

**Don't hide your
child's future health
under the pillow...**



Don't hide your child's future health under the pillow

Milk teeth contain stem cells which could be used to treat your children if they're ill later in life.

It's a special stage in your child's development when their milk teeth start to wobble and the tooth fairy pays a visit. But when that happens, rather than placing a coin under their pillow, wouldn't something that helps their future health be a better gift?

At the heart of your children's teeth is a reservoir of dental pulp. And inside this is a supply of precious stem cells. These are known as mesenchymal stem cells, the most powerful of all the cells in their teeth.

These stem cells have the ability to change themselves into lots of different kinds of cells that may be able to repair joints, muscles, bone, nerves, even a damaged heart. They may also help treat ailments like diabetes, arthritis and neurological diseases.

Future Health Biobank has developed the technology, expertise and care, to keep your children's dental stem cells safe, healthy, and ready should they ever be needed.

Future Health Biobank is already a pioneer and leading name in collecting and preserving umbilical cord and tissue stem cells. Who better to trust with your children's future health. The tooth fairy?



Contents

What are stem cells?	4
What are tooth stem cells?	5
What treatments could tooth stem cells be used for?	6
What the experts say	8
Storing stem cells from your own 'adult' teeth	9
Case history. A mum's experience	10
How your child's tooth stem cells are collected	11
What happens when the tooth reaches Future Health Biobank?	13
Information required for successful stem cell storage	14
Questions & Answers	16
Why choose Future Health Biobank?	18
Other ways we can help your family's future health	19
What do you do now?	19

What are stem cells?

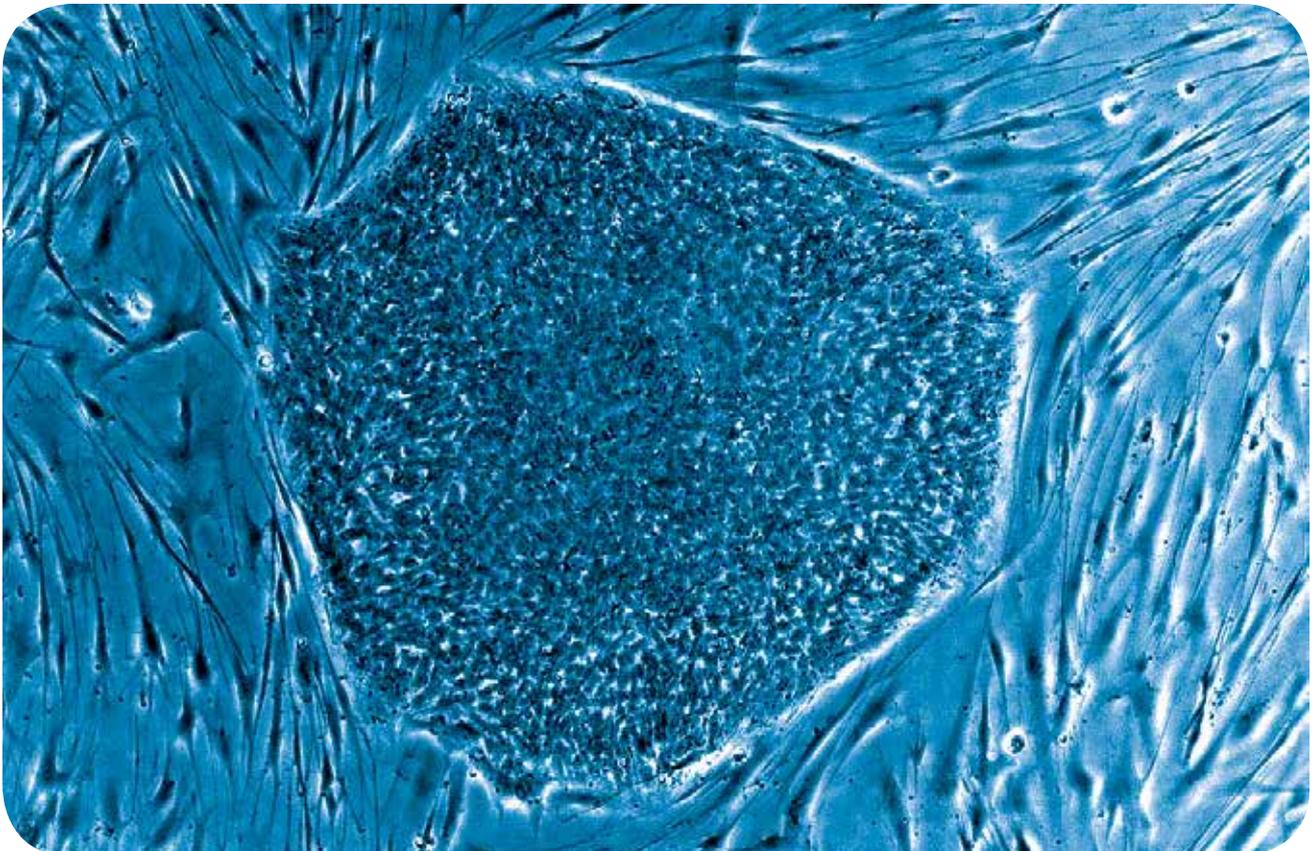
A cell is the smallest unit of life that can be classified as a living thing and is often called the building block of life. It's what we're made of.

