

In addition to Central and South America, and the Caribbean, people whose ancestors are from these shaded parts of the world are more likely to have hemoglobin variants such as S, C, E, or B-Thalassemia.



A whiteboard with a gray frame and a base. On the whiteboard, the text "Sickle Cell Trait" is written in purple at the top, "Sickle Cell Disease" is written in purple in the middle, and "What Is The Difference?" is written in purple at the bottom. On the base of the whiteboard, there is a black marker and a black eraser.



**California
Department of
Health Services**

Newborn Screening Program
Genetic Disease Branch
www.dhs.ca.gov/gdb

What Is Hemoglobin?

Hemoglobin is a protein inside red blood cells. It gives blood its red color. It carries oxygen to all parts of the body. There are many types. The most common is hemoglobin A. This type allows for normal red blood cell function. Hemoglobin types are passed down from parent to child in the genes. Genes are the tiny bits of information found in the father's sperm and the mother's egg. Together, these genes form a pattern for a new life. Most people have two genes for hemoglobin A. They get one gene for hemoglobin A from each parent.

What Is Hemoglobin S?

Hemoglobin S (sickle cell hemoglobin) is slightly different from hemoglobin A. Hemoglobin S is more often found in people whose families came from Africa, Mexico, Central America, India, the Middle East, and parts of Europe and Asia. Yet, anyone can have hemoglobin S in their blood.

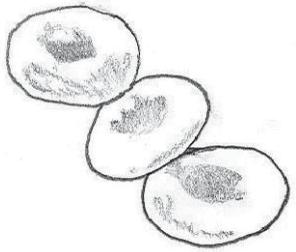
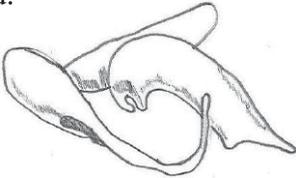
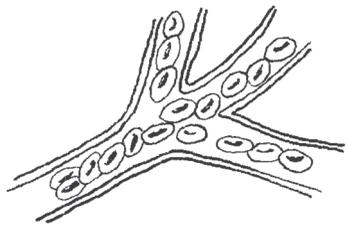
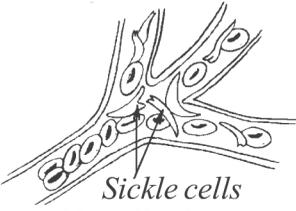
What Is Sickle Cell Trait?

This trait occurs when a person gets a gene for hemoglobin A from one parent and a gene for hemoglobin S from the other parent. They have enough hemoglobin A for red blood cells to function normally. This is **not** a disease. Other common hemoglobin traits are AD (D trait), AC (C trait) and beta thalassemia trait. There are also other less common traits.

What Is Sickle Cell Disease?

This disease occurs when a person gets one gene for sickle (S) hemoglobin from one parent and a sickle (S), C, D, E or beta thalassemia gene from the other parent. This disease can cause serious long term health problems.

There Is Quite A Difference Between . . .

<u>Sickle Cell Trait. . .</u>	<u>Sickle Cell Disease. . .</u>
Is not a disease.	Can cause mild to severe symptoms.
Medical treatment usually not needed.	Ongoing medical follow-up needed.
Cannot change to disease.	Is present at birth and can never be outgrown.
Does not shorten one's life.	Many lead long and full lives.
Is found in about 1 out of 14 African Americans in California. It is seen in others including people whose families come from Mexico, Central America, India, the Middle East, and parts of Europe and Asia.	Is found in about 1 out of 400 African Americans in California. It is seen in others including people whose families come from Mexico, Central America, India, the Middle East, and parts of Europe and Asia.
There is enough hemoglobin A for normal red blood cell function.	There is little or no hemoglobin A. When red blood cells carrying hemoglobin S release their oxygen to the tissue, they change from round to sickle shaped.
 <p style="text-align: center;">Normal Red Blood Cells</p>	 <p style="text-align: center;">Sickle Red Blood Cells</p>
The normal round red blood cells flow easily through small blood vessels.	The sickle shape of the red blood cells gives "sickle cell" disease its name. The hard, sticky sickle red blood cells have trouble moving through small blood vessels. Sometimes they clog up these blood vessels and blood can't bring oxygen to the tissues. This can cause pain and/or damage to these areas.
 <p style="text-align: center;"><i>Smooth, round red blood cells flowing easily through small blood vessels.</i></p>	 <p style="text-align: center;"><i>Sickle cells</i> <i>Hard sticky sickle cells clogging up small blood vessel.</i></p>

How Many Types of Sickle Cell Disease Are There?

There are many types. The two most common are sickle cell anemia (SS disease) and sickle "C" disease (SC disease). Sickle beta thalassemia disease (S beta thal disease) is another type, but is less common. Some people with sickle cell disease have fewer problems than others. Symptoms caused by sickle cell disease vary from person to person.

How is This Disease Treated?

Sickle cell disease is a lifelong condition. Ongoing medical follow-up is needed. Infections are serious problem for infants. Daily antibiotics can prevent many of these infections. New treatments can improve the quality and length of life. Bone marrow and cord blood transplant can give a cure for some children with severe disease. Still these treatments have some medical risks.

If Both Parents Have Sickle Cell Trait, They Can Have Babies With Sickle Cell Disease.

To find out your hemoglobin type or for more facts contact your doctor or:

