor for melanoma. Overall, the lifetime risk of getting melanoma is about 3% (1 in 33) for White people, 0.1% (1 in 1,000) for Black people, and 0.5% (1 in 200) for Hispanic people. “ (American Cancer Society, 2024) Sun exposure has a huge role in human evolution, as well as an individual's reaction to UV radiation. Although our bodies may have some level of natural protection due to melanin production, these adaptations are not sufficient enough against the harmful rays the sun emits. Especially as outdoor activities increase, choosing an effective sunscreen is critical for protection against radiation.

Harmful Chemical Compound Consisting in Sunscreen (Oxybenzone)

Sunscreen is a crucial step to protecting our skin from the harmful UV rays that come from the sun. However research has discovered numerous harmful chemical compounds that have raised concern about its effect on human skin and the environment. Oxybenzone has received a lot of attention recently, as it is a hormone disruptor. Therefore, it has the ability to cross cell membranes and affect the body’s natural hormone production. A recent study held by the U.S. Centers for Disease Control (CDC) had discovered that approximately 97% of Americans are contaminated with oxybenzone, which resulted in cell damage, hormone disruption, as well as allergies. Not only does Oxybenzone have detrimental effects, it is a penetration enhancer, a chemical that assists other chemicals to penetrate the skin (Environmental Working Group, 2008). Oxybenzone is a very common ingredient in sunscreens, as it is found in over 3,500 products world wide. This chemical compound has been seen to absorb through the skin and stay in our bodies about 30 minutes after application, this process is called bioaccumulation. It is when certain toxins that our bodies are exposed to accumulate into a large amount, which could become an unhealthy amount. Oxybenzone has also been shown to cause genetic damage and even deaths, in coral reefs. This compound can accumulate in the tissues of marine organisms, leading to the biomagnification as it moves up the food chain. Biomagnification occurs when a predator consumes prey that contains a high concentration of toxins, which results in the buildup of those toxins in the predator. For instance, if a predator consumes a prey that has a large amount of toxins, the build up of that toxin will then be transferred to the predator. This increases the concentration of oxybenzone, posing a greater risk to the entire ecosystem, including us humans who consume seafood. Certain states, such as Hawaii, have started putting in place regulations that ban certain sunscreens containing those chemicals, as it has shown to be harmful to the environment. The ban had stated, “oxybenzone and octinoxate, have significant harmful impacts on Hawaii's marine environment and residing ecosystems, including coral reefs that protect Hawaii's shoreline. Act 104, Session Laws of Hawaii 2018, bans the sale, offer of sale, and distribution in the State of any sunscreen, excluding facial cosmetics, that contains oxybenzone or octinoxate, without a prescription, beginning January 1, 2021.”(State of Hawaii, 2020). Many products have started excluding numerous toxins, and states have began placing restrictions, as new evidence comes to light.

As mentioned previously, research is very limited on this topic, hence there isn’t enough data to prove the harms that certain chemicals are capable of. Figure 2 provides a chart filled with the number of studies that have some sort of association between Oxybenzone (BP-3), Octinoxate (OMC), and the various outcomes. For example, 1 study has proven that as the concentration of BP-3 in urine increases, kidney functions decrease. The chart also states that 2 studies have shown a correlation between thyroid hormone levels and Ozybenzone. Meaning that high levels of BP-3 were linked to low thyroid hormone levels. The chart highlights a diverse range of association between 2 common toxins (BP-3 & OMC) and possible outcomes. These findings emphasize the need for further research, in order to gain a better understanding of potential health impacts.

Table 2.

Number of human studies about the association between urinary concentration of oxybenzone (BP-3) or octinoxate (OMC) and the physiological outcomes. n=16 (duplicate excluded)

Target effect	Statistically significant association		No statistically significant association	
	BP-3	OMC	BP-3	OMC
Thyroid hormone level	2 (↓↓)	0	3	1[a]
Pubertal onset	2 (↓↓)	0	0	0
Male reproductive hormone level	1 (↓)	0	1	1[a]
Female reproductive hormone level	0	0	2	1[a]
Kidney function	1 (↓)	0	0	0
Fertility	0	0	4	0
Childhood adiposity	0	0	1	0

In parenthesis, ↓ indicates a negative correlation with elevated BP-3 level. ↑ indicates a positive correlation with elevated BP-3 level.