Before we're born, our cells are unspecialised and each one is given the job of building the various parts of our body. Throughout our life, our stem cells are more flexible and can develop the ability to multiply and transform into any of those specialised cells.

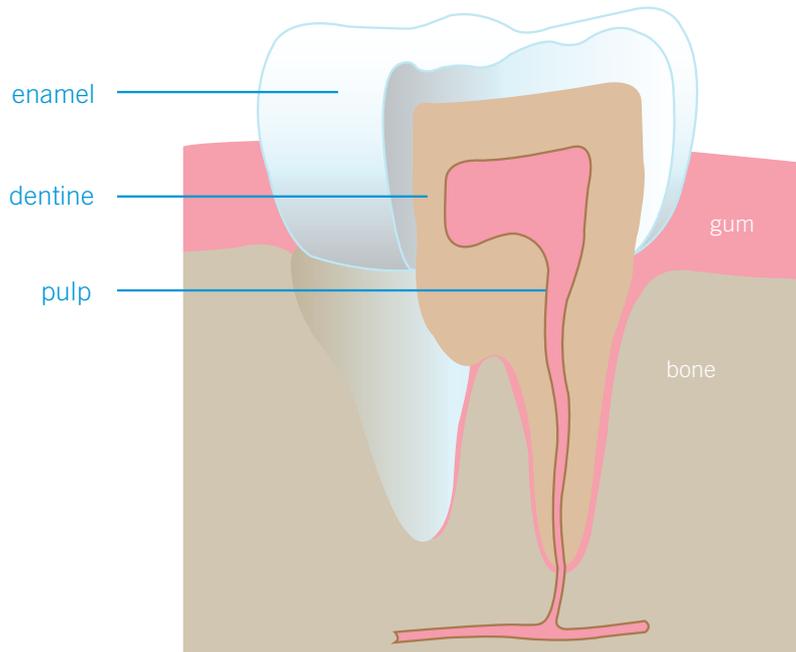
Our stem cells can produce muscles, tissue, organs, blood, bone...everything. In doing so, they form the best natural repair system our body could ever wish for.

Over the past 20 years, exciting developments have taken place using stem cell technology in medicine and treatments. For instance, as well as carrying out general maintenance throughout our body, stem cells have now been shown to help restore the function of our blood... come to the aid of our ailing immune system...help regenerate our organs...and treat us for an ever-increasing variety of medical conditions. Some of them life-threatening.

Stem cells are found throughout the body. From the blood in our veins and the marrow in our bones...to the teeth in our mouth.



What are tooth stem cells?



Tooth stem cells are special cells that live in the pulp tissue inside our teeth. They were only discovered as recently as 2003, by a scientist at the National Institute of Dental and Craniofacial Research in the USA.

The best tooth stem cells are found in the dental pulp of the 20 deciduous or milk teeth our children have.¹ These stem cells are formed during the sixth week of a baby's development in the womb and contain unique mesenchymal stem cells that have the potential to be used in a wide variety of medical treatments – tissue and bone regeneration, for instance.

