S I C K L E

Sickle Cell Anemia

C E L L

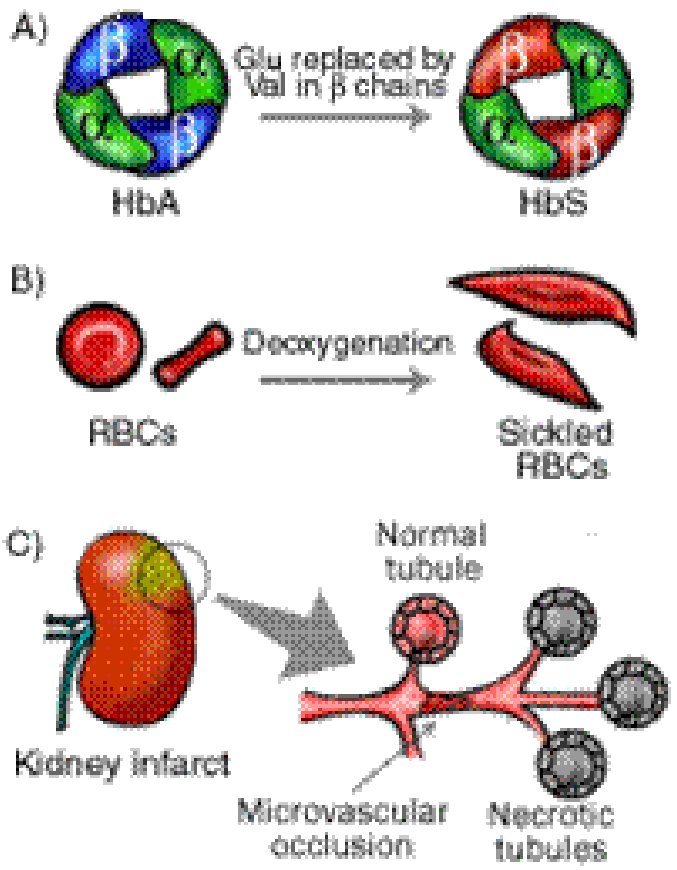
Ashley John IntroSem118Q Prof. Brutlag October 1, 2008

What is Sickle Cell?

- Autosomal recessive disease
- Caused by E6V point mutation in hemoglobin beta gene (HBB) found on chromosome 11p15.5
- Most common inherited blood disorder in US (72, 000)
- Homozygous Sickle Cell Disease (Hb SS) accounts for 60-70% sickle cell disease cases in the United States
- Common in people of African, Mediterranean, Middle Eastern, and Indian ancestry
- Also common in persons from the Caribbean and parts of Central and South America
- 8% the African-American population are carriers

Sickle Cell Diagram

- In SCA a point mutation causes Glu to be replaced by Val in B chains of HbA (HbS)
- Low oxygen levels RBCs with HbS become sickled
- Sickled cells block small vessels producing occlusions which cause necrosis of the tissue

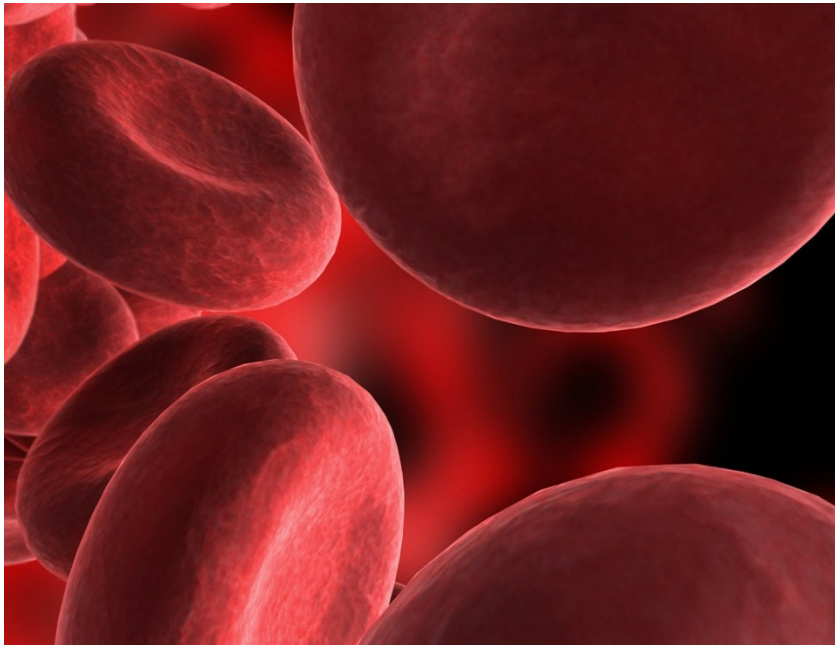


Symptoms/Complications

- Pain associated with vaso-occlusive crises
- Chronic hemolytic anemia
- Severe infections
- Pulmonary hypertension
- Priapism
- Stroke
- Delayed growth and sexual maturation
- Abdominal pain
- Poor appetite
- Fatigue
- Cough
- Night sweats
- Acute Chest Syndrome
- Organ dysfunction
- Leg ulcers

