Democratizing Education for
Sickle Cell Disease Gene Therapy

Clinical trial process for sickle cell disease gene therapy

A starter guide for patients

Today, gene therapy for sickle cell disease is considered experimental and only available to you if you participate in a clinical trial. While there are a number of clinical trials for sickle cell gene therapy, the general process for this journey is similar across all the trials. This can be a long process and it's important to understand what happens at each phase.

Discussion should take place before, during and after each step.

Patient → Discussion with:

- Physician
- Support system
- Other clinical trial patients

Step 1: Referral for participation in a clinical trial

If you are referred to a certain trial, you should learn about:

- Phases of a clinical trial.
- Study outcome(s).
- How researchers will know if the treatment worked.

Step 2: Eligibility

Your eligibility to participate in a trial may be dependent on:

- Your age.
- Your diagnosis of sickle cell disease.
- Your response to other treatments.
- Whether you are taking any other treatments.
- Your health.

You may also be required to have:

- Certain screenings (e.g., MRI, blood tests).
- A genetic test to determine your risk of developing cancer from gene therapy.

Step 3: Consent process

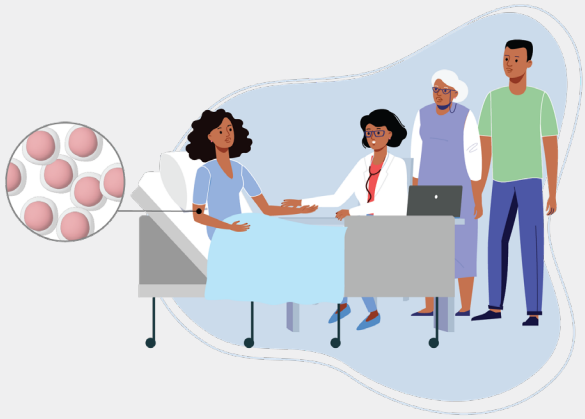
- Read, understand and review the informed consent document. Discuss it with your support system.
- Ask questions. If you still don't understand, either ask again or ask to speak to someone else.
- Know your risks of withdrawing from (or leaving) a clinical trial.

Step 4: Preparation for stem cell collection (~90 days)

Gene therapy requires stem cells to be collected from your bone marrow or blood, taken to a lab for modification, then returned to you.

Prior to collection, you may:

- Stop taking hydroxyurea for 2-3 months.
- Receive blood transfusions each month to reduce the number of sickled blood cells.



Step 5: Stem cell collection (~6-8 weeks)

The stem cell collection process is called apheresis. Each round occurs over 2–3 days.

To collect your stem cells, you will:

- Be admitted to the hospital for 1–3 days.
- Be given a medication that causes your bone marrow to release stem cells.
- Require an intravenous catheter. (A catheter will be inserted in your vein.)

During collection, stem cells flow into a bag, and the rest of your blood returns to your body.

You may require multiple rounds of the preparation and collection phases to provide enough stem cells. There are usually 4 weeks between rounds.

Make sure you know about potential side effects, including pain crisis.

Step 6: Manufacturing and processing

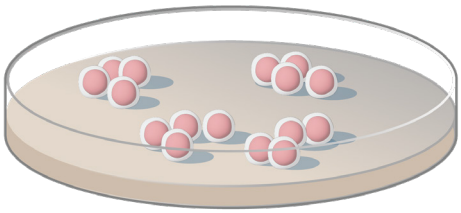
Your collected stem cells will be taken to a special laboratory where they will be modified, or manufactured and processed. This process can take many weeks after stem cell collection.

The process differs based on the type of gene therapy approach.

The process does not always work.

- If it fails, you may need to repeat stem cell collection.
- If the gene-modified stem cells do not meet certain criteria and cannot be returned to your body, then you may not be able to stay in the trial.

If the gene-modified stem cells meet the criteria to be returned to your body, the clinical trial team will contact you to schedule your appointment for the next process.



Step 7: Conditioning and cell infusion (~1 week)

To receive your modified stem cells, you will:

- Be admitted to the hospital.
- Receive a chemotherapy drug through an intravenous catheter. This process, called conditioning, will make space in your bone marrow for your modified stem cells.
- Receive your gene-modified stem cells (on Day 0) through a catheter.

Make sure you know about potential side effects.

Step 8: Initial recovery (~100 days after cell infusion)

Inpatient: 1 month
Because the conditioning process will lower your immune system, you will be moved to a protective environment in the hospital to reduce your risk of infection.

Medical staff will monitor you closely through:

- Daily tests (e.g., blood tests, physical exams) to track your progress
- Medicine to help prevent and treat infections

Outpatient: 2–3 months
Once your clinical trial physician determines that your bone marrow and immune system have recovered, you may leave the hospital and move to outpatient care.

Make sure you know about potential complications.

Step 9: Continuity of care

- Each month, you will have a follow-up visit to see how well the therapy is working and to track your overall health.
- Your research team and other clinical providers should discuss what each team will do to help you manage any potential health complications.

Long-term follow-up (~15 years)

- The study may follow-up with you for 15 years to identify and monitor any long-term effects. This would require a separate informed consent step.
- Follow-up visits typically involve annual appointments and bloodwork.

The Democratizing Education Project welcomes your feedback about the sickle cell disease gene therapy resources. Please email your comments or questions to DemocratizingEd@mail.nih.gov.