



Children's Susceptibility to Direct DNA Damage as Compared to That of Adults

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## Children's Susceptibility to Direct DNA Damage as Compared to That of Adults

### Abstract

DNA damage and genetic mutations have been strongly correlated with the risk of developing certain cancers such as melanoma. It is important to assess correlations in conjunction with findings that are related to DNA damage to order to have a greater understanding of how the disease operates. Direct DNA damage happens when UV photons directly penetrate a cell's DNA, causing base pairs to bond next to each other changing the sequence. Recent studies have begun to explore the idea that there are critical stages in one's life where DNA is more vulnerable to direct damage. Data collected from GEM, a database of over three thousand melanoma patients of varying age, ethnicity, occupation, etc., has given us a distinct insight as to when sunburns that cause DNA damage occur. The results have shown that an overwhelming majority of sunburns had occurred during the early stages of their lives. Using the data from GEM, one can infer that children have a higher susceptibility to this form of direct DNA damage; however, to analyze this phenomenon a holistic view of the environment, physiological, bio cellular, genetic and psychological distinctions between adults and children is needed to avoid oversimplification of this complex topic. Reviewing data from these areas formulates several hypotheses as to why children may be more susceptible to direct DNA damage for future studies. Although differences in DNA damage susceptibility between adults and adolescences have not been fully explored, using data from previously published work several observations, such as melanoma risk factors during childhood, can be made to rationalize these trends. Additional examination in this area could further explain the growing number of melanoma cases, as well as reassess the protocol and initiatives for prevention.

### Keywords

susceptibility; melanoma; risk factors; direct DNA damage



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### **ABSTRACT**

DNA damage and genetic mutations have been strongly correlated with the risk of developing certain cancers such as melanoma. It is important to assess correlations in conjunction with findings that are related to DNA damage to order to have a greater understanding of how the disease operates. Direct DNA damage happens when UV photons directly penetrate a cell's DNA, causing base pairs to bond next to each other changing the sequence. Recent studies have begun to explore the idea that there are critical stages in one's life where DNA is more vulnerable to direct damage. Data collected from GEM, a database of over three thousand melanoma patients of varying age, ethnicity, occupation, etc., has given us a distinct insight as to when sunburns that cause DNA damage occur. The results have shown that an overwhelming majority of sunburns had occurred during the early stages of their lives. Using the data from GEM, one can infer that children have a higher susceptibility to this form of direct DNA damage; however, to analyze this phenomenon a holistic view of the environment, physiological, bio cellular, genetic and psychological distinctions between adults and children is needed to avoid oversimplification of this complex topic. Reviewing data from these areas formulates several hypotheses as to why children may be more susceptible to direct DNA damage for future studies. Although differences in DNA damage susceptibility between adults and adolescences have not been fully explored, using data from previously published work several observations, such as melanoma risk factors during childhood, can be made to rationalize these trends. Additional examination in this area could further explain the growing number of melanoma cases, as well as reassess the protocol and initiatives for prevention.

**Key Words:** susceptibility, melanoma, risk factors, direct DNA damage

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