



DIETARY

SCREENING
INFORMATION PACK

A genetic screening for babies and children to detect their predisposition to:



LACTOSE INTOLERANCE



COELIAC DISEASE



BITTER TASTE SENSITIVITY



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What is a dietary screening?

A dietary screening is an effective, non-invasive way to discover if your baby or child is at an increased genetic risk of developing **lactose intolerance**, **coeliac disease** and/or **bitter taste sensitivity**.

Why is the screening useful?

- Make informed choices on feeding and weaning
- Identify foods to avoid if symptoms develop
- Can help to explain symptoms already present*
- Full scientific report provided*
- Scientifically robust genetic analysis



How can I do it?

The screening is available in two formats:

Cord blood storage & dietary screening

1



Select our Premium+ stem cell storage package

2



Your umbilical cord blood sample is collected after birth and sent to our lab

3



We'll carry out the dietary screening on a small drop of cord blood and return the results by email

Or

Dietary screening cheek swab

1



Order your dietary screening kit directly from us

2



Carry out the simple cheek swab at home

3



Return the kit to us and receive your results by email

*If your baby or child shows symptoms of lactose intolerance, coeliac disease or bitter taste sensitivity you must seek the advice of a healthcare professional regardless of the result of the test. Your report can be used by a healthcare professional to provide additional insight when considering your child's medical care.



LACTOSE INTOLERANCE

What is it and how does it occur

Milk is the first and most important food for every baby, containing components such as proteins, fats, carbohydrates, minerals and vitamins that are essential for growth and development. Lactose is the main carbohydrate found in dairy products.

Most newborn babies have high concentrations of lactase, the enzyme that digests lactose. However, many children start to lose the ability to readily digest lactose shortly after weaning, as genetic triggers cause their lactase production to slow down. This form of lactose intolerance (also known as lactose non-persistence, or adult-type hypolactasia) is in fact very common, ranging from 28% of children in Europe to 70% in the Middle East¹.

What are the symptoms of lactose intolerance?

As the ability to produce lactase is reduced, lactose in the gut undergoes bacterial fermentation, leading to a build-up of gas. This commonly causes symptoms such as:

● wind ● bloating ● stomach cramps ● diarrhoea

These symptoms are relatively non-specific and can appear anywhere between 15 minutes to 2 hours after the last intake of milk or dairy, making it difficult to accurately diagnose.

The symptoms of lactose intolerance can be reduced by limiting the intake of foods that are rich in lactose. It is also possible to take lactase tablets at meal times to improve lactose digestion.

Screening for lactose intolerance

There are several ways to test for lactose intolerance, these tests are often unpleasant and rely upon provoking symptoms, or can even involve taking an invasive biopsy of the small intestine.

Our dietary screening provides an alternative way to find out if your child is predisposed to developing lactose intolerance. The screening can be performed before any symptoms of intolerance become evident^{2,3}. Therefore, with an appropriate diet, it is possible to prevent symptoms from ever appearing.





COELIAC DISEASE

What is it and how does it occur?

Coeliac disease is a widespread autoimmune condition which is caused by hypersensitive reactions to dietary gluten. Gluten is a protein found in the grains of wheat, barley, rye and spelt, and is consequently found in some of the most common foods eaten around the world.

What are the symptoms of coeliac disease?

In those with coeliac disease, the gluten causes an abnormal reaction of the immune system against the small intestine, the section of the digestive system that absorbs nutrients from food. This reaction results in diarrhoea, abdominal swelling, cramps, nausea and in some cases can lead to stunted growth. Coeliac disease affects around 1-2 in every 200 people worldwide⁴.

Screening for coeliac disease

Suspected cases of coeliac disease are confirmed with blood tests and often intestinal biopsies.

Our dietary screening identifies carriers of gene variants associated with the onset of coeliac disease. The associated genes are part of the human leukocyte antigen (HLA) family. Certain variants of two genes, HLA-DQA1 and HLA-DQB1, are found in over 95% of coeliac patients⁵⁻⁷.

If these variants aren't present, it is unlikely coeliac disease will develop. The screening is a quick, simple, pain-free alternative to test performed after the onset of symptoms.





BITTER TASTE SENSITIVITY

What is it and how does it occur?

Sensitivity to bitter tasting foods is believed to be an evolutionary development that arose through natural selection, in order to prevent us from consuming toxic plants. However, it can cause a negative reaction to common foods such as sprouts, cabbage, broccoli and other cruciferous vegetables that contain bitter-tasting compounds called glucosinolates.

First noticed in 1931 by a research chemist called Arthur Fox, some people detect bitterness in food more easily than others. He discovered this when he and a colleague accidentally inhaled phenylthiocarbamide (PTC). His colleague remarked on its bitter taste, whereas he tasted nothing⁸.

Screening for bitter taste sensitivity

The PTC compound, along with other bitter compounds such as 6-n-propylthiouracil (PROP), can be used in taste testing strips which are placed on the tongue to determine if a person is a 'taster' or 'non-taster'⁹.

Sensitivity to bitter tastes is a heritable trait controlled by gene variants¹⁰. Our dietary screening analyses these gene variants directly rather than relying on a potentially unpleasant taste test strip. Knowing that your child carries a 'taster' genotype can help inform dietary choices during weaning and beyond¹¹.



CONDUCTING THE DIETARY SCREENING

Your options

The dietary screening can be carried out either as a simple cheek swab or alongside cord blood banking allowing parents and parents-to-be to choose the most convenient way.

With cord blood banking

Future Health Laboratories is part of Future Health Biobank, one of the world's largest stem cell banks. If you're an expectant parent, combining the dietary screening with cord blood banking might be the most advantageous option for you.