So, by the time your child's milk teeth come out – usually between 6 and 12 years old – the stem cells from one or more of them could easily be preserved by us for as long as you wish, to help ensure your child's future health. Or even the health of other members of your family.

That's why these teeth are too precious to be hidden under a pillow then discarded or saved as mementos.

Did you know?

The roots of milk teeth are actually digested inside the gum by the permanent set of teeth waiting to emerge. So the healthier those milk teeth are, the healthier your child's new permanent 'adult' teeth may be.

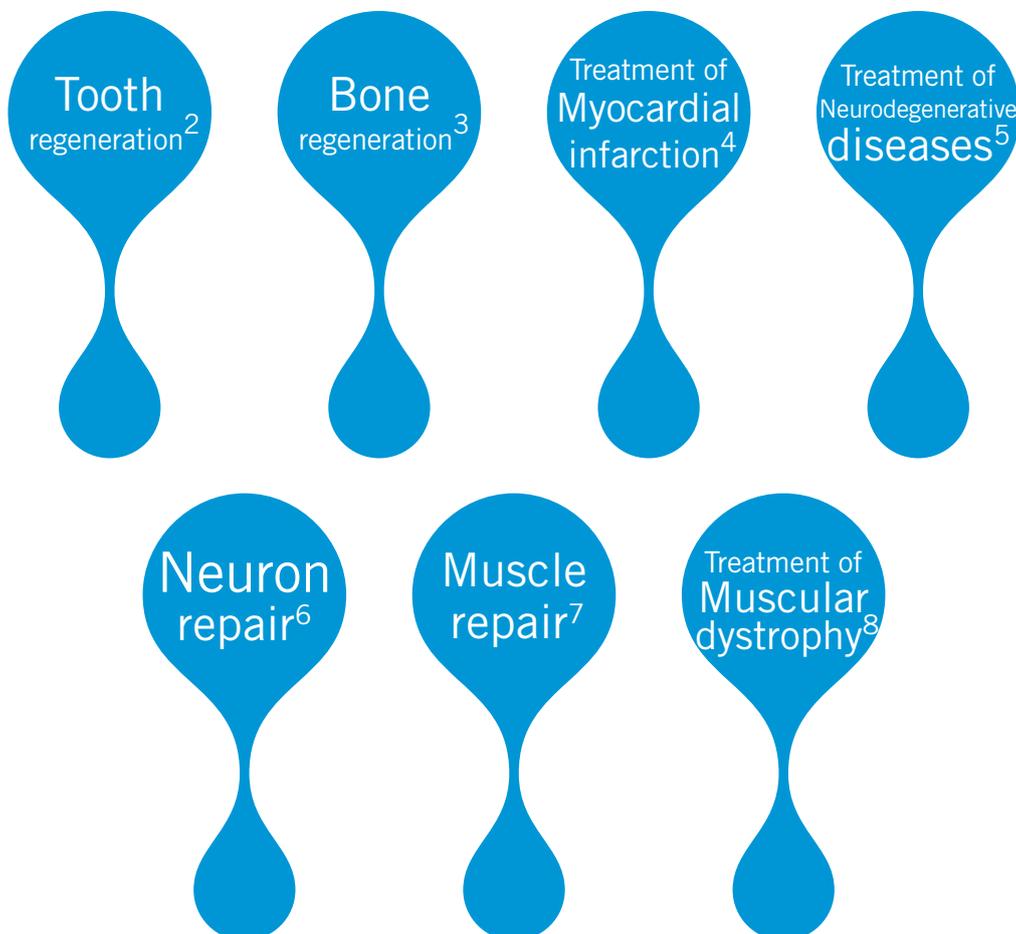
What treatments could tooth stem cells be used for?

Medicine advances in much the same way as technology. Think how fast mobile phones and the internet have grown to become an integral part of our lives. With stem cell therapy, many people believe that stem cell treatments have the potential to change the face of human disease and alleviate suffering.

Today, stem cells can be used to treat either blood disorders or tissue regeneration. Tomorrow...who knows.

