

Unit L3 • Traits and Heredity

Testing Athletes for Sickle Cell Trait

Generally speaking, people who have only one recessive sickle cell allele are healthy, although they may pass the allele to their offspring. They have what's called "sickle cell trait." This special use of the word trait in the medical name of a particular genetic condition may be a little confusing: Although sickle cell anemia is one genetic trait, people with "sickle cell trait" do not have sickle cell anemia.

However, sickle cell trait is not always harmless. Intense physical exertion can sometimes cause sickle cell carriers to suffer pain or even death from heat-related illness. During intense exercise, more of their blood cells may become sickle shaped, temporarily limiting the delivery of oxygen to where it's needed in their bodies. The risk can be greater at high altitudes, where there is less oxygen in the atmosphere.

In response to the deaths of several student athletes who had sickle cell trait, U.S. colleges and universities have started testing many athletes for this trait in recent years. In 2010, the National Collegiate Athletic Association (NCAA) started a policy of testing all Division I athletes. The NCAA later extended the policy to include Division II athletes, and eventually Division III athletes as well.

The NCAA's sickle cell testing policy is controversial. People who favor the policy say that it's better to know if a student might be at risk. Under the policy, sickle cell carriers are still allowed to participate in athletics. The idea is just to make sure that those students and their coaches know that they need to be especially alert for symptoms of overexertion, take precautions such as good hydration, and rest if they experience cramping or extreme shortness of breath. Students can refuse to be tested.

However, this testing policy has its critics, including the Sickle Cell Disease Association of America, and the U.S. Health and Human Services Department's Advisory Committee on Heritable Disorders in Newborns and Children. Critics of the policy point out that not all sickle cell carriers experience heat-related illness from exertion, and not all athletes who experience heat-related illness from exertion are sickle cell carriers. In other words, athletes with sickle cell trait and athletes who have life-threatening responses to exertion may be overlapping groups, but they are not the same group. Therefore, these critics argue, the smart thing to do would be to follow precautions that protect the health of all athletes, rather than testing a generation of athletes for an allele that doesn't accurately identify who will or won't experience problems training and competing.

Even though the NCAA's policy says that both sickle cell carriers and those who refuse to be tested will be allowed to participate in sports, critics of the policy are skeptical about whether all athletes will really be treated equally. Concerns about discrimination based on genetic testing are all the greater because the sickle cell allele is distributed differently in different ethnic populations: It is estimated that 8% of African Americans, 0.5% of Latinos, and 0.2% of Caucasians carry alleles for sickle cell. The high occurrence of sickle cell trait in African Americans results from the protection that sickle cell trait provides against malaria, a disease that is common in Sub-Saharan Africa and other tropical parts of the world. Therefore, if there were any discrimination against athletes with sickle cell trait, it might affect African American athletes disproportionately.

On the other hand, one could argue that the medical dangers of sickle cell trait also affect African American athletes disproportionately, and that the potential positive results from genetic screening outweigh concerns about possible discrimination.

How should the danger of discrimination be weighed against the danger of a known risk factor for illness and death? Is it common sense to check for such a risk factor, or common sense for everyone to follow the same precautions, while keeping their medical information private? What do you think?

