Kiandra Simmons

College Of Southern Nevada

Mentor: Dr Zaven O'Bryant

kiandra.simmons@student.csn.edu

Abstract

The Connection Between Sickle Cell Disease vs Iron Deficiency Anemia

Sickle Cell Disease (SCD) is a common genetic disease known to be an inherited red blood cell (RBC) disorder. SCD affects a protein called Hemoglobin causing it to become abnormal. Many RBCs contain Hemoglobin which is responsible for transporting oxygen throughout the blood. Due to the abnormality of the Hemoglobin protein, the RBC loses its round shape figure and forms a C-shape causing the blood to become hard and sticky. This may lead to other health problems such as infection, acute chest syndrome, and stroke. According to the Centers for Disease Control (CDC), about 1 in 365 African Americans are born with SCD and 1 in 13 African Americans are born with the Sickle Cell Trait (SCT). SCT is when a child inherits a mutated hemoglobin gene from one parent and a normal gene from the other. Usually, no signs are detected, but in rare cases health problems may develop.

Anemia is also another very common red blood cell disorder that results from the lack/dysfunction of the RBC within the body. This disorder has a low amount of Hemoglobin which can lead to reduced oxygen flow to some of the body's organs, causing destruction and low production of the RBC, along with blood loss. The lack of healthy red blood cells causes Sickle Cell Anemia (SCA). Also, Iron Deficiency Anemia can develop through some blood loss, genetic, and/or heavy menstrual periods.

In this study, we will investigate the restriction enzyme, Dde I, which cleaves normal human DNA at the position corresponding to amino acid number 5 of the beta-globin chain. This will discriminate between HbA (normal) and HbS (disease) genes. We will collect and analyze samples from a small family cohort (n=) to evaluate the presence or absence of the affected genes and subsequent disease. We aim to investigate, firsthand, Medelian genetics and molecular biology to gain skills in preparation for the molecular detection of disease, in space, as well as forensic science on Earth.