Stem cells taken from sources such as umbilical cord blood have the potential to be used to treat disorders such as leukaemia, anaemia, autoimmune disease, even some forms of cancer.

Stem cells cultured from both milk teeth and adult extracted teeth, in particular wisdom teeth, are being used in a variety of global research projects. As such, leading scientists have reported that dental pulp stem cells could provide a cure in the foreseeable future in various areas of regenerative medicine, such as:





What the experts say

“Every child loses primary teeth, which creates the perfect opportunity to recover and store this convenient source of stem cells – should they be needed to treat future injuries or ailments.”

Dr. Vishal Seth.

<http://orthocj.com/2010/08/novel-applications-for-stem-cells-from-human-exfoliated-deciduous-teeth---paving-the-way-for-further-solutions>

“Recent studies have shown that Human Exfoliated Deciduous teeth (milk teeth) have the ability to develop into more types of body tissues than other types of stem cells.”

Miura M, Gronthos S, Zhao M, Lu B, Fisher LW, Robey PG, Shi S. SHED: Stem cells from human exfoliated deciduous teeth. Proc Natl Acad Sci U S A, 100(10): 5807–12, 2003.

“Dental pulp is a promising source of mesenchymal stem cells with the potential for cell-mediated therapies and tissue engineering applications.”

Woods EJ *et al.*

Optimized cryopreservation methods for human dental pulp-derived stem cells and their tissues of origin for banking and clinical use. Cryobiology. 2009 Oct; 59(2): 150-7. Epub 2009 Jun 16.

You can also store the stem cells from your own ‘adult’ teeth

Future Health Biobank doesn't only collect and store the tooth stem cells from childrens' milk teeth. Some adult teeth, including wisdom teeth, are also accepted for processing and storage.

These contain mesenchymal stem cells, similar to those found in a child's milk teeth – and they can have as profound an affect on your health, as your childrens' stem cells have on theirs.

These adult teeth, however, must be healthy and free from decay and infection, otherwise the stem cells contained in them wouldn't be viable for collection and preservation.

Extraction of problem wisdom teeth that may be impacted, for instance, gives you the perfect opportunity to have the stem cells from your dental pulp collected and preserved.

The collection, processing and preservation of the dental pulp stem cells in these teeth is exactly the same as with your child's milk teeth.

So...if you're planning on having an extraction, why not call us beforehand and we can discuss it and answer any questions you may have.



A mum's experience

A case history

Jo is a 36 year old mum living in Cheshire. When her oldest son, Ted, was approaching six, she read about Future Health Biobank, how they collected and saved tooth stem cells – and what the possible benefits could be for her family.

Said Jo, *“I have three energetic young boys who are all in good health. We have a family history of diabetes, arthritis and heart disease so it's important to me to take advantage of any advances in medical science that could help them in the future.*

“Future Health Biobank were great. They were really efficient and friendly. I contacted them before Ted was six and before his teeth started to come out. When his first one got very wobbly, I helped it out a little. I had a Future Health Biobank Collection Kit by then, and found it very easy to use. In fact the whole process went like clockwork. I even told Ted that I was going to send it off to the tooth fairy early, but they would still leave some money under the pillow!

“At first, storing Ted's tooth stem cells seemed like a big outlay. And anyway, how can you put a price on the health of your child. It's more like an insurance for later on in life!”



How your child's tooth stem cells are collected

Step 1. Be prepared

Take care of your child's teeth

Healthy teeth and gums mean healthy dental pulp stem cells. So make sure your child brushes well and regularly.

Know what to do before teeth start to come out

Make sure you're prepared before it happens. Send for a Future Health Biobank Collection Kit while your child's teeth are still in place and read all the information you can about collecting them ready for preservation.

Act when teeth are wobbly

Ideally, the tooth should be wobbly, rather than have dropped out. It may be better to give it a gentle tug yourself or arrange for your dentist to do so. Teeth that have dropped out on their own can still be used, but they may have a lower volume of stem cells.

Step 2. Put the tooth in our Collection Kit container

Once the tooth is out, it NEEDS to be put in the Collection Kit container within 15 to 20 minutes, to make sure the pulp doesn't dry out and maintains the stem cells.

