Identifying Natural Compounds and Genes that Will Protect from UV Radiation

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Ultraviolet radiation (UVR) exposure is a health hazard that causes several diseases including cancer, neurodegenerative disease, XP syndrome, cataracts of the eye, and sunburn. The ozone layer in the atmosphere absorbs UVR, but modern civilization has depleted it resulting in more UVR reaching the earth. The Central hypothesis of this research is that the dietary natural compounds rich in anti-oxidants have a high potential for protection against the UVR. To test this hypothesis, Apigenin (found in celery), Zerumbone (found in ginger), Resveratrol (found in grapes and berries), and Curcumin (found in turmeric) were tested. Bacteria were plated on petri dishes containing the compounds, and half of each plate was exposed to UVR. The other half was used as a control. Then, the bacterial growth was determined. The results demonstrated that all of these compounds protected bacterial cells from UVR similar to or better than the two sunscreens tested here. Notably, Apigenin showed a dramatically higher level of protection compared to the other natural compounds. Thus, these natural compounds and specifically Apigenin can be used for new herbal medicines and creams for UVR protection. To find the genes/pathways that play a role in protection from UVR, Bioinformatics analysis were performed to identify genes/pathways that are altered in Skin cancer. The Skin cancer databases in FireBrowse and Oncomine were used for analysis. Several important pathways/genes, that may play a role in Skin cancer, were identified. The future goal is to examine if the alterations of these genes are inhibited by the natural compounds used. Inhibiting these genes and pathways will help in the development of drugs that will protect us from UVR-related health hazards.

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