The blood from a baby's umbilical cord is full of hematopoietic stem cells that, if preserved, can be used to treat blood cancers such as leukaemia and genetic blood diseases like Fanconi anaemia. In fact it can be used in up to 85 standard therapies.

Parents often choose to store their baby's umbilical cord blood so, should the need arise, they can avoid the arduous task of searching for a donor. The cells are a 100% match for the baby and a 25% chance of a match for siblings. Private cord blood stem cell banking means the cells are stored exclusively for your family.

Shortly after birth, the umbilical cord blood is collected and transported to the UK-based Future Health Biobank laboratory to extract the stem cells. A small amount of this cord blood can also be used to carry-out the dietary screening test.

With a cheek swab

The alternative method of carrying-out the dietary screening is through a cheek swab. You can order this at any time, although we recommend from five months and into early childhood before symptoms develop.

The process is very simple as the kit contains everything you need to complete the screening and return it to our UK laboratory for analysis.

Supplied in each kit are two cheek swabs, one for the left and one for the right cheek, meaning your sample can be collected in a matter of minutes.

Your results will be processed and sent to you within 14 days.



LACTOSE INTOLERANCE



COELIAC DISEASE



BITTER TASTE SENSITIVITY

UNDERSTANDING YOUR RESULTS

Your screening results are delivered via email with an explanation of the results. The great thing about this report is, should you need to, you can take it to your healthcare professional should the screening indicate a high likelihood of developing the condition or if symptoms go on to develop.

SWAB KIT CONTENTS

Please ensure the box contains the following items before conducting the test:

- Swabs (x2)
- Biohazard bag
- Security sticker
- Prepaid postage label
- Information pack
- Postage bag
- Consent form

INSTRUCTIONS

Stage 1: Collecting a cheek swab sample

- 1 Open one of the tubes by twisting the cap, then remove the swab from its tube
- 2 Brush the swab against the inside of the right cheek for 30 seconds, using the same force as you would to brush your teeth
- 3 Allow the swab to dry for a few minutes at room temperature. Ensure the swab does not touch any other surfaces or your hand
- 4 Place the swab back into its tube and tighten the cap to close
- 5 Repeat steps 1-4 with the second swab, however, this time brush the swab against the inside of the left cheek for 30 seconds
- 6 Label the swab tubes with the name of the person who the swab is from and the date it was taken

Stage 2: Returning your samples to Future Health Laboratories

- 1 Remove all items from box
- 2 Insert both tubes into the biohazard bag, remove the air from the bag and seal, then place it back into the box
- 3 Complete the consent form and place into the box
- 4 Close the box and apply the security sticker to the lip of the box to securely fasten
- 5 Place the box inside of the postage bag and seal
- 6 Affix the provided medical express prepaid courier collection label to the bag, ensuring not to obscure the UN3373 labeling, and arrange collection with us.

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References

1. Storhaug CL, Fosse SK, Fadnes LT. Country, regional, and global estimates for lactose malabsorption in adults a systematic review and meta-analysis. *The Lancet*, 2017;2:738-46
2. Büning C, Genschel J, Jurga J, Fiedler T, Voderholzer W, Fiedler E-M, Worm M, Weltrich R, Lochs H, Schmidt H, Ockenga J. Introducing Genetic Testing for Adult-Type Hypolactasia. *Digestion*, 2005;71:245–250
3. Dell'Edera D, Nicoletti FP, D'Apice MR, Allegretti A, Epifania AA. Genetic Aspects of Adult-Type Hypolactasia. *Journal of Gastrointestinal & Digestive System*, 2016;6(5)DOI:10.4172/2161-069X.1000475
4. N Gujral, Freeman HJ, Thomson ABR. Celiac disease: Prevalence, diagnosis, pathogenesis and treatment. *World Journal of Gastroenterology*, 2012;18(42):6036-59.
5. S Martina, F Fabiola, G Federica, B Chiara, L Gioacchino, DM Francesco, L de'Angelis Gian. Genetic susceptibility and celiac disease: what role do HLA haplotypes play? *Acta Biomedica*, 2018;89(9):17-21
6. RS Choung, JR Mills, MR Snyder, JA Murray, MJ Gandhi. Celiac disease risk stratification based on HLA-DQ heterodimer (HLA-DQA1 – DQB1) typing in a large cohort of adults with suspected celiac disease. *Human Immunology*, 2020;81(2-3):59-64
7. Tye-Din JA, Cameron DJS, AJ Daveson, AS Day, P Dellsperger, C Hogan, ED Newnham, SJ Shepherd, RH Steele, L Wienholt, MD Varney. Appropriate clinical use of human leukocyte antigen typing for coeliac disease: an Australasian perspective. *Intern Med J*, 2015;45(4):441–450
8. Smail HO. The roles of genes in the bitter taste. *AIMS Genetics*, 2019;6(4):88-37
9. Taha MA, Shortess CJ, Noonan MJ, Chambliss Harrod C, Barham MJR, Mousa RR, Barham HP. Validation Study: Evaluating Phenotypic Expression of Bitter Taste Receptors. *Journal of Otolaryngology and Rhinology*, 2021;7:110
10. Calancie L, Keyserling TC, Smith Taillie L, Robasky K, Patterson C, Ammerman AS, Schisler JC. TAS2R38 Predisposition to Bitter Taste Associated with Differential Changes in Vegetable Intake in Response to a Community-Based Dietary Intervention. *G3 (Bethesda)*, 2018; Jun; 8(6): 2