The Collection Kit supplied has everything you need to keep your child's tooth, or yours, safe and sound until it reaches our laboratory. The Kit is:

- Fully accredited by the appropriate authorities.
- Completely covered by our licence to transfer biological substances.

Step 3. Complete a simple questionnaire

In your Collection Kit, you'll find a 'health' questionnaire. Simply complete this and return it to us in the pack containing your child's tooth and blood sample. It won't take long and the answers are completely confidential.

Step 4. Call us!

Pop everything in your Collection Kit container, give us a call right away and we'll arrange for our approved medical courier to come and collect it. If it's in the evening, you can keep your tooth and blood sample in the fridge overnight – then call us first thing in the morning. The tooth must reach our laboratory no more than 72 hours after the tooth comes out.

Step 5. Take a sample of donor blood

To comply with our regulations, we need to collect a small sample of blood. With this sample we check for HIV, HTLV, Hep B & C and Syphilis, as part of our standard blood screening procedure. Future Health Biobank will contact you once you have informed us of the tooth shipment to arrange the collection of the blood sample.



What happens when the tooth reaches Future Health Biobank?

Processing

Once here, your details are entered into our computerised processing system. Dental pulp stem cell separation and preservation are carried out by specialised scientific laboratory personnel, in accordance with strict guidelines, in our purpose-built sterile laboratory.

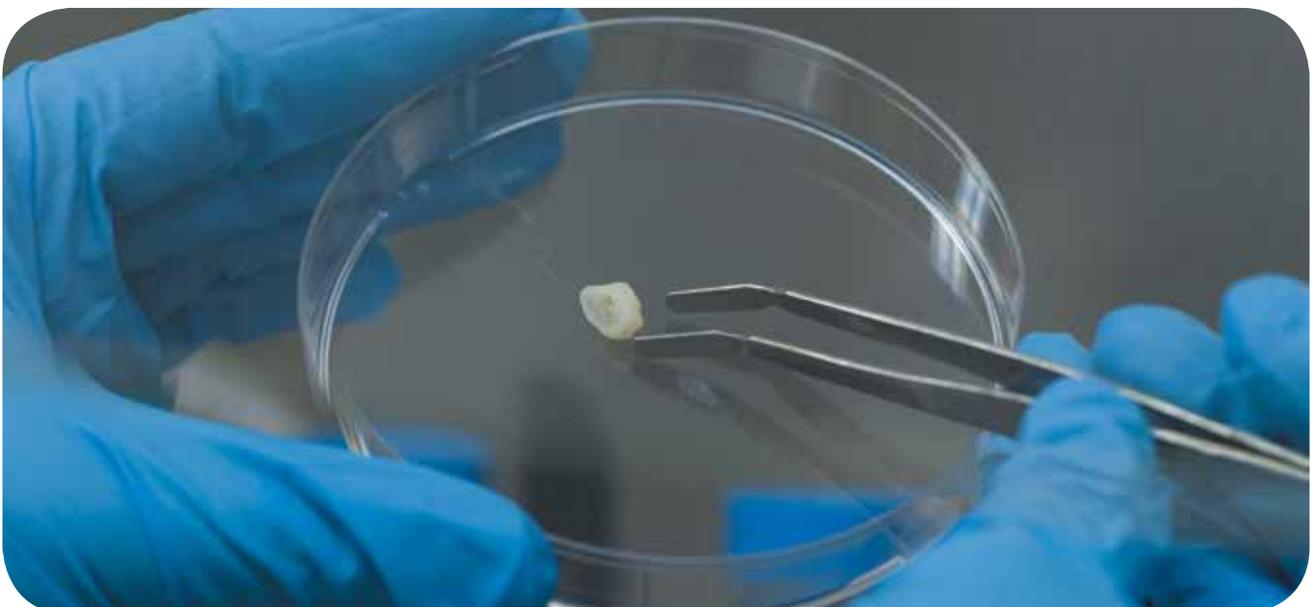
First, the tooth quality is assessed to ensure that the tooth is healthy enough and contains dental pulp that is viable for stem cell extraction.

