PATIENT EDUCATION

The American College of Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

Pregnancy • EP172

Cord Blood Banking

*Cord blood is the blood from the baby that is left in the **umbilical cord** and **placenta** after birth. It contains special **cells** called **hematopoietic stem cells** that can be used to treat some types of diseases. Cord blood can be donated to a public bank for use by anyone who needs it or stored in a private bank (sometimes called a "family bank") for your baby's or family's use.*

This pamphlet explains

- *what hematopoietic stem cells are*
- *using stem cells to treat disease*
- *types of transplants*
- *how cord blood is stored and collected*
- *making a decision*

Hematopoietic Stem Cells

Most cells can make copies only of themselves. For example, a skin cell only can make another skin cell. Hematopoietic stem cells, however, can mature into different types of blood cells in the body. They are not the same as embryonic stem cells, which come from an ***embryo***, but they are very similar. Hematopoietic stem cells also are found in blood and ***bone marrow*** in adults and children.

Using Stem Cells to Treat Disease

Hematopoietic stem cells can be used to treat over 70 types of diseases, including diseases of the ***immune system***, ***genetic disorders***, ***neurological disorders***, and some forms of cancer, including leukemia and lymphoma. For some of these diseases, stem cells are the primary treatment. For others, treatment with stem cells may be used when other treatments have not worked or in experimental research programs.

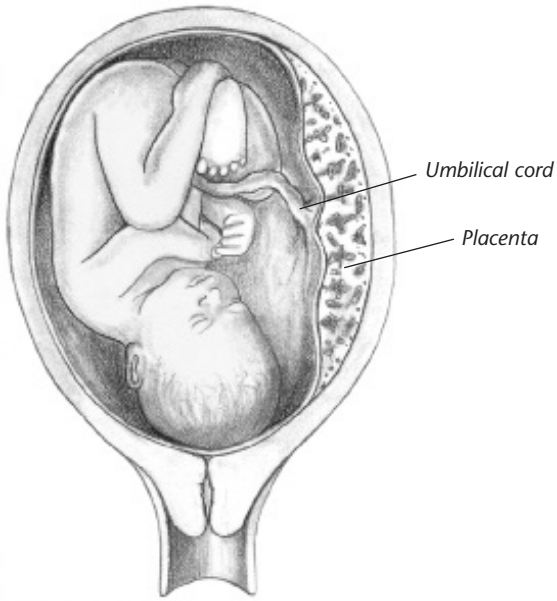
Using the stem cells in cord blood to treat a disease has the following benefits compared with using those in bone marrow:

- Stem cells from cord blood can be given to more people than those from bone marrow. More matches are possible when a cord blood transplant is used than when a bone marrow transplant is used. In addition, the stem cells in cord blood are less likely to cause ***rejection*** than those in bone marrow.
- It is harder to collect bone marrow than it is to collect cord blood. Collecting bone marrow poses some risks and can be painful for the donor.
- Cord blood can be frozen and stored. It is ready for anyone who needs it. Bone marrow must be used soon after it is collected.
- Stem cells in cord blood can be used to strengthen the immune system during cancer treatments. Bone marrow stem cells do not have this capability.

Other uses for cord blood stem cells are being studied. Cord blood stem cells may someday be used to regrow tissues that have been injured by disease or other causes.

A disadvantage of cord blood is that it does not contain many stem cells. Units from several donors can be combined to increase the number of stem cells if a transplant is needed for an adult.

Umbilical Cord and Placenta



Blood in the baby's umbilical cord and placenta contains stem cells that can be used to treat some diseases. After the baby is born, some of this blood can be saved in a private or public bank.

Types of Stem Cell Transplants

In an ***autologous transplant***, a newborn's cord blood is used by that child. This type of transplant is rare for the following reasons:

- A child's stem cells cannot be used to treat genetic diseases in that child. All of the stem cells have the same ***genes*** that cause the disease.
- A child's own stem cells cannot be used to treat that child's leukemia, a cancer of the blood.

Another person's stem cells are much more likely to be used to treat a child's disease. This is called an ***allogenic transplant***. The donor can be a relative or be unrelated to the child.

For an allogenic transplant to work, there has to be a good match between donor and recipient. A donor is a good match when certain things about his or her cells and the recipient's cells are alike. The better the match, the more likely that the recipient's immune system will accept the new cells. If the match is not good, the recipient's immune system may reject the donated cells. If the cells are rejected, the transplant does not work.

Storing Cord Blood

Cord blood is kept in one of two types of banks: public or private. They differ in important ways that may affect your choice.

Public Cord Blood Banks

Public cord blood banks operate like other blood banks. Public banks store cord blood for allogenic transplants. They do not charge to store cord blood. The stem cells in the donated cord blood can be used by anyone who matches. Some public banks will store cord blood for ***directed donation*** if you have a family member who has a disease that could potentially be treated with stem cells.

Public banks work with certain hospitals. Not all hospitals work with a public bank. The National Marrow Donor Program (www.bethematch.org) is a network that has a list of public banks.

Donors to public banks must be screened. The goal of screening is to learn of any blood or immune system disorders or other problems. The mother's blood is tested for genetic disorders and infections, and the cord blood also is tested after it is collected. This is similar to the testing that is done when you donate blood to a blood bank. Once it arrives at the blood bank, the cord blood is "typed." It is tracked by a computer so that it can be found quickly for any person who matches when needed.

