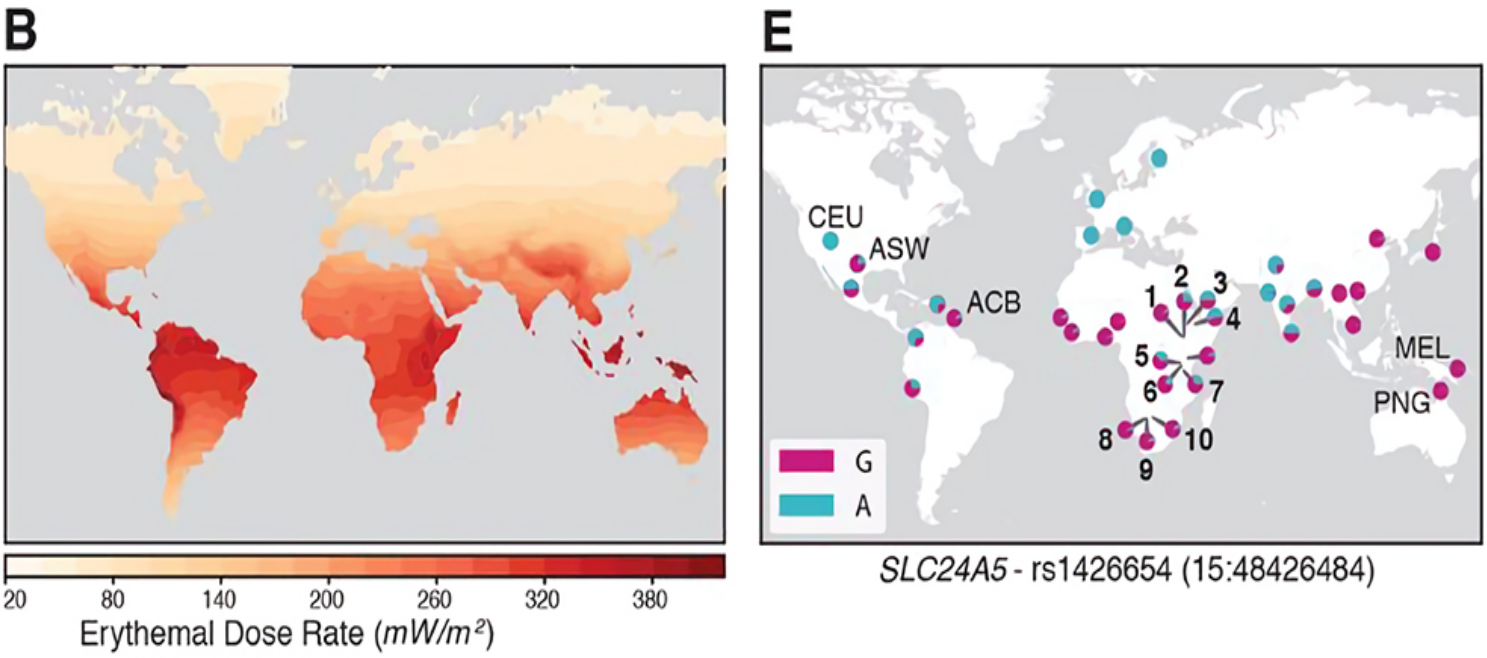

Caption: *Figure B shows global measurements of erythemal dose rates. Higher erythemal dose rates indicate more exposure to ultraviolet (UV) radiation from sunlight. Figure E is based on DNA samples from human populations around the world. Each circle on the map represents a different population, and the colors in the circle indicate the proportion of that population with either the ancestral allele ("G") or the derived allele ("A") of the gene* SLC24A5. *The study focused on 10 African populations (Labels 1–10). Data from these populations were compared to published data from other populations, including Melanesian (MEL), Papua New Guinean (PNG), European ancestry (CEU), African-American Southwest US (ASW), and African Caribbean in Barbados (ACB) populations.*

OBSERVATIONS, NOTES & QUESTIONS

BACKGROUND INFORMATION	BIG IDEAS, NOTES & QUESTIONS
Height, weight, eye color, skin color, and many other traits are affected by genes, gene regulation, and the environment. The genetic factors contributing to variation in these traits are often unclear and thus the subject of much research. Results from this research have improved our understanding of how traits are formed, related medical conditions, and human evolution. In this study, scientists investigated the genetic factors contributing to skin color differences, particularly within African populations. Prior to this study, research on the genetics of skin color included mostly people of European or Asian descent. The scientists collected DNA samples from 1,570 people of African descent and obtained more genetic data from other populations around the world. After comparing many DNA sequences, they identified four genomic regions that were significantly correlated with skin color differences. The most significant correlation between variation in skin color and variation in genetic sequence in Africans was at the *SLC24A5* gene. This gene codes for a membrane transport protein that helps cells called melanocytes produce the pigment melanin. Melanin gives skin its color and protects against UV radiation from the sun. Although too much UV radiation can damage the skin, our bodies use exposure to small amounts of UV radiation to make vitamin D. This process is important for healthy bones, especially for people with diets low in vitamin D. Changing just one nucleotide in the *SLC24A5* gene can change the way the protein functions. This type of genetic variation is called a single-nucleotide polymorphism, or SNP. In this study, the scientists examined one SNP of *SLC24A5* that is strongly linked to skin color differences. The ancestral form of *SLC24A5* for this SNP is a guanine (G) nucleotide. A new allele, or version, of *SLC24A5* later arose in some groups of people due to a mutation that changed the guanine to adenine (A). This mutation disrupts the function of the protein coded by *SLC24A5*, which prevents melanocytes from producing as much melanin. Although both the ancestral (G) allele and derived (A) allele exist today, these alleles have different frequencies in different populations.	