

BANK IT. DON'T BIN IT. A COMPREHENSIVE GUIDE TO CORD BLOOD BANKING



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WHAT ARE STEM CELLS AND WHAT CAN THEY DO?

Stem cells are powerful master cells that have two unique properties:

- The ability to self-renew indefinitely
- The power to divide into specialised cells

The human body is made up of over 200 specialised cells. For example, the cells that make up your muscles are different to those found in your blood, which are different again to the cells that make up your hair. Stem cell is simply the name we give to a master or 'naïve' cell that can transform into these specialised cells depending on where in the body it is needed. These properties make them extremely valuable to medicine.

Umbilical cord blood is the blood that can be collected from your baby's umbilical cord and the placenta after they are born. Cord blood contains billions of powerful stem cells, which are already used to treat over 80 different diseases.



WHAT MAKES UMBILICAL CORD BLOOD STEM CELLS DIFFERENT?

Stem cells can be found in various parts of the human body. However, umbilical cord blood is a rich source of naïve stem cell types, which is why many parents choose to save their children's cord blood and tissue following birth.

For example, cord blood contains mesenchymal stem cells (MSCs)^{1,2,3}, haematopoietic stem cells (HSCs)⁴, and very small embryonic like stem cells (VSELs)⁵, all of which may be usable in stem cell treatment.

Furthermore, the presence of **hormones** and **growth factors** that help the baby to develop are believed to increase the overall success of stem cell treatment and provide additional therapies.



WHAT CAN BE TREATED WITH CORD BLOOD STEM CELLS?

The stem cells from your baby's umbilical cord blood can be used to treat disease and injury, and are considered to be the cornerstone of regenerative therapies.

Although there are many fields of study, two types of therapy are receiving particular focus. These are transplants and regenerative therapy.

TRANSPLANTS

Haematopoietic stem cells (HSCs) can transform into any type of blood cell and are currently being used in the treatment of various blood cancers and disorders.

Available today to treat:

Metabolic Disorders:

- Krabbe Disease
- Hurler Syndrome

Blood Cancers:

- Leukaemia
- Lymphoma
- Myeloma

Solid Tumours:

Neuroblastoma

Immune Disorders:

- Severe combined immunodeficiency (SCID)
- Wiskott-Aldrich Syndrome

Blood Disorders:

- Sickle Cell Anaemia
- Aplastic Anaemia
- Fanconi Anaemia



REGENERATIVE THERAPY

This groundbreaking medical field uses umbilical cord stem cells to repair or replace damaged tissues and organs.

Over half the samples released by Cells4Life have been used in this area.

Being researched to treat:

- Cancer
- Brain Injury
- Multiple Sclerosis
- Cerebral Palsy
- Parkinson's Disease
- Alzheimer's Disease
- Cystic Fibrosis
- Hearing Loss
- Bone Fractures
- BurnsStroke
- Heart Disease
- Cardiac Regeneration
- Liver Failure
- Diabetes
- Spinal Cord Injury



1 MILLION

80+

haematopoietic stem cell transplants have been performed worldwide.

medical conditions are currently treated with cord blood stem cells.



35+

years of successful use since the first cord blood transplantation in 1988.

47%

of privately banked cord blood releases have been for use in Regenerative Medicine.

5

WHAT IS CORD BLOOD BANKING?

Cord blood banking is the process of collecting umbilical cord blood at birth and storing it for future use. It's a once-in-a-lifetime opportunity to save the most powerful source of stem cells your baby will ever have. The process is non-invasive and should have no impact upon your birth plan.

After birth, once the umbilical cord is cut, your doctor or midwife will perform the cord blood collection using the materials provided in the Cells4Life collection kit. Then one of our dedicated staff will come to pickup the sample and bring it directly back to our laboratory. We will then process the cord blood, perform various tests and place it securely into long term storage.

Should your child or a family member ever need to use the sample, all you have to do is contact us and we will liaise with your medical facility to release the stem cells for treatment.

Aside from cord blood, Cells4Life also stores the cord tissue, cord vessel, Wharton's jelly, placenta, chorionic villi and amnion. This gives you the opportunity to store the maximum number of newborn stem cells at the time of birth.