Figure 2. Number of studies that show relations between two toxins (BP-3 and OMC) and their potential effects. (Suh, et al. 2020)

Chemical Compounds in Sunscreen that are Overlooked / As Well as Alternatives

Fortunately, the harmful effects that are created due to Oxybenzone are slowly being recognized due to new-found evidence and research. Although, there are numerous other compounds that are overlooked due to lack of examination. Sunscreen is a product that is meant to be used repeatedly each day for a lifetime, in order to protect our skins from the Ultraviolet-Rays. Therefore, it is important that companies test regularly, to check for any short-term or long-term health risks. As seen in Figure 1.1 Oxybenzone, Octinoxate, homosalate, octisalate, octocrylene, and avobenzone, were all classified as not safe and effective in 2019, by the Food and Drug Administration (FDA). However they are still under observation, hence not much is being done. Figure 4 lists a few active ingredients that are commonly seen in many household products, such as nail polish and hair care products. The chart explains potential threats, as well as its role in protecting the skin from sunscreen. A common similarity seen in these components is its effect on certain systems in the human body, however due to lack of research, these ingredients have not received much awareness. While there are a list of harmful toxins found in some sunscreen products, there are also many products that are safe and effective. For example, Zinc Oxide and Titanium Dioxide have been approved as effective against UVA and UVB radiation. Knowing the difference between harmful and beneficial chemicals is important in order to find proper sunscreen/skin-care products. As our world is becoming more and more advanced, certain alternatives have been created. Microencapsulation of sunscreen has shown a significant amount of benefits, such as safety and overall experience of a sunscreen product. Chemical sunscreen contains chemical ingredients that are directly mixed into the sunscreen. These ingredients absorb UV radiation, converting it into heat, which is then released from the skin. Whereas encapsulated sunscreens contain chemical UV filters that are enclosed within capsules. This reduces the risk of skin irritation, and enhances the stability of active ingredients, such as oxybenzone and octinoxate. Oxybenzone and a few other elements of sunscreen have started to receive attention, however these chemicals that have shown the potential to be harmful have been overlooked.

Chemical	FDA 2019 proposed classification as safe and effective	Skin penetration	Hormone disruption	Skin allergy or other concerns
Oxybenzone	No	+	+	+
Octinoxate (Octyl methoxycinnamate)	No	+	+	+
Homosalate	No	+	+	+
Octisalate	No	+	–	–
Octocrylene	No	+	–	+
Avobenzone	No	+	+	+
Titanium dioxide	Yes	–	–	+ Inhalation concerns
Zinc oxide	Yes	–	–	+ Inhalation concerns

Figure 3. FDA's classification of health Concerns associated with certain active ingredients in sunscreen (EWG 2018)

Chemical Compounds	Commonly Found in / Use of ingredient	Harmful Effects
Octinoxate	<u>Commonly Found in:</u> ● Lip Balms ● Nail Polish ● Sunscreen ● Hair products (Hair dye, shampoo, etc.) ● Moisturizers (as well as other skin care products) <u>Use of ingredient:</u> ● Protects the skin by absorbing Ultraviolet-B rays from the sun. ● This ingredient is also used in products other than sunscreen, such as cosmetics, as it protects the product from degrading when exposed to sunlight.	● Octinoxate drastically increases cell proliferation (a process in which skin cells repair) when triggered by estrogen exposure. However a large amount of estrogen exposure creates a risk factor of developing breast cancer. ● Studies have proven that octinoxate has a negative effect on reproductive organs, for both male and female, which could be passed onto their offsprings. ● Octinoxate is also an Endocrine Disruptor. Meaning it drastically increases cell proliferation. ● Absorption of this chemical can be seen as it is detected in human urine, blood, and breast milk. This raises concerns of long-term impacts.
Homosalate	<u>Commonly Found in:</u> ● Sunscreen	● Homosalate, similar to Octinoxate, has an impact on the estrogen system.

	• Skin Care products with UV ray protection Use of ingredient: • Homosalate protects the skin from short-wave UVB rays which have the potential to damage DNA and increase the risk for skin cancer.	• Breast cancer cells grow in response to estrogen. • Exposure to homosalate creates 3.5 times more cell multiplications, which poses a huge threat. • Studies have started to recommend young children and pregnant woman to avoid any skincare products with this this chemical compound
Benzophe-none	Commonly Found in: • Baby Sunscreen • Fragrance • Hair products (Conditioner, hair spray, shampoo, etc.) • Lip balms • Nail polish Use of ingredient: • Benzophenone is a very common product throughout various household products. • In certain fragrances it is used to retain the scent when exposed to UV radiation. • Oxybenzone is derived from Benzophenone, both ingredients are used in nail polish and lip balm to prevent any changes when hit with UV light.	• California EPA's Proposition 65 list includes benzophenone as a cancer risk. • This ingredient has the ability to harm the endocrine system, which regulates many bodily functions such as reproduction and metabolism. • Studies in adult rats show that benzophenone are linked to estrogen activities, however the European Commission on Endocrine Disruption decides there is not sufficient evidence supporting this claim.

