



# GENE THERAPY CONDITIONING

## *Patient Guide*

*Sickle cell disease (SCD) changes the shape of red blood cells. It causes pain episodes, renal complications, asthma, stroke and other conditions. Promising new treatments, called gene therapies, are being studied to make sure that they are safe and effective.*

### HOW DO GENE THERAPIES WORK?

The cells used in gene therapies, called stem cells, come from a patient's bone marrow. Bone marrow is the soft spongy area in the larger bones of the body that creates all cell types that make up the blood. Stem cells are stimulated to exit the bone marrow and enter the blood stream for collection using a procedure called apheresis. Then, they are modified in the lab and given back to the patient. These stem cells can now make healthy, round red blood cells in addition to other blood cells. For gene therapies to work, a patient must go through a procedure called *conditioning*.

## About gene therapy conditioning

### What is conditioning?

Conditioning is the process used to get a patient ready for gene therapies. This is done by using a chemotherapy drug. There are two types of conditioning: myeloablative and reduced intensity. Myeloablative conditioning often uses the drug Busulfan. Reduced intensity conditioning typically uses the drug Melphalan.



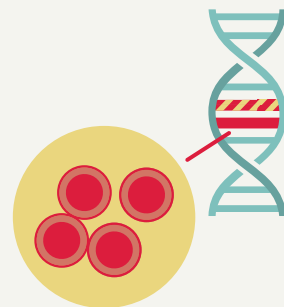
### When and where does conditioning happen?

Conditioning happens after the stem cells have been modified in the lab. It allows the stem cells to be returned to the patient. Conditioning is done in a hospital and the patient could have to stay for several weeks after conditioning begins.



### Why is conditioning needed and how does conditioning work?

A patient's bone marrow needs to have space for the new stem cells modified by gene therapies. This allows them to settle in to later make new blood cells. Without this space, the modified stem cells will not survive, and the treatment will not work.



## How do I prepare for conditioning?

### Before

#### LIFE PLANNING

Life planning should be a part of preparing for conditioning. This includes making plans about your family, home, finances, pets, and employment. You should also think about completing a legal document called an “advanced directive” (including living will, durable power of attorney, and healthcare proxy). A lawyer or social worker should be able to help with these documents.<sup>3</sup>

#### MEDICAL PROCEDURES

Making sure that you are mentally and physically ready for the procedure is important. A physician will run tests to be sure that you can have the procedure. In addition to the chemotherapy, you may have to take other drugs before, during and after the procedure.

These drugs can help lessen the side effects of conditioning. To minimize the number of intravenous (IV) lines and needle sticks, a thin flexible tube, called a central line, will be placed into a large vein in your upper chest. It is important to keep the area clean and watch for signs of infection. You should ask your doctor how to properly care for the central line.<sup>1,2</sup>

### After

Patients stay in the hospital for several weeks after conditioning because the risk of infection is a lot higher during that period. Your health will be watched closely while you are in the hospital. You will also receive check-ups for several years after conditioning.

## WHAT SIDE EFFECTS CAN HAPPEN WITH CONDITIONING?

There are a number of side effects that can happen with conditioning. Some things that can happen quickly are hair loss, rash, nausea or vomiting, and infections, some of which can be life-threatening. Things that can take longer to show up are tooth and mouth issues, not being able to have children, cancers, or liver and bone damage.

A full list of risks should be given to you before starting conditioning. Talk with your doctor to help figure out the most likely risks.



National Heart, Lung,  
and Blood Institute

## QUESTIONS TO ASK A PROVIDER

- Are there other treatment options for sickle cell disease that may be better for me?
- Why do I need to get conditioning?
- What is the difference in the side effects of myeloablative and reduced intensity conditioning?
- How do doctors figure out the dose and schedule of my conditioning regimen?
- How long will I be in the hospital?
- Are there additional drugs that I can take to help with side effects?
- What are the most common fertility issues?
- Is it an option for me to go through fertility preservation treatments? If so, when do I need to decide?
- What precautions will I need to take before conditioning? After?
- What can I expect after I leave the hospital?
- How do I care for my central line?
- Are there foods or medications that I should or shouldn't take?
- Are there activities I should or shouldn't do?
- When should I call a doctor?

## ADDITIONAL RESOURCES

- How Can Gene Therapy Cure Sickle Cell Disease? ([Infographic](#)).
- Pre-gene Therapy Assessment of Patient Readiness and Resilience: Best Practices and Recommendations for Implementation in Sickle Cell Disease ([Recommendations](#)).

For more information, please visit: [www.curesickle.org](http://www.curesickle.org) and follow us on X @TheCureSCi

## REFERENCES

- 1 Leukemia and Lymphoma Society: Blood and Marrow Stem Cell Transplantation
- 2 AHPON medication factsheet 5th edition.