Simple Steps to Cord Blood Banking with Cells4Life



Call us to book for an appointment

Order your kit & sign the contract

Advise your doctor

Cord blood collection at birth

Call us to arrange for courier pick-up

Sample initial testing

Maternal sample testing Sample viability testing

Sample sterility testing

Sample storage & certificate release

DELAYED CORD CLAMPING AND CORD BLOOD BANKING

Cord blood banking is possible even with delayed cord clamping. Research has shown that a 1-minute delay in clamping the umbilical cord will result to a transfer of about 80ml of blood into the infant, with more than 100ml of blood left for cord blood banking.

The recommended times for delaying cord clamping are:

- World Health Organization (WHO) between 1 to 3 minutes⁶
- Royal College of OB-GYNs (RCOG) 30 seconds to 2 minutes⁷
- The American College of OB-GYNs (ACOG) 30 seconds to 60 seconds⁸

All of the above international bodies suggested not to go over 3 to 5 minutes before clamping due to the high incidence of increased risk for neonatal phototherapy, higher risk of polycythemia, hyperbilirubinemia and other neonatal disorders.

WHY CAN MY OWN CHILD'S STEM CELLS BE MORE EFFECTIVE?

Currently most stem cells used for treatment come from a public bank, these are anonymous donations. Whilst all donor samples are matched to the recipient, there is a risk that when they are introduced into the human body during treatment, they might be rejected⁹ or result in graft-versushost disease (GvHD),¹⁰ either of which can cause extremely serious side-effects.

Storing your own child's umbilical stem cells ensures that a perfect match is always available. Simply put, if your child becomes ill or suffers injury, it is quite possible that they may be treated with their own umbilical stem cells without these risks. Naturally, storing stem cells is considered particularly important if:

- A sibling is already known to suffer from a treatable disease.
- You have a family history of a disease that could be treated using cord blood, such as Type 1 Diabetes, Leukaemia, Multiple Sclerosis.
- You come from a minority or mixed race background, where the chance of finding a match on a public registry is greatly reduced.
- There is limited access to a biologically related family member following adoption, surrogacy or the use of a donor sperm/egg.

WHAT ARE THE CHANCES OF NEEDING STEM CELLS?

When Cells4Life launched in 2002, the chance of a child using their stored stem cells was 1 in 20,000. By 2008, it was predicted that 1 in 3 individuals might benefit from regenerative medicine therapy."

Considering the expanding number of ways in which stem cells can be used to treat illnesses and injuries, there is a significant chance that your children will use some or all of their stored stem cells in their lifetime.

In 1988, the first successful cord blood transplant was performed in Paris, treating a young boy with Fanconi Anemia by utilising his newborn sister's cord blood collected at birth.



100% Match to your newborn baby



25% Chance of a match for siblings



50% Parents are a partial match



CELLS4LIFE CORD BLOOD BANK

Founded in 2002, Cells4Life have more than 150,000 cord blood samples stored in the UK lab and collected in more than 50 countries worldwide.

We have released cord blood samples for treatment of:

- Leukaemia
- Cerebral Palsy
- Autism
- Perinatal Stroke
- Diamond Blackfan Anaemia
- Beta-Thalassemia Major

In 2014, we became the first cord blood bank to provide umbilical cord tissue for an experimental new treatment.

We are the first UK cord blood bank licensed by the DHA to collect, process, and store cord blood samples in Dubai.

<image>

BANK IT, DON'T BIN IT

Cord blood is far too important to waste, yet, if it is not collected and banked, it is routinely thrown away. Cord blood banking preserves powerful stem cells and ensures your baby can enjoy the benefits of cord blood storage:



Choice

Banking your child's own cord blood and tissue means that they, and the rest of your family, have exclusive use of the stem cells – how you need them, when you need them.



Protection

Your baby's cord blood is their perfect biological match, which means treatments can take place without risk of rejection. It is also possible siblings and parents can use the sample too.



Security

The chances of finding a stem cell match in a public cord blood bank can be as low as 30% and for some ethnic groups, as low as 1 in 500,000. Private cord blood banking ensures your child's perfect match is ready and waiting, whenever they need it.

