Sickle Cell Trait

What is Sickle Cell Trait?

Sickle cell trait is not a disease. Sickle cell trait is the inheritance of one gene for sickle hemoglobin and one for normal hemoglobin. Sickle cell trait will not turn into the disease. Sickle cell trait is a life-long condition that will not change over time.

During intense exercise, red blood cells containing the sickle hemoglobin can change shape from round to quarter-moon, or “sickle.”

Sickled red cells may accumulate in the bloodstream during intense exercise, blocking normal blood flow to the tissues and muscles.

During intense exercise, athletes with sickle cell trait have experienced significant physical distress, collapsed and even died.

Heat, dehydration, altitude and asthma can increase the risk for and worsen complications associated with sickle cell trait, even when exercise is not intense.

Athletes with sickle cell trait should not be excluded from participation as precautions can be put into place.

Do You Know If You Have Sickle Cell Trait?

People at high risk for having sickle cell trait are those whose ancestors come from Africa, South or Central America, India, Saudi Arabia and Caribbean and Mediterranean countries.

Sickle cell trait occurs in about 8 percent of the U.S. African-American population, and between one in 2,000 to one in 10,000 in the Caucasian population.

Most U.S. states test at birth, but most athletes with sickle cell trait don’t know they have it.

The NCAA recommends that athletics departments confirm the sickle cell trait status in all student-athletes.

Knowledge of sickle cell trait status can be a gateway to education and simple precautions that may prevent collapse among athletes with sickle cell trait, allowing you to thrive in your sport.

How Can I Prevent a Collapse?

Know your sickle cell trait status.

Engage in a slow and gradual preseason conditioning regimen.

Build up your intensity slowly while training.

Set your own pace. Use adequate rest and recovery between repetitions, especially during “gassers” and intense station or “mat” drills.

Avoid pushing with all-out exertion longer than two to three minutes without a rest interval or a breather.

If you experience symptoms such as muscle pain, abnormal weakness, undue fatigue or breathlessness, stop the activity immediately and notify your athletic trainer and/or coach.

Stay well hydrated at all times, especially in hot and humid conditions.

Avoid using high-caffeine energy drinks or supplements, or other stimulants, as they may contribute to dehydration.

Maintain proper asthma management.

Refrain from extreme exercise during acute illness, if feeling ill, or while experiencing a fever.

Beware when adjusting to a change in altitude, e.g., a rise in altitude of as little as 2,000 feet. Modify your training and request that supplemental oxygen be available to you.

Seek prompt medical care when experiencing unusual physical distress.

For more information and resources, visit www.NCAA.org/health-safety
Although sickle cell trait screening is normally performed on all U.S. babies at birth, many student athletes do not know whether they have the trait. Following the recommendations of the National Athletic Trainers Association (NATA) and the College of American Pathologists (CAP), if the trait is not known, the NCAA recommended in 2009 that athletic departments confirm sickle cell trait status in all student-athletes during the Medical Examination (Bylaw 17.1.5).

In April 2010 the NCAA decided that all Division I student athletes must do one of the following:
- Be tested for sickle cell trait
- Show proof of a prior sickle cell test
- Sign a waiver releasing the institution from liability

In the fall of 2008 the University of Oregon Athletic Medicine department began offering sickle cell trait screening for all incoming student athletes. Sickle cell trait screening is done by a simple blood test during the pre-participation physical exam process. Sickle cell trait is not a disease. It is a term describing an inherited condition where an individual has one normal gene for hemoglobin (A) and one abnormal gene for hemoglobin (S). In general having sickle cell trait does not affect the longevity of an individual. There are no restrictions on athletic activity for student athletes with sickle cell trait but there are some recommendations involving intense exercise.

The sickle cell gene is common in people who come from places where malaria is widespread because carrying one sickle cell gene (sickle cell trait) helped decrease the risk of dying from malaria. This makes sickle cell trait much more common in people of African or Mediterranean ancestry, where malaria is common. Sickle cell trait causes some red blood cells to change shape when they are stressed by low oxygen levels, dehydration, heat, and other conditions that result from exertion. This shape change can have serious consequences because sickling cells can block blood flow to important organs and muscles. Sickle cell trait has been implicated in the deaths of nine athletes in the past seven years. The kind of intense exercise done by student-athletes can put unknowing athletes with sickle cell trait at risk. Although the consequences can be severe, sufficient rest, hydration, and cooling may be all that are needed to treat most cases of exertional sickling. Athletes who have sickle cell trait can follow a few precautions to ensure their safety.

These include:
- Engage in a slow and gradual preseason conditioning regimen
- Build up your intensity slowly while training
- Set your own pace. Use adequate rest and recovery between bouts of interval training
- If you experience symptoms such as muscle pain, abnormal weakness, undue fatigue or breathlessness, stop the activity immediately and notify your athletic trainer and/or coach
- Stay well hydrated at all times, especially in hot and humid conditions
- Avoid using high-caffeine energy drinks, supplements, or other stimulants, as they may contribute to dehydration
- Maintain proper asthma management
- Refrain from extreme exercise during acute illness, if feeling ill, or while experiencing a fever
- Beware when adjusting to a change in altitude, e.g. a rise in altitude of as little as 2,000 feet. Modify your training and request that supplemental oxygen be available to you.
- Seek prompt medical care when experiencing unusual physical distress

Knowledge of sickle cell trait status can be a gateway to education and simple precautions that may prevent collapse among athletes with sickle cell trait, allowing you to thrive in your sport.

It is important that you understand the presence of sickle cell trait will NOT restrict you from play. Any student athletes with a positive test will receive the appropriate follow up care. Your health information will remain confidential, but positive test will be communicated to the appropriate coach and athletic trainer(s).

Your sickle cell trait screening will be done as part of your Pre-Participation Physical. Please let us know if you have any questions.
I have read and understand the above information and my questions have been answered.

☐ I agree to sickle cell testing.

☐ I decline sickle cell testing and release the University of Oregon from all liability relating to my sickle cell status.

Student-Athlete Signature ____________________________ Date __________

Print Name ____________________________ Date __________