



Just the Facts:
The Science
& Potential
of Cell Donation
& Banking

Part 1: Cord Blood & Uses
to Treat Disease



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Cord Blood: Just the Facts

A PRECIOUS AND LIMITED RESOURCE

Cord blood is collected from the placenta and umbilical cord after a baby is delivered. Not only does it contain all components of whole blood (red and white cells, platelets, and plasma), but it contains blood stem cells, also called hematopoietic stem cells, which can produce all types of blood and immune cells for a person's entire life.

Blood stem cells can be used to treat and even cure some diseases of the blood and immune system through a stem cell transplantation. These stem cells can be collected from cord blood as well as from bone marrow and peripheral blood (e.g. from an arm vein) and then delivered intravenously to a patient.

Cord blood can be used immediately to treat disease, or easily stored for future public or private use (see Private Banking vs. Public Donation below). It is also an important resource for stem cell research. Since the first cord blood transplant in 1988, over 40,000 have been performed.

TREATING DISEASE: WHAT THE SCIENCE SAYS

A successful blood stem cell transplantation can potentially cure patients of some diseases by replacing their blood stem cells. Whether blood stem cells are used from cord blood, bone marrow, or peripheral blood depends on the patient's age, disease, and availability of an appropriate donor, among other factors (see Finding your Match below).

Diseases most commonly treated by transplantation include diseases of the blood (such as cancers or red blood cell disorders), bone marrow failure diseases, and certain immunodeficiencies (diseases that result from missing or dysfunctional immune cells). Less commonly treated by transplantation are inherited

metabolic diseases (deficiencies in breaking down substances in the body).

A list of diseases that can be treated by blood stem cell transplantation is available on [Be the Match](#), the largest international registry of blood stem cells. Additional information on blood stem cell transplantation is available from the [National Institute of Health](#).

Be aware that many predatory clinics offer treatments using cord blood cells, or cells derived from the placenta or amnion, that are not supported by the current understanding of science and blood stem cell biology. While these stem cell clinics may advertise the use of blood stem cell transplantation for a variety of diseases, many of these treatments have not been proven to be safe or effective. To help determine whether a stem cell treatment has been scientifically proven to have therapeutic benefits see "[Stem Cell Treatments: What to Ask.](#)"

FINDING YOUR MATCH

Blood stem cells used for a transplant can either come from yourself or from someone else. If the patient has a blood cancer or another genetic blood disease, their stem cells may also be diseased and therefore cannot be used in their own transplant.

If a donor is needed, they must be a good immunological match with the patient. Stem cells that are not a good match can either be attacked as foreign cells, or, more commonly, the newly produced immune cells can mount an attack on the patient's tissues, known as graft-versus-host disease, which in severe cases can be life-threatening.

Advantages of using cord blood as a source of stem cells for transplantations.

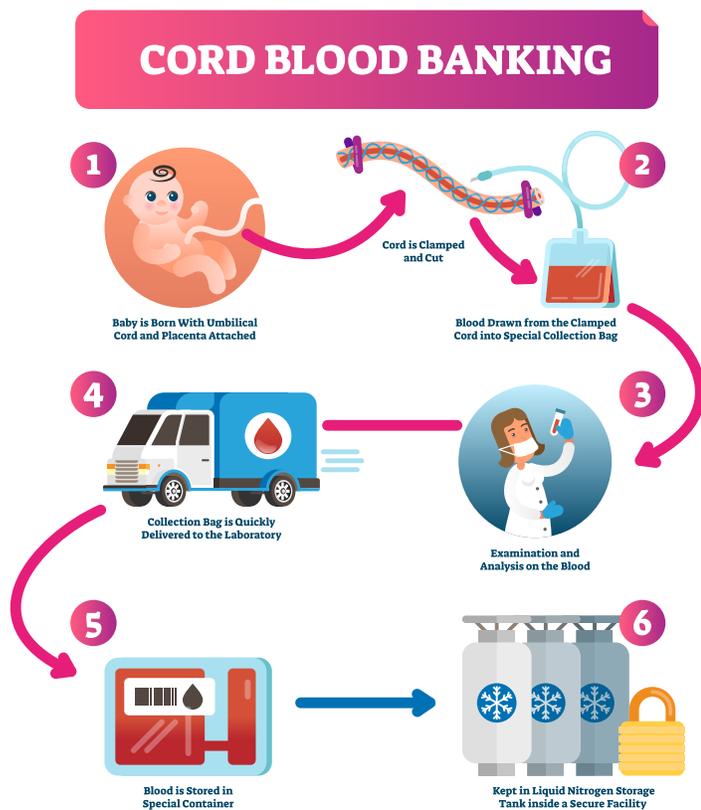
- Stem cells from cord blood have a lower risk of carrying blood borne infectious diseases, or of causing the potentially fatal immune response, graft-versus-host disease.
- Cord blood may offer a matched source of stem cells for patients who cannot find an immunological match in bone marrow donor registries.

Disadvantages of using cord blood as a source of stem cells for transplantations.