CORD BLOOD BANKING SERVICES

1. Volume-Reduced Storage

Our Volume-Reduced Storage focuses on extracting the maximum number of haematopoietic stem cells (HSCs) from the umbilical cord blood and is similar to what many other umbilical cord stem cell storage providers in the Middle East offer.

More cells = More treatments

Storing the maximum numbers of HSCs means more access to future treatments and developments.



Lower cost option

Because the cord blood volume is greatly reduced, this offers the benefit of lower storage costs.

2. Whole Cord Blood Storage

Our Whole Cord Blood Storage preserves all cell types found in umbilical cord blood which involves minimal manipulation, thereby achieving a 100% cell recovery rate and preventing unwarranted loss of vital cell types. This approach ensures the storage of the highest number of stem cell groups for both present and future treatments.

100% of all cells and every cell type stored

By storing the whole cord blood, all components present in the cord blood are captured including HSCs, MSCs, VSELs as well as hormones and growth factors.



MORE cells = More opportunities & future proofing

Whole cord blood also contains other unidentified cells that may be useful in the future. Storing these cells together with those already known means more opportunities for treatments and future developments.

MORE cells = More treatments

Cells4Life split the whole cord blood sample across a bag and multiple vials. Some therapies only require a fraction of cord blood sample. Storing in multiple subdivisions mean that you have an option to use just a portion of the sample as required and keep the remaining in storage until needed.







100% OF ALL CELL TYPES



CORD BLOOD BANKING SERVICES

3X MORE STEM CELLS

3. CellsPlus Storage

Our CellsPlus is powered by TotiCyte, a ground-breaking cord blood separation technology patented by and is exclusive to Cells4Life!¹² Found to be the highest performing cord blood processing system when tested in a published, peer-reviewed head-to-head study, **TotiCyte delivers 2.2 to 3 times more stem cells** at the point of therapy than other leading technologies.



Highest cell recovery TotiCyte delivers up to three times as many viable cells at the point of therapy.

How Does TotiCyte Work?¹³

- TotiCyte causes the red blood cells to sediment, leaving all other cell types, including the stem cells, suspended in plasma.
- 2 The plasma and stem cells are expressed into the next processing bag, leaving 99% of the red cells behind.



99% red cell removal

TotiCyte removes more red blood cells that improves blood type compatibility.

- S The plasma and stem cells are gently centrifuged, which causes a layer (called the 'buffy coat') of stem cells to form at the bottom of the plasma.
- The excess plasma is removed leaving a 25ml stem cell sample, which can be divided into multiple units prior to storage.



More Viable Cells at the Point of Treatment

The more cells stored, the more treatments they will be able to have, especially as we also store the sample into up to 6 subdivisions. For many therapies, the number of cells required is linked to body weight – choosing CellsPlus could mean the difference between only being able to treat a small child and having enough cells to treat an adult.¹⁴

Delayed Cord Clamping

Delayed cord clamping is essential for optimal health outcomes and TotiCyte ensures compatibility with this practice, allowing for cord blood banking without compromise. With TotiCyte, even small samples can be processed, delivering up to **3 times more cells** at the point of treatment compared to other leading systems, thus maximizing therapeutic potential.



CORD TISSUE BANKING SERVICES



- Cord tissue is a rich source of Mesenchymal stem cells (MSCs)¹⁵which are currently being investigated for the treatment of stroke, Type 2 diabetes, Parkinson's disease, psoriasis, Multiple
- sclerosis, and more. In 2014, Cells4Life is the first UK stem cell bank to release a cord tissue sample for therapy.



2. Cord Vessel*

Cord vessel contains several unique cell types such as:

- Human Umbilical Vein **Endothelial Cells** (HUVECs)
- Epithelial Cord Lining Stem Cells (CLSCs)
- Human Umbilical Cord Perivascular Cells (HUCPVCs)



3. Wharton's Jelly*

Wharton's jelly contains mesenchymal stem cells (MSCs) that can differentiate into various cell types, offering therapeutic potential in regenerative medicine by promoting tissue repair, immunomodulation, and addressing conditions such as cardiovascular diseases and neurodegenerative disorders.

