



Sickle Cell Trait

Family Information

Hemoglobinopathy Screening and
Comprehensive Care Program
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What is hemoglobin?

Hemoglobin (Hb) is the special protein within the red blood cells that carries oxygen from the lungs to the rest of the body. Hemoglobin is what makes your blood look red in color.

Where does your hemoglobin come from?

Your hemoglobin type is inherited through family genes. The color of your hair, the color of your eyes, your body build, and your hemoglobin type are all examples of things about you that are determined by genes. You receive one gene for hemoglobin type from your mother and one from your father.

Hemoglobin A or normal adult hemoglobin is the most common type. There are over 500 different types of variations of hemoglobin.

What is hemoglobin S?

Sickle hemoglobin or hemoglobin S is a hemoglobin type that is most common in the African-American population. However, it does occur in other racial groups including the white population.

What is sickle cell trait?

People with sickle cell trait inherit a normal hemoglobin gene (Hb A) from one parent, and a sickle hemoglobin gene (Hb S) from the other parent. This results in hemoglobin AS or sickle cell trait. A person with sickle cell trait may also be called a sickle cell carrier.

Sickle cell trait is not a disease. It does not turn into sickle cell disease. It is not contagious. People with sickle cell trait are not sick. *They can lead normal lives and have minimal medical problems due to sickle cell trait.* For a few people, painful episodes may occur if they fly in unpressurized planes at high altitudes. Some people with sickle cell trait may occasionally have blood in their urine. If these problems occur, a physician should be notified.

Counseling and education regarding the trait are important because the sickle gene can be passed to a carrier's children.

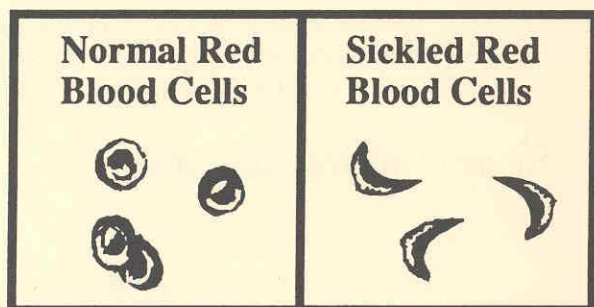
The most important aspect of identifying people with sickle cell trait is informing them of their risk of having a child with sickle cell disease.

Is sickle cell trait common in Iowa?

One out of twelve African-Americans has sickle cell trait. Each year, approximately 100 babies with sickle cell trait are born in Iowa.

What is sickle cell disease?

A type of sickle cell disease called sickle cell anemia occurs when a person inherits the hemoglobin S gene from each parent (Hb SS). The red cells contain only hemoglobin S and no normal hemoglobin A. The person with sickle cell anemia has red cells which sickle and block the body's small blood vessels. The sickling of red blood cells may cause the following medical problems: anemia (low red blood counts), painful episodes, enlarged spleen, infections, lung problems and strokes.

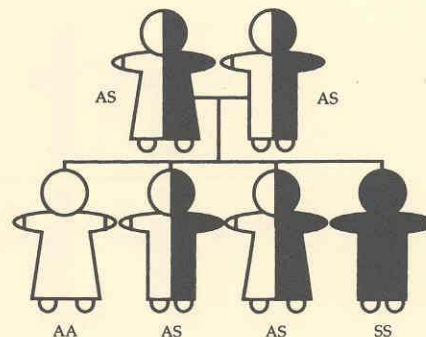


There are other hemoglobin types such as hemoglobin C or hemoglobin E, that in combination with the gene for sickle hemoglobin can result in different forms of sickle cell disease (Hb SC, Hb SE, Hb S/ beta thalassemia . . .).

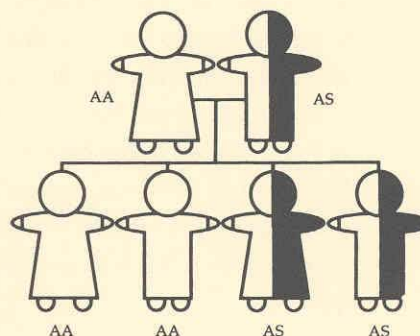
Any child with sickle cell disease needs close medical attention from their local doctor. The child should also be followed by a Comprehensive Care Program which offers specialized services for children with sickle cell disease. The child's caregivers should receive teaching about the disease and understand his/her special needs.

Patterns of inheritance

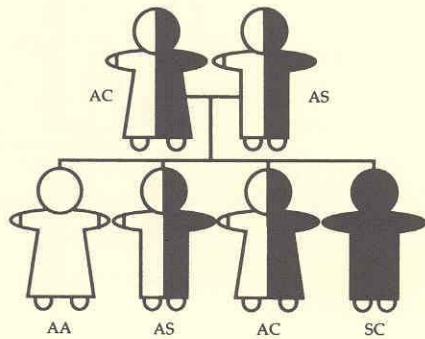
If two people with sickle cell trait have a child, there is a 50% chance that the child will have sickle cell trait (hemoglobin AS). There is also a 25% chance the child will be unaffected (hemoglobin AA) and a 25% chance that the child will have sickle cell disease (hemoglobin SS). These risks are true for *each* pregnancy.



If one parent has sickle cell trait and the other has normal hemoglobin, it is unlikely that any of their children will have sickle cell disease. However, there is a 50% chance with *each* pregnancy that the child will have sickle cell trait, as well as a 50% chance the child will be unaffected (Hb AA).



If one parent has sickle cell trait (Hb AS) and one parent has hemoglobin C trait (Hb AC), there is a 25% chance that the child will have sickle cell trait and a 25% chance that the child will have hemoglobin C trait. There is also a 25% chance the child will be unaffected (Hb AA) and a 25% chance that the child will have sickle cell disease (Hb SC). These risks are true for *each* pregnancy.



How can I find out whether my child has hemoglobin S?

The Iowa Newborn Screen includes a test (hemoglobin electrophoresis) for hemoglobin S. This test will identify persons with sickle cell trait and sickle cell disease. It is done before the newborn leaves the hospital. If the first test shows hemoglobin S, a second test will be done when the baby is 4 months old to confirm the diagnosis. A hemoglobin electrophoresis should be done for older children or adults in the family if sickle cell trait or disease is in question.

What services are available in Iowa for persons with hemoglobin S?

- The Iowa Newborn Metabolic Screening Program (INMSP) tests newborns for hemoglobin S.
- Interested family members can also be screened for hemoglobin S and other abnormal hemoglobins for a small fee.
- Genetic counseling is available through the Regional Genetic Consultation Services (RGCS) or at the University of Iowa Hospitals & Clinics, Iowa City.
- The Hemoglobinopathy Comprehensive Care Program nurses are available to provide community education so schools, churches, and other interested groups can learn more about sickle cell trait and sickle cell disease.

For more information contact:

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This educational brochure was printed with funds obtained from the Children's Miracle Network Telethon.

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