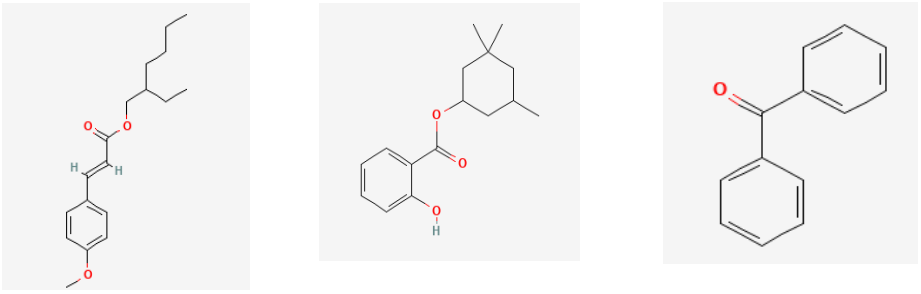

Figure 4. The harmful effects of certain chemical compounds consisting in sunscreen, as well as its use. (Kallat 2024)

Results

There is currently not enough evidence to corroborate the claim that the chemical compounds in sunscreen pose a risk factor for human health. However the Food and Drug Administration (FDA) has been reviewing certain components such as oxybenzone and octinoxate, as it has started receiving more and more attention for its

harmful reactions. There have been significant negative correlations between certain toxins in sunscreen and adverse health effects, making these findings alarming as sunscreen is a very common product that is used worldwide. Sunscreen plays a huge role in protecting our skin, especially by preventing formation of thymine dimers, which have the ability to cause damage to our bodies DNA. Studies prove that regular application of sunscreen can significantly reduce formation of these dimers. Geographic locations also play a role with sun exposure and skin cancer risk, due to individuals with higher levels of melanin, having a natural barrier against UV radiation. Those with lighter skin tones are proven to be more likely to develop skin cancer, showing the importance of wearing proper sunscreen.

The chemical compounds that exist in sunscreen, particularly oxybenzone (BP-3) have been associated with numerous health concerns, such as hormone disruption. The U.S. Center for Disease Control (CDC) claims that Americans have high levels of oxybenzone in their bodies, which raises many concerns, such as accumulation. There are multiple other compounds, such as octinoxate and homosalate that have been associated with potential risks to human health. “California's Proposition 6,” lists Benzophenone as a cancer risk, which is shocking, as it is used in many common household products, such as nail polish, hair care products, and cosmetics. Along with human impacts, environmental impacts are also crucial to acknowledge. Chemicals like oxybenzone and octinoxate contribute to coral bleaching and have many toxic effects on marine life, such as biomagnification. This process in organisms poses as a risk to not only predators, but also to humans. Hence, many places, such as Hawaii, have instituted bans and other methods to stop the spread of toxins in our environment.

There have been many innovations in the formulation of sunscreen, such as encapsulation, which is reassuring as it shows us improvement in the stability and safety of sunscreen. These alternatives reduce risk of skin irritation, as well as enhance the effectiveness of the product. Therefore, a continuance in research is evident to gain a better understanding of both long-term and short-term impacts of sunscreen ingredients, as well as to safely create alternatives.

Conclusion

There is no doubt that sunscreen is an essential component for protecting our skin against the harmful effects of UV radiation. However, there have been concerns regarding potential health and environment risks posed by certain chemical compounds in sunscreen products. Continuing ongoing research is essential to identify safer alternatives and ensure public health, as well as environmental safety. As worldwide skin-cancer rates start to increase, we start to grasp the seriousness of proper skin protection. Public awareness is crucial in order to inform society about the potential risks associated with certain chemical compounds in sunscreen. By educating the public and encouraging them to use safer alternatives, we can minimize negative impacts on not only the people but also the environment.

Limitations

Throughout the process of this research I have encountered numerous online sources that provided me with a better understanding of the potential impacts sunscreen could have on the world, through humans, as well as the environment. However, as mentioned before, this topic hasn’t been taken seriously due to limited research. When locating sources, a problem I repeatedly faced was a lack of long-term studies on the effects the ingredients have on humanity and the environment. There were not many variability in studies, making it hard to identify all potential risks. Many studies were either biased, or had limited sample sizes, making it difficult to find accurate data. The differences of regulation standards across different regions made it difficult to assess

potential risks, as each area has certain ways of collecting data. These limitations highlight the need for more research to fully understand the risks associated with certain sunscreens.