Early clinical trials have shown promising results for:



Neurological conditions

Heart and vascular disease

Inflammatory

& autoimmune







Cancers



Trilineage Differentiation

Umbilical cord tissue samples processed and stored by Cells4Life contain MSCs that can be isolated and expanded into billions of cells. These MSCs can transform into fat, cartilage and bone cellular lineages, demonstrating their ability to differentiate.

Cord Tissue Clinical Trials

In 2014, a review article¹⁶ found that 70% of clinical trials using cord tissue MSCs is in China.





PLACENTA BANKING SERVICES

1. Placenta*

The maternal side of the placenta is also known as maternal decidua. It plays a vital role in delivering oxygen and nutrients to the baby while removing waste products from the baby's blood through the umbilical cord's blood vessels.

POWERFUL

Cells taken from the placenta are perinatal, which means that they are younger and more naive, and therefore have greater potential in a variety of treatments.



SAFE

Collecting the placenta is quick, simple, safe and completely non-invasive.



UNIQUE

Cells from the placenta are unique. They are a perfect match for your baby and can also be used by the mother in therapies.



2. Amnion

Amnion is the innermost layer of the placenta. It is the thin sheet of epithelial and stromal cells that lines the placental sac.

The amnion contains:

- Healing components collagen, fibronectin, hyaluronic acid
- Growth factors
- Anti-inflammatory proteins
- Anti-microbial components

In the USA, disorders of the cornea account for 41% of all amnion transplants.²²

Amnion: Proven Uses



ULCERS

In 2017, researchers found that the amniotic membrane was able to induce 'epithelialisation', which is the process where the body is able to replace skin cells in a wound.¹⁷ Other studies have also shown amnion tissue is helpful in healing diabetic foot ulcers,¹⁸ which affects 10% diabetes suffers in the UK.¹⁹



AMNION SKIN GRAFT

The amniotic membrane contains a significant number of cytokines and growth factors, which means it can support wound healing and reduce the formation of scar tissue. It is also thought to reduce pain when applied to a wound.²⁰



BURNS

A 2016 study concluded that using the amnion to dress burns wounds can improve pain and result in faster healing.²¹

PLACENTA BANKING SERVICES

Amnion: Clinical Trials



DRY EYE

Doctors have used amnion to enhance recovery in 90 patients with severe dry eye and saw an improvement in 88% of cases.²³



CARDIOVASCULAR CONDITIONS

Patches of the amniotic membrane have been used to treat patients with inflammatory cardiovascular conditions.²⁴



LUNG AND LIVER FIBROSIS

The powerful anti-inflammatory effect of the amniotic membrane may also make it the ideal therapeutic option for liver fibrosis. In an animal model, application²⁵ of amnion resulted in tissue regeneration, inhibits fibrosis (scarring of connective tissue), and reduces inflammation.²⁶

3. Chorionic Villi

- Chorionic villi are tree-like structures which extend from the chorion.
- They maximise baby's contact with the mother's blood stream, ensuring they receive essential nutrients during pregnancy.
- They are rich in regenerative cells.





BRAIN INJURY

Amnion-derived cells could help with brain injury by reprogramming inflammatory responses, and permanently improving neurological function.²⁷



DIABETES

A study in 2016 showed an amnion injection of placenta tissue-derived cells might be able to improve glycaemic control in patients with diabetes.²⁸



3D PRINTING BODY PARTS

Scientists have used stem cells from the amnion to create functional muscles, jawbone fragments and even ears using 3D printers.²⁹

Clinical Trials Using Chorionic Villi:



HEART DISEASE

Cells from the chorionic villi have are expected to help create heart valves, and maybe even replace blood vessels.^{30,31}

CROHN'S DISEASE



Preclinical studies have used placenta cells from the chorionic villi to decrease inflammation in the liver, which is a symptom of Crohn's disease.³²

OSTEOARTHRITIS



Chinese researchers have injected placenta cells into arthritic knees to determine if they can reduce inflammation, stiffness, pain and loss of movement.³³

DIABETES



After receiving cells from the placenta, patients with Type 2 diabetes experienced increased levels of insulin and 4 out of 10 patients reduced their insulin doses by more than 50%.³⁴

ISCHAEMIC STROKE



Scientists have used stem cells from the amnion to create functional muscles, jawbone fragments and even ears using 3D printers.³⁵

WHY CHOOSE CELLS4LIFE?

