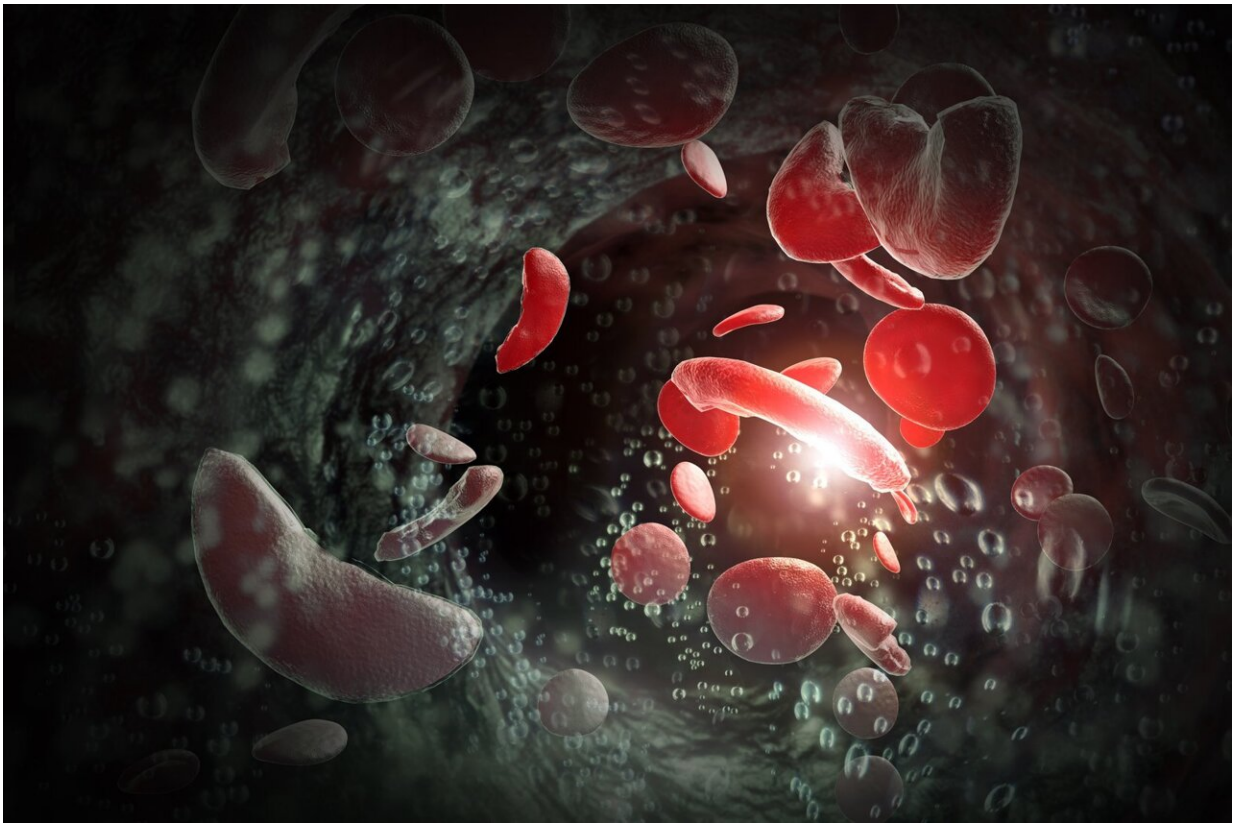
FDA advisors to weigh new gene therapy for sickle cell anemia

October 30 2023, by Cara Murez



Patients with sickle cell disease may soon have two new treatments to try.

On Tuesday, a U.S. Food and Drug Administration advisory committee will weigh the merits of a new gene therapy for the painful, inherited condition, which typically strikes Black people.

The agency is expected to make a decision on that therapy in early December, and it also plans to decide on a second new treatment before year's end, the *Associated Press* reported.

The treatment being reviewed Tuesday is based on CRISPR technology, a gene-editing tool. The inventors of that tool won the Nobel Prize in 2020 for their work, the *AP* reported.

A one-time treatment, "exa-cel" is made by Vertex Pharmaceuticals and CRISPR Therapeutics, and it permanently changes DNA in a patient's blood cells.

How does it work? Stem cells are removed from a patient's blood, and then CRISPR knocks out a gene that triggers the development of defective, crescent-shaped blood cells. Meanwhile, medicine kills off flawed blood-producing cells in patients, who are then given back their own altered stem cells.

"Anything that can help relieve somebody with this condition of the pain and the multiple health complications is amazing," Dr. Allison King, a professor at Washington University School of Medicine in St. Louis, told the *AP*. "It's horribly painful. Some people will say it's like being stabbed all over."

On Tuesday, FDA advisors will consider whether more research is needed into potential unintended consequences of the new gene therapy.

In briefing documents filed with the advisory committee, Vertex said that 46 people got the treatment in its study. Among the 30 who had 18

months of follow-up, 29 were free of pain crises for at least a year and all 30 avoided being hospitalized for pain crises.

Still, the FDA advisory panel is asking outside gene therapy experts to discuss the possibility of "off-target effects," which are unexpected changes to a person's genome.

The FDA would like to determine whether company research on these possible effects has been adequate or whether more studies are needed, the *AP* reported.

The company has proposed a post-approval safety study and product labeling that notes potential risks, the *AP* said.

Victoria Gray, who has received the gene therapy, shared her experience with researchers at a scientific conference recently, saying she felt she "was being reborn" when she got the therapy, the *AP* reported. Gray had experienced bouts of terrible pain since childhood.

Now, she is active with her kids and works full time.

"My children no longer have a fear of losing their mom to sickle cell disease," she said.

Sickle cell disease affects the protein that carries oxygen in red blood cells. The cells can become crescent-shaped because of a genetic mutation. This can block blood flow and cause pain, organ damage and stroke. The disease affects millions of people around the world, including 100,000 in the United States.

It occurs more often in places where malaria is common, like Africa and India. Being a carrier of the trait may protect against severe malaria.

Standard treatments include medications and blood transfusions. A bone marrow transplant from a closely matched donor without the disease is the only cure.

The second gene therapy for sickle cell disease that the FDA will consider is intended to work by making functional copies of a modified gene, the *AP* reported. This helps red blood cells produce hemoglobin that isn't misshapen. That treatment is made by Bluebird Bio.

Prices for the two gene therapies haven't been released, the *AP* reported.

However, a price tag of around $2 million would be considered cost-effective because the existing treatments cost about $1.6 million for women and $1.7 million for men from birth to age 65, according to recent research.

"But if you think about it," King said, "how much is it worth for someone to feel better and not be in pain and not be in the hospital all the time."

More information: The U.S. Centers for Disease Control and Prevention has more on sickle cell disease.