The Genetics of Melanoma

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INTRODUCTION

Melanoma is one of the most deadly types of skin cancer. In fact, scientists are discovering more deadly genes involved in melanoma susceptibility: "Melanoma is the most aggressive of the common skin cancers, being responsible for 75% of deaths from skin cancer" (Potrony, 2015, p. 1). This problem has negatively impacted numerous people around the world because of the increased environmental risk factors, such as exposure to ultraviolet radiation (UVR), which can mutate the gene, leading to abnormalities and, ultimately, melanoma (Shain, 2016, p. 345).

Melanoma is an important cancer to study further as it affects the skin, the largest organ of the human body. Research done in this field, including possible preventative measures, benefits many people around the world.

Figure 1. This graphic from the Skin Cancer Foundation displays the two types of skin cancer tumors. A benign tumor is one that does not spread, while a malignant tumor is one that spreads and, thus, is deadlier.

RESEARCH METHODOLOGIES

Inquiry Approach: Correlational Research (comparing factors, like race and geography, with melanoma susceptibility rates)
Data Collection Tool: Database -- the SEER (Surveillance, Epidemiology, and End Results) database, a program of the National Cancer Institute that provides data regarding cancer statistics.
Data Analysis Technique: Descriptive Statistics (using summaries to formulate conclusions based off of the data collected)

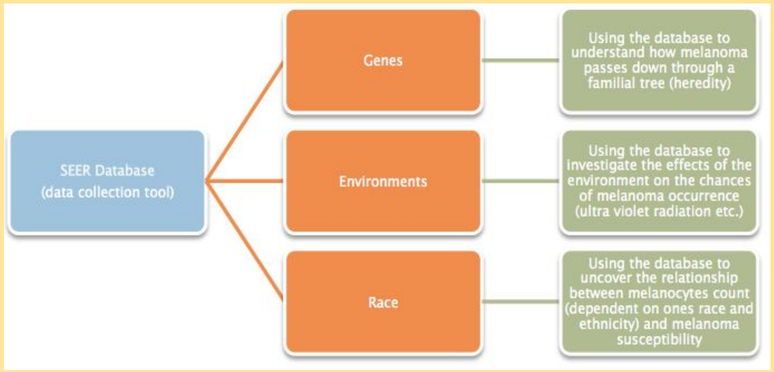

Figure 2. This graphic shows the path of data recovery and analysis.

DATA AND FINDINGS

Correlation of Race with Melanoma

Fifteen years of data, ranging from 1999-2014, collected from the SEER database are displayed for the male and female genders. The races included are White, Black, Asian/Pacific Islander, American Indian/Alaska Native, Hispanic, and a category for All Races. The data displays the data for the White population to be much higher than that of the Black population. Populations, such as the Hispanic population, are found closer toward the third of the range.

Correlation of Environment with Melanoma

The SEER database only contains data within the United States; it does not have data from other countries. Thus, the data was found from a science journal. The countries included are Queensland (Australia), New Zealand, United States, and Italy. The melanoma incidence rates are the highest in Queensland (Australia), followed by New Zealand, the United States, and finally Italy.

DISCUSSION, ANALYSIS, AND EVALUATION

Correlation of Race with Melanoma

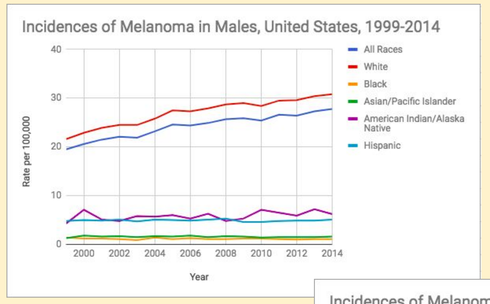

Figure 3. This graph describes the incidence rates of melanoma in males from 1999-2014.

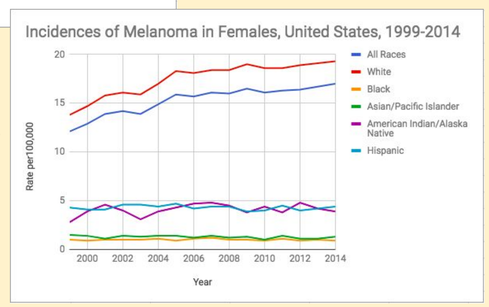

Figure 4. This graph shows the incidence rates of melanoma in females from 1999-2014.