- Fewer blood stem cells are available from an umbilical cord sample than other sources. Two cords are typically required for each adult transplant.
- The immune system recovers more slowly after a cord blood transplantation, putting the recipient at greater risk for certain infections.
- There is a higher probability that a cord blood transplant will be unsuccessful.
- More cord blood sample cannot be obtained after the initial collection.

PRIVATE BANKING VS. PUBLIC DONATION

After cord blood is collected it can be banked, frozen at very low temperatures and stored, for future use (see figure below).



Blood stem cells are collected from the umbilical cord and can then be processed to be banked for public or private use.

Image adapted from ©VectorMine/Adobe Stock.

Cord blood can be donated to public cord blood banks and made available for anyone who needs to use it, or it can be retained in private banks for one's own use or use by a family member.

In 2017, the [American Academy of Pediatrics](#) reported that there are about 800,000 units of cord blood stored at public banks, and over 5 million units banked for private use worldwide. Even though there are over 6 times as many units stored in private banks, public banks have released about 30 times more units for therapeutic use.

Families storing cord blood should seek facilities that have been accredited by reputable organizations. Foundation for the Accreditation of Cellular Therapies (FACT) sets international standards and accredits cord blood banks and cell transplantation programs. The organization AABB accredits facilities that provide banking and transfusion services as well as blood centers. Families can find a list of [FACT-accredited public and private cord blood banks](#) and international [AABB Accredited Facilities](#) online.

Public Donation

At this time the [American Academy of Pediatrics](#) and the [American College of Obstetricians and Gynecologists](#) recommend that families donate cord blood to public cord blood banks, rather than storing it in a private bank for "biological insurance" against a future issue.

Since patients need stem cells from a donor who is an immunological match, it is crucial to increase the genetic diversity of cord blood available in public banks. It is therefore important that people from diverse genetic and ethnic backgrounds donate cord blood to public banks.

When a family donates cord blood to a public bank, it is done altruistically for the benefit of anonymous recipients or stem cell research. The family gives up rights to the blood, and the bank is responsible for collecting, processing, testing, and storing it.

In 2014, there were more than 160 public banks in 36 countries. Databases of public cord blood banks

around the world can be found through [The Parent's Guide to Cord Banking](#) and the [World Marrow Donor Association](#). Additional information can also be found on the [EuroStemCell website](#).

Private Banking

Private banks generally charge an initial fee for collecting, testing, and registering the blood, as well as yearly storage fees. In return, only the family has access to the stored stem cell sample.

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According to an article published in the journal [PLOS Medicine](#), the probability of needing to transplant your own blood stem cells is less than 1 in 20,000. Should a patient require a stem cell transplant that uses their own blood stem cells or the stem cells of a sibling, these cells can usually be obtained at the time necessary by bone marrow or peripheral blood stem cell collection.

Additionally, if an individual has an inherited genetic blood or immune disorder that requires a stem cell transplant, the blood stem cells harvested from the cord blood of that individual will have the same genetic mutation(s), and therefore cannot be used to cure the patient without additional gene therapy. Studies are ongoing to try to genetically correct mutated stem cells, however, more research is needed.

The [American Academy of Pediatrics](#) encourages private banking if the donor is a full match to a relative who has a disease that is treatable by stem cell transplantation. In fact, some private banks may store cord blood for free if the child has a full sibling with a disease treatable by blood stem cell transplant.

HOW TO DONATE

Not all hospitals facilitate cord blood collection and donation. In order to learn which hospitals offer public cord blood donation in the United States visit [Be The Match](#), the largest international registry of blood stem cells from bone marrow and cord blood. If you are not delivering at a donation hospital you may also participate in a [mail-in donation program](#) through Cord for Life.

The U.S. Department of Health and Human Services has [guidelines to learn how to donate cord blood](#).

It is important to note that you need to talk to your doctor or midwife about cord blood donation before delivery so that the necessary health screening can be completed and collection kits can be arranged. Check this [list of requirements](#) to see if you are initially eligible to donate cord blood. If you are ineligible, your cord blood can still be donated for research. Ask your doctor or hospital for more information.

IN SUMMARY

Blood stem cell transplantation is a powerful technique which can potentially cure patients of devastating diseases. Cord blood is one of three sources of blood stem cells that can repopulate a patient's blood and immune system. Cord blood has both advantages and disadvantages compared to bone marrow or peripheral blood as a source of blood stem cells. It is unlikely that someone will use their own stem cells in a blood stem cell transplant. It is currently [recommended](#) that cord blood is donated to public banks to increase the chance that people in need of a transplant can find an immunological match.

Whether or not to donate or bank cord blood is a personal decision, and you should always consult your doctor or a trusted medical professional. For more information on stem cell therapies visit www.closerlookatstemcells.org.

USEFUL LINKS

[American Academy of Pediatrics](#)

[American College of Obstetricians and Gynecologists](#)

[Be The Match](#)

[EuroStemCell](#)

[The Parent's Guide to Cord Banking](#)

[World Marrow Donor Association](#)