Acknowledgments

This research paper was created with the assistance of Professor Virgel Torremocha and Professor Kathryn Wilwohl, who explained the process of creating a well-written research paper, as well as taught me the principles of infectious diseases. Doctor Wilwohl gave me insight on various different topics that are associated with sunscreen, which was very helpful in making sure that my research paper had a diverse range of topics. Professor Torremocha provided me with valuable information on the different steps that are included in a research paper, he had also taught me how to cite sources with APA citation. I am so grateful for this opportunity to learn more about potential harmful effects certain sunscreen products may pose, as well as how to build a successful research paper. I also want to thank Gifted Gabber for giving me the chance to learn so much more about a topic that is of interest to me. I have always wanted to have a deeper look on sunscreens' interaction with our skin cells, and Gifted Gabber provided me with an opportunity to gain a better understanding of these toxins, as well as educate the public.

References

Al Robaee, A. A. (2010). Awareness of sun exposure and use of sunscreen by the general population. *Bosnian Journal of Basic Medical Sciences*, *10*(4), 314–318. https://doi.org/10.17305/bjbms.2010.2678

Brenner, M., & Hearing, V. J. (2007). The Protective Role of Melanin Against UV Damage in Human Skin. *Photochemistry and Photobiology*, *84*(3), 539–549. https://doi.org/10.1111/j.1751-1097.2007.00226.x

EWG. (2008). *EWG's 2018 Guide to Safer Sunscreens*. Ewg.org. https://www.ewg.org/sunscreen/report/the-trouble-with-sunscreen-chemicals/

EWG's 2019 Guide to Sunscreens. (2019). *EWG's 2019 Guide to Safer Sunscreens*. Ewg.org. https://www.ewg.org/sunscreen/report/executive-summary/

Harvard Health Publishing. (2021, February 15). *The science of sunscreen*. Harvard Health. https://www.health.harvard.edu/staying-healthy/the-science-of-sunscreen

Homosalate. (n.d.). Safe Cosmetics. https://www.safecosmetics.org/chemicals/homosalate/

Kita, R., & Fraser, H. B. (2016). Local Adaptation of Sun-Exposure-Dependent Gene Expression Regulation in Human Skin. *PLOS Genetics*, *12*(10), e1006382. https://doi.org/10.1371/journal.pgen.1006382

Mahroos, M. A., Yaar, M., Phillips, T. J., Bhawan, J., & Gilchrest, B. A. (2002). Effect of Sunscreen Application on UV-Induced Thymine Dimers. *Archives of Dermatology*, *138*(11). https://doi.org/10.1001/archderm.138.11.1480

Pont, A. R., Charron, A. R., & Brand, R. M. (2004). Active ingredients in sunscreens act as topical penetration enhancers for the herbicide 2,4-dichlorophenoxyacetic acid. *Toxicology and Applied Pharmacology*, *195*(3), 348–354. https://doi.org/10.1016/j.taap.2003.09.021

PubChem. (2019). *Benzophenone*. Nih.gov; PubChem. https://pubchem.ncbi.nlm.nih.gov/compound/Benzophenone#section=2D-Structure

PubChem. (n.d.). *Homosalate*. Pubchem.ncbi.nlm.nih.gov. https://pubchem.ncbi.nlm.nih.gov/compound/Homosalate#section=2D-Structure

PubChem. (n.d.). *Octinoxate*. Pubchem.ncbi.nlm.nih.gov. https://pubchem.ncbi.nlm.nih.gov/compound/5355130

Reef Relief | Learn. Explore. Act Now. (n.d.). Reef Relief. https://www.reefrelief.org/understanding-sunscreens/#:~:text=Oxybenzone%20is%20 absorbed%20through%20the

SB2028. (n.d.). Www.capitol.hawaii.gov. https://www.capitol.hawaii.gov/sessions/session2020/bills/SB2028_.HTM

Suh, S., Pham, C., Smith, J., & Mesinkovska, N. A. (2020). The banned sunscreen ingredients and their impact on human health: a systematic review. *International Journal of Dermatology*, *59*(9). https://doi.org/10.1111/ijd.14824

Sander, M., Sander, M., Burbidge, T., & Beecker, J. (2020). The Efficacy and Safety of Sunscreen Use for the Prevention of Skin Cancer. *Canadian Medical Association Journal*, *192*(50), E1802–E1808. https://doi.org/10.1503/cmaj.201085

Sunscreen Questions and Answers - Health & Wellness | Loma Linda University Health. (n.d.). Lluh.org. https://lluh.org/patients-visitors/health-wellness/blog/sunscreen-questions-and-answers