Private Cord Blood Banks

Private or family banks store cord blood for autologous use or directed donation for a family member. Private banks charge a yearly fee for storage. Blood stored in a private bank must meet the same standards as blood stored in a public bank. If you have a family member with a disorder that may potentially be treated with stem cells, some private banks will store the cord blood free of charge.

Obstetricians or other health care professionals may have a financial or other conflict of interest with a private bank. You should be informed about any of these conflicts before you make a decision.

Collecting Cord Blood

Cord blood is collected by your obstetrician or the staff at the hospital where you give birth. Not all hospitals offer this service. Some charge a separate fee that may or may not be covered by insurance.

Certain steps must be done beforehand:

- The bank must be notified and a collection kit must be obtained in advance (usually 6 weeks or more) of the due date. Some hospitals have collection kits on hand. Others do not. It is important to make sure that a collection kit is available well before you give birth.
- A family medical history must be provided and the mother's blood must be tested.
- Consent must be given before labor begins.

If you choose a private bank, you will sign a contract and pay a fee before the baby is born.

The process used to collect cord blood is simple and painless. After the baby is born, the umbilical cord is cut and clamped. Blood is drawn from the cord with a needle that has a bag attached. The process takes about 10 minutes.

Sometimes, not enough cord blood can be collected. This problem can occur if the baby is preterm or if it is decided to delay clamping of the umbilical cord. It also can happen for no apparent reason. If an emergency occurs during delivery, priority is given to caring for you and your baby over collecting cord blood.

Making a Decision

The decision about whether to store cord blood needs to be made several weeks before delivery. Whether to donate cord blood to a public bank or store it in a private bank is up to you. You also can decide not to donate or store cord blood. Think about the following points when making your choice:

- Donating cord blood to a public bank adds to the supply and can potentially help others. Donating to a public bank is especially important for ethnic minorities, who are not well represented in cord blood banks. Public cord blood donation increases the chance of all groups finding a match.
- Only certain hospitals collect cord blood for storage in public banks. If you are interested in donating to a public bank, you need to make sure your hospital is able to do this.
- Storing a child's stem cells in a private bank as "insurance" against future disease is not recommended.
- If you already have a child with a medical condition that may be helped by a cord blood transplant, donating a biological sibling's cord blood for directed donation is encouraged. You may want to talk to your child's doctor about this option.
- If problems arise during labor or delivery, it may not be possible to collect cord blood.
- If you decide to store cord blood in a private bank, you should find out the total cost, including charges for collecting and processing the cord blood and the annual storage fees.

Many resources are available if you want to learn more. The following organizations offer detailed information about cord blood banking and the uses of stem cells in the treatment of disease:

National Marrow Donor Program
3001 Broadway Street NE
Suite 100
Minneapolis, MN 55413
www.bethematch.org

Parent's Guide to Cord Blood Foundation
www.parentsguidecordblood.org

HealthyChildren.Org/The American Academy of Pediatrics
141 Northwest Point Boulevard
Elk Grove Village, IL 60007
www.healthychildren.org

American Association of Blood Banks
8101 Glenbrook Road
Bethesda, MD 20814
www.aabb.org

Finally…

The stem cells in cord blood can be used to treat some diseases and in research studies of new treatments. Public cord blood banks store cord blood for use by anyone who needs it. You are contributing to the overall supply of cord blood when you donate to a public bank. Private banks store cord blood for use by your baby or by family members. You should know all of the facts about cord blood banking before making a decision about storing or donating your baby's cord blood.

Glossary

Allogenic Transplant: A transplant in which the donated tissue, organ, or cells come from another person. The donor may be a family member or unrelated to the recipient.

Autologous Transplant: A transplant in which the recipient uses his or her own cells or tissue (such as bone marrow).

Bone Marrow: The spongy tissue in bone cavities that produces new blood cells.

Cells: The smallest units of a structure in the body; the building blocks for all parts of the body.

Directed Donation: A donation of an organ or cells that is directed to a specific individual or group, such as a family member.

Embryo: The developing organism from the time it implants in the uterus up to 8 completed weeks of pregnancy.

Genes: Segments of DNA that contain instructions for the development of a person's physical traits and control of the processes in the body. They are the basic units of heredity and can be passed down from parent to offspring.

Genetic Disorders: Disorders caused by a change in genes or chromosomes.

Hematopoietic Stem Cells: A type of blood cell that can mature into other types of blood cells.

Immune System: The body's natural defense system against foreign substances and invading organisms, such as bacteria that cause disease.

Neurological Disorders: Diseases that affect the brain, spinal cord, or nerves.

Placenta: Tissue that provides nourishment to and takes waste away from the fetus.

Rejection: An immune response in which the body recognizes transplanted cells or tissues as foreign and attacks them.

Umbilical Cord: A cordlike structure containing blood vessels that connects the fetus to the placenta.

This Patient Education Pamphlet was developed by the American College of Obstetricians and Gynecologists. Designed as an aid to patients, it sets forth current information and opinions on subjects related to women's health. The average readability level of the series, based on the Fry formula, is grade 6–8. The Suitability Assessment of Materials (SAM) instrument rates the pamphlets as "superior." To ensure the information is current and accurate, the pamphlets are reviewed every 18 months. The information in this pamphlet does not dictate an exclusive course of treatment or procedure to be followed and should not be construed as excluding other acceptable methods of practice. Variations, taking into account the needs of the individual patient, resources, and limitations unique to the institution or type of practice, may be appropriate.

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