Next, the dental pulp stem cells are extracted and separated from all the other parts of the tooth. The isolated stem cells are seeded onto tissue culture plastic and their growth observed through a microscope to check that the process has been successful. At that point we'll harvest the stem cells and prepare them for long term cryostorage.

Preservation

Once the dental pulp stem cells are separated, they're placed in unique cryovials, bar coded to ensure that your child's dental pulp stem cells are never misplaced and can always be identified as theirs. Then they're placed in a cryobox for extra protection.

The cryobox is then bar coded and placed in a storage tank containing liquid nitrogen where it will sit, safe and secure, in the nitrogen vapour. Waiting for the day when they may be needed.



Information required for successful stem cell storage

We take our responsibilities to you and your family's tooth stem cells very seriously. As such, there are certain things that we have a legal requirement to do.

We'll tell you when storage has begun

When your child's (or any member of your family's) dental pulp stem cells are placed in storage, we will contact you in writing and let you know that the process has begun. This will serve two purposes. One, to officially record the storage start date – and two, to put your mind at ease that everything is going according to plan.

We'll tell you if we find a problem with the tooth stem cells

Occasionally, it isn't possible to extract enough volume of stem cells from the dental pulp, either because the tooth quality simply isn't good enough, or there's a problem with the blood sample. If this happens to your sample, we will contact you and you may have to supply another tooth.

All your information is covered by the UK Data Protection Act 1998

Every piece of information you share with us, and every detail of the collection and storage of the tooth stem cells of your child or any member of your family, will be covered by the Data Protection Act of 1998. This means that all your personal data is confidential.

'Informed Consent'

When you send your child's tooth, or yours, to us, you will also be asked to sign and return an Informed Consent form.

This says that you understand and confirm that you've read the information provided, have asked any questions and had them answered to your satisfaction, and that you consent to the collection and storage of your tooth stem cells.

This is a legal requirement and is designed to ensure that we are completely transparent in our explanations and our service to you. With it, you can enjoy complete peace of mind, knowing that everything is being done to help you store the tooth stem cells of your children or anyone else in your family in the best way possible.

What you should tell us

If, at any time in the process, you discover a health problem, either with your child's or your family's health history, you must tell us. It may be something that you've forgotten to mention...or something you've just found out.

It may mean that storing the dental pulp stem cells is no longer possible, or it may not affect the process at all. Please let us know.



Questions & Answers

Q. What happens if my child's tooth drops out at school?

A. As long as your child's tooth is put immediately in a container of milk and placed in a fridge within 15 or 20 minutes after it comes out, it will be fine. It can then be put in the Future Health Biobank collection container once your child comes home. There, it can safely stay overnight in the fridge until it's collected the next day and transported to us within 72 hours of the tooth coming out.

Q. Do I need to save ALL my childrens' teeth?

A. No. The dental pulp from one of your childrens' teeth should provide stem cells to treat them or any other member of your family. That's provided the tooth is healthy and has enough stem cells. You may find that, if it doesn't, we may require another tooth from which to extract stem cells.

Q. Is it better to wait until my child's 'loose' tooth comes out on its own?

A. No. Ideally it's better if you make an appointment for your child at the dentist. There, the loose tooth can be extracted simply and safely, and there's a better chance of us extracting more stem cells. Remember to take the preservative solution with you!

Q. Can anyone else benefit from child's tooth stem cells?

A. It is possible that your other family members could benefit from the tooth stem cells. Mesenchymal stem cells in milk teeth and the teeth from adults, can be used in a growing variety of vital regenerative treatments.

Q. How long are the tooth stem cells stored for?

A. As long as you want, which means as long as you have a valid contract with us.

Q. When my child turns 18, who owns their tooth stem cells?

A. They do. But until then, you do, as their parent or legal guardian.





Why choose Future Health Biobank?

Our experience

For over 9 years, Future Health Biobank has been a global leader in the collection and storage of human blood and tissue for the treatment of a wide variety of diseases. Our knowledge and expertise are second to none. For instance:

- We were the first private cord blood bank in the UK to receive a full accreditation as a human tissue bank, awarded in 2004 by the UK's Medicines & Healthcare products Regulatory Agency (MHRA).
- We have an MHRA Blood Establishment Authorisation (BEA). We also hold an ISO9001 certificate.
- We hold a Tissue Bank Licence from the Human Tissue Authority (HTA).