The graphs show that melanoma is more prevalent in the White population of both males and females in the United States and less prevalent in the Black populations. This is related to the number of melanocytes present in lighter pigmented skin versus darker pigmented skin. There are fewer melanocytes in lighter skin (as there is subsequently less pigment) while there are more melanocytes in darker skin.

Correlation of Environment with Melanoma

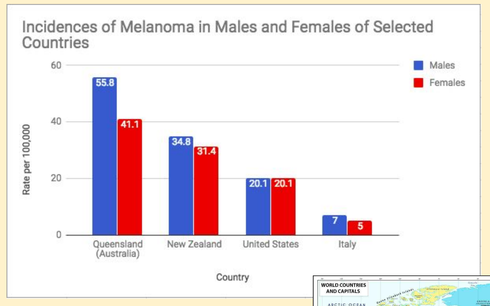

Figure 5. This graph shows the incidence rates of melanoma in males and females in four different nations around the world.

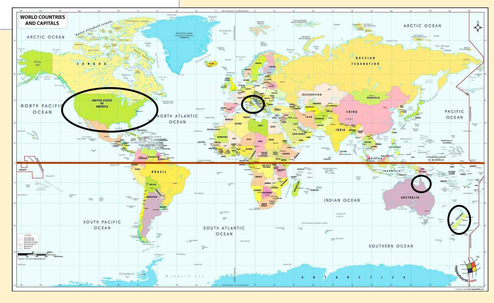

Figure 6. This is a map of the world with surveyed countries circled in black and the equator outlined in red.

The above figures show data of certain locations and a map with the locations indicated; the map shows the distances of the countries from the equator (outlined in red). The location closest to the equator (Queensland, Australia) reflects the highest incidences of melanoma, as seen through the graph. The trend continues throughout the graph and map; the next closest country is New Zealand, which reflects the second highest rates of melanoma. The data shows the relationship between the equator, and the incidence rates of countries around the world -- as the equator produces large amounts of UVR, the relationship between increased intake of UVR and increased rates of melanoma is present.

CONCLUSIONS, IMPLICATIONS, AND NEXT STEPS

This data is important as it can act as preventative measures for those fearful of melanoma, and even skin cancer in general. In terms of race, the data shows certain races (e.g., White) to be more susceptible to melanoma whereas other races (e.g., Black) are not as susceptible. Scientifically speaking, this is a matter of the number of melanocytes present in one's body, but in a broader context it helps those of an essentially targeted race to be more aware and more careful in terms of preventative measures. Likewise, the data for environment also displays certain parts of the world to be at a greater risk due to their distance from the equator and their exposure to UVR. An important solution to this problem is simply applying sunscreen -- those who do live closer to the equator must be made aware of the dangers that come along with their location, and must protect their skin to keep themselves healthy.

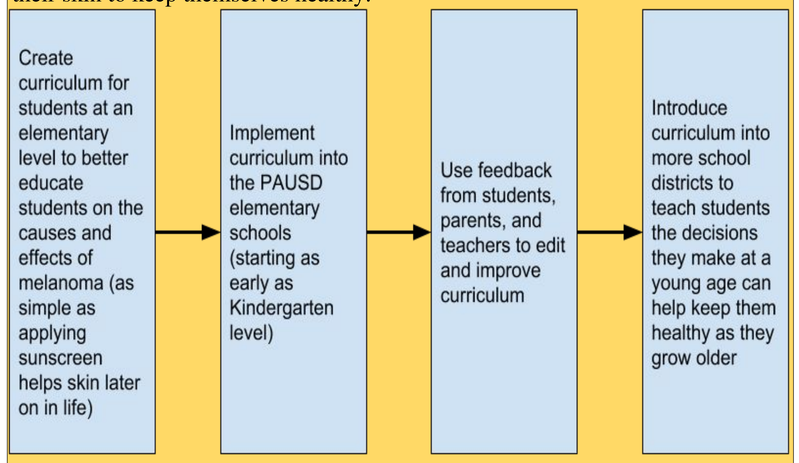

Figure 7. This graphic demonstrates the next possible steps for this project.

ACKNOWLEDGEMENTS / REFERENCES

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