

Potential new sunscreen is coral-safe and provides more UVB/UVA protection

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A new study published in *Scientific Reports* has found that methylene blue, a century-old medicine, has the potential to be a highly effective, broad-spectrum UV irradiation protector that absorbs UVA and UVB,

repairs ROS and UV irradiation induced DNA damage, and is safe for coral reefs. The study suggests that methylene blue could become an alternative sunscreen ingredient that supports the environment and protects human skin health.

80% of today's sunscreens use oxybenzone as a chemical UV blocker, despite multiple studies that have shown it expedites the destruction of [coral reefs](#). Several states and countries have now banned the use of oxybenzone and its derivatives to stop the devastating effects on the world's marine ecosystem. In addition, consumers focus primarily on the [sun protection factor](#) (SPF) to prevent sunburns and potentially dangerous long-term health issues. However, SPF only measures UVB exposure, leaving sunscreen users vulnerable to UVA-triggered oxidative stress and photo-aging.

"Our work suggests that [methylene blue](#) is an effective UVB blocker with a number of highly desired characteristics as a promising ingredient to be included in sunscreens. It shows a broad spectrum absorption of both UVA and UVB rays, promotes DNA damage repair, combats reactive oxygen species (ROS) induced by UVA, and most importantly, poses no harm to coral reefs." says the study's senior author Dr. Kan Cao, Founder of Mblue Labs, Bluelene Skincare and a Professor at the University of Maryland Department of Cell Biology and Molecular Genetics.

The research team, which included scientists from Mblue Labs and the University of Maryland, looked at the UV protection benefits of methylene blue from several angles in primary human keratinocytes and skin fibroblasts from young and old donors and compared those results with oxybenzone. They concluded that methylene blue not only absorbs UVA & UVB as the traditional sunscreen actives do, it also helps repair the DNA damage caused by UV irradiation, thereby leading to better cell survival. They also exposed the same amounts of methylene blue or

oxybenzone in *Xenia umbellata*, a soft coral species, in isolated tanks and monitored coral reefs' growth and responses to these chemicals. They reported drastic coral bleaching and death in oxybenzone-treated *Xenia* corals in less than a week, while methylene blue does not have any negative effects on coral health even at a relatively high concentration (1 micro molar).

They also compared methylene blue with other well-known skincare antioxidants such as vitamin A (retinol) and vitamin C in their ability to reduce cellular oxidative stress. "We are extremely excited to see that skin fibroblasts, derived from both young and old individuals, have improved so much in terms of proliferation and cellular stress in a methylene blue-containing cell culture medium." Dr. Cao shares. "Most surprisingly," says Dr. Cao, "we found that the combination of methylene blue and Vitamin C could deliver amazing anti-aging effects, particularly in skin cells from older donors, suggesting a strong synergistic reaction between these two beneficial antioxidants."

"Altogether, our study suggests that methylene blue has the potential to be a coral reef-friendly sunscreen active ingredient that can provide broad-spectrum protection against UVA and UVB," the team concludes in the abstract.

Based on the findings, the researchers believe methylene blue is an effective UV blocking agent that also delays skin aging and promotes DNA damage repair; they have filed a patent application and have started developing sunscreen prototypes containing methylene blue. In addition, Mblue Lab (Bluelene) recently launched the first multifunctional skincare product that combines methylene blue and vitamin C to deliver the optimal anti-aging effects (Bluelene's Night Plus+).

More information: "Ultraviolet radiation protection potentials of

Methylene Blue for human skin and coral reef health " *Scientific Reports* (2021). www.nature.com/articles/s41598-021-89970-2

Provided by Mblue Labs

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