Problems Arising with Age

- Renal impairment
- Lower hemoglobin levels
- Respiratory failure due to Acute Chest Syndrome



Classical Treatment

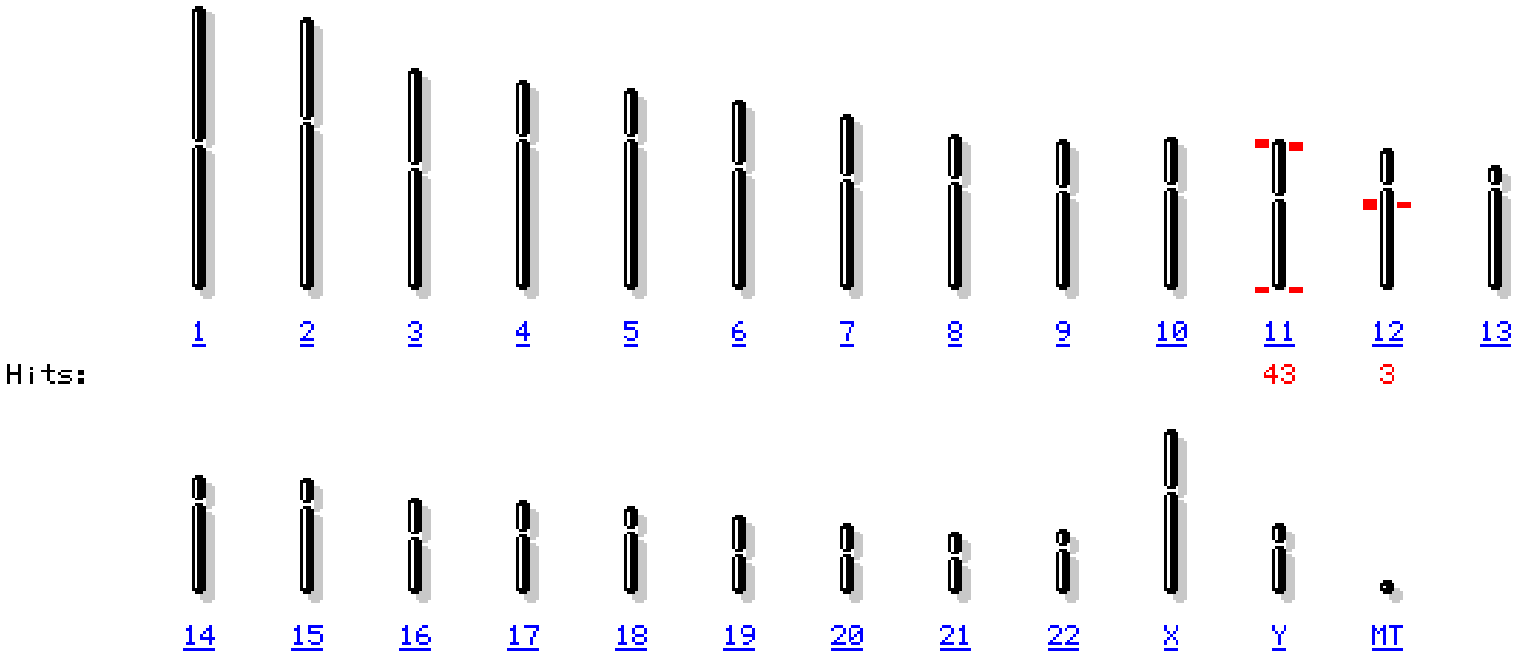
- No cure
- Lifelong comprehensive care- routine health maintenance and medications
- Fluids
- Painkillers
- Antibiotics
- Transfusions
- Hydroxyurea (crises)- prevents sickling
- Oxygen
- Immunizations

Genetic Diagnosis

- Testing for the EV6 mutation of HBB
  - Confirmatory testing
    - DNA -based
  - Carrier testing
    - High-performance liquid chromatography(HPLC)
    - IEF-based
  - Prenatal diagnosis
    - By analysis of DNA from fetal cells obtained by amniocentesis usually performed at about 15-18 weeks' gestation or chorionic villus sampling (CVS) at about 10-12 weeks' gestation.

Genetic Treatment

- All are under investigation
  - Experimental drugs
  - Gene therapy



Additional Information

- Most healthy at birth; symptomatic later in infancy or childhood after fetal hemoglobin (Hb F) levels decrease and hemoglobin S (Hb S) levels increase
- Life span normally 40-50 years, though have been reported much longer
- Avoid dehydration, temperature extremes, physical exhaustion
- Heterozygotes (Hb AS)- usually no symptoms

Sources

- OMIM
- Clinical Trials
- Gene Reviews
- Genes and Diseases