Everything about our service has been designed with one purpose in mind – to ensure the long-term health protection of your child. Here are just a few of the benefits of choosing our cord blood lab to store your newborn baby's stem cells.





REGULATORY APPROVAL

Cells4Life is the first UK Cord Blood Bank licensed by the Dubai Health Authority (DHA) to collect, process, and store cord blood samples in Dubai. Our regional headquarters is in the UAE, licensed by Dubai Healthcare City.



PATENTED TECHNOLOGY

Our CellsPlus premium service is powered by TotiCyte – a patented cord blood separation technology that preserves up to 3 times more viable stem cells for future treatments than any other similar technology.



COMPREHENSIVE SERVICE

Cells4Life provides a full range of storage services: Cord Blood, Cord Tissue, and Placenta, allowing you to store the maximum number of stem cells for more treatment opportunities in the future.



SPECIALISED HANDLING

Cord blood samples are efficiently collected from hospitals by our trained staff, ensuring their safe transport to our lab in Dubai. We also use a temperaturecontrolled vehicle to maintain the cord blood sample viability while in transit.



TIMELY PROCESSING

Cord blood samples are promptly processed upon arrival at the lab. Our trained lab staff performs rigorous testing on the cord blood samples and we provide a detailed testing certificate as a proof of cord blood storage.



ROBUST STORAGE

Every piece of laboratory equipment is electronically monitored and has an integrated backup system. Our 2-tonne nitrogen storage tank is the largest to have been imported into the UAE and we store samples in multiple subdivisions for more treatment opportunities.













FREQUENTLY ASKED QUESTIONS

Will I have to alter my birth plan if I want to collect and store my baby's cord blood?

No. Cord blood collection is compatible with all birth choices, including; home births, natural deliveries and caesarian sections, and managed or physiological third stages.

What would happen if there were complications at birth?

The wellbeing of the mother and baby is always the primary consideration. Cord blood is collected after delivery of the placenta. Procurement neither affects the management of the labour nor does it change or interfere with the care needed at the critical time of delivery. However, where collection of the cord blood may distract from the care of mother or baby, the procedure should not be carried out.

How is cord blood, cord tissue, and placenta collected?

After your baby's birth, your obstetrician or midwife uses the Cells4Life Collection Kit we provide to clean the umbilical cord. They then insert the blood bag needle into the umbilical vein, allowing the blood to flow into the bag by gravity. Following the collection, they clamp, seal, and label the blood bag tubing.

For cord tissue collection, they carefully select, clean, and cut about 10-15cm of the umbilical cord. In the case of placenta collection, the placenta is placed in a separate sterile bag provided in the collection kit.

All the collected samples are then placed back into the Cells4Life Collection Kit box and transported to our lab.

Are there any medical risks to either the baby or myself?

When the Cells4Life protocol is followed this does not add any risk to the mother or baby at birth. It is a simple, quick and safe process and occurs after child birth. The person procuring the sample is trained in the process to ensure the safety of the mother and baby and the integrity of the sample.

What happens if my baby's stem cells are needed for a treatment in the future?

We already have experience of releasing samples for treatment of cerebral palsy, autism, stroke, diamond blackfan anaemia, leukaemia, and brain injuries.

If your child or a family member required their stem cells for a treatment, with your consent, we would liaise directly with the treating facility, whether in the UK or anywhere else in the world, to set up the transfer of the sample. In these instances there would be no release fee and, for any recognised heamatopoietic diseases, we would also pay for the cost of transporting the samples.

What is the difference between private and public cord banks?

Mothers who give birth at certain hospitals can choose to donate cord blood voluntarily to the public cord bank. However, once donated, the sample will be used for anyone with a clinical need.

The sample will not be available for use by the donor, as this is prohibited under these banks' accreditation standards. Private storage is the only way to guarantee a perfectly matched sample and ready availability should your child need it.

CELLSPLUS

3 times more cells Powered by TotiCyte Unique to Cells4Life



% Of Viable Stem Cells Post Thaw

The number of stem cells recovered post-thaw is very important, since this will be the total amount of stem cells available for treatment after the cord blood sample is processed, frozen and finally prepared for treatment.