Our advanced laboratories and facilities

We use the very latest processing and cryopreservation equipment and operate under the very highest security and monitoring protocols.

Our laboratories strictly adhere to the guidelines of the Code of Practice for Human Tissue Banks, the guidance on the Microbiological Safety of Human Organs, Tissues and Cells used in Transplantation and current Good Manufacturing Practice (cGMP). We also adhere to all current EU directives.

We are based in Nottingham, UK, where we have our own purpose-built laboratories, on-site storage facility and administrative offices.

We have experience in 51 different countries across 4 continents, with our umbilical cord blood and tissue banking.

Our security is in force 24/7 365 days a year and our storage temperature is controlled and monitored on a 24-hour a day basis.

Our contingency plan allows all of our cryopreservation tanks to be relocated to another HTA facility temporarily, if necessary.

Our Advisory Board includes some of the most highly qualified and respected experts in the field of Immunogenetics, Transplantation Biology, Disease Mechanisms, Cell Biology, Chemical Pathology, Haematology, Gynaecology, and Metabolic Medicines.

Other ways we can help your future health

Banking the tooth stem cells from you or your child isn't the only way that Future Health Biobank can help your family's future health. In fact we have a whole family of services designed for the collection and preservation of:



Banking your newborn baby's umbilical cord blood stem cells for the future treatment of blood based diseases such as Leukaemia.



Saving your newborn baby's umbilical cord tissue to help repair a variety of damaged cells and organs later in life.



Preserving adult healthy immune cells now, in case your immune system needs help to treat diseases later in life.



Collecting and saving stem cells in your fatty tissue to help with cosmetic procedures and regenerative treatments as you get older.

What do you do now?

If you would like Future Health Biobank to store your tooth stem cells, or you have any further questions about this or any other Future Health Biobank service, please call our Customer Careline anytime on **+44 115 967 7707**, email **info@fhbb.com** or visit us at **www.futurehealthbiobank.co.uk**

References: **1.** Inherent differential propensity of dental pulp stem cells derived from human deciduous and permanent teeth. Govindasamy V *et al.* J Endod. 2010 Sep;36(9):1504-15. **2.** Catón J *et al.* Future dentistry: cell therapy meets tooth and periodontal repair and regeneration. J. Cell. Med. 2010 Dec 28. doi: 10.1111/j. 1582-4934. 2010.01251.x. (Epub ahead of print). **3.** Yamada Y *et al.* Promising cell-based therapy for bone regeneration using stem cells from deciduous teeth, dental pulp, and bone marrow. Cell Transplant. 2010 Nov 5 (Epub ahead of print). **4.** Gandia C *et al.* Human dental pulp stem cells improve left ventricular function, induce angiogenesis, and reduce infarct size in rats with acute myocardial infarction. Stem Cells. 2008 Mar; 26(3): 638-45. Epub 2007 Dec 13. **5.** Vaglini F *et al.* Human dental pulp stem cells protect mouse dopaminergic neurons against MPP+ or rotenone. Brain Res. 2011 Jan 7; 1367: 94-1-2. Epub 2010 Sept 18. **6.** Király M *et al.* Integration of neuronally predifferentiated human dental pulp stem cells into rat brain in vivo. Neurochem Int. 2011 Jan 8 (Epub ahead of print). **7.** Yang R *et al.* Clones of ectopic stem cells in the regeneration of muscle defects in vivo. PLoS One. 2010 Oct 20; 5(10): e13547. **8.** Kerkis I *et al.* Early transplantation of human immature dental pulp stem cells from baby teeth to golden retriever muscular dystrophy (GRMD) dogs: Local or systemic? J Transl Med. 2008 Jul 3; 6: 35.



Future Health Biobank, 10, Faraday Building, Nottingham Science & Technology Park, University Boulevard, Nottingham NG7 2QP, United Kingdom
Telephone: + 44 115 967 77 07 Fax: + 44 115 967 78 36 Email: info@fhbb.com Web: www.futurehealthbiobank.co.uk