On the peer-reviewed study, post-thaw is where we see the biggest difference. Upon thawing, the study found that TotiCyte retained 66% of the CD34+ population of cells, compared to 42% for the AXP, 41% for HES, 38% for MacroPress and 40% for the Sepax 2.



TotiCyte Relative Comparison

The study utilised Colony Forming Unit (CFU) analysis, a gold standard for testing stem cells before treatment as it tells you the number of viable stem cells, and how many have retained the functional ability to grow and divide. When taking in to account the number of viable stem cells within the thawed samples that had retained the ability to behave like functioning stem cells by forming colonies, **TotiCyte retained 2.2 times more viable stem cells than the AXP and 3 times more stem cells than the MacroPress Smart.**

Overall comparison of TotiCyte versus industry standard technologies for volume reduction on CD34+ cell recovery at point of use.

Processing Method	Post-thaw viable CD34+ recovery	CFUs	Overall viable post-thaw CD34+ and CFUs relative to TotiCyte
TotiCyte	1.00	1.00	1.00
AXP	0.64	0.72	0.46
HES	0.62	0.69	0.43
MacoPress Smart	0.57	0.59	0.34
Sepax 2	0.60	0.58	0.35

Summary of Analysis



CUSTOMER TESTIMONIALS

"Great and relatively unobtrusive service. Have used Cells4Life for both our kids and have been very happy with the service. They know what they are doing, arrive when they say they will, do what they have to do and get out! Impressed!"

- SCOTT

"It was a great experience with the Cells4Life here in Dubai. The genuine care from their staff, and the quality of the service delivered is outstanding. I advise people to consider such a service, since it is being proved that future medicine depends on storing those stem cells."

- FARES

"Professional team with good response timing. Customer oriented service with great commitment to their job. Keep it up!"

-DIMA & TAREK

"If you are a soon-to-be parent, our advice is don't procrastinate or think twice over making a decision. You never know the exact date of the birth and if you reach that day without having arranged for a piece of the umbilical cord to be collected and stored your chance is gone forever to be able to make a huge difference in your child's life... because you never know what can happen!"

- DARRYL & ANGELIQUE

"Dealing with Cells4Life was a pleasure, from making the appointment, and asking all the random questions you never think of before investigating blood and tissue storage, to collection and receiving certification. This is an insurance policy that I hope we never need but is one of the best things we have done for our daughter."

- DEE

"We have tried another company for our first baby and we were happy, but I must say that with Cells4Life we have had a much better experience so far... Very professional and very much customer oriented. The response of the representative was excellent..."

- NABIL

"We were blessed with the delivery of triplet boys and asked for Cells4Life to store all their stem cells. The service was professional, and our local representative was able to handle it on time and managed to get the samples as soon as the delivery was done and without delay."

— FAISAL



"I have been connected to Cells4Life for the past four years. I am happy at the quick and responsible attitude that has always been adopted by you. At the time of delivery, the collection of the cord went really smooth and that's a great relief. Thanks for the continuous updates on research and discoveries as well!" - DEENA PHILIP

"I went into labor unexpectedly at 32 weeks with my twins. I had not had time to finalize the paperwork for the collection of the cord blood. We called the company representative and he arranged for the equipment to be delivered to the hospital immediately at 11PM, in time to do the collection for both babies. Thank you!" --- RACHEL

"The representative were very knowledgeable and patient with my questions before we agreed to purchase the service. Scheduling pick up was simple, and we were updated regularly throughout the delivery and processing."

— CM

"The decision to go for stem cells storage and cord blood collection was at the very last minute -during labour! The responsiveness and assistance of the representative was outstanding. The followup was also great. Keep it up!"

— JEAN A.

"We used Cells4Life when our daughter was born and thought the service was great. We like getting updates that inform us of all the developments in medical world. It has confirmed for us that it was the right decision to use cord blood banking. We sincerely hope to never need it, but feel secure in the knowledge that it is in a safe place."

- MURIEL

"We found Cells4Life to be extremely professional, courteous, punctual and responsive to our requests for information. The testing and analysis was swift and comprehensive and everything was explained thoroughly to us. We definitely have peace of mind that our baby's samples are being handled by the right company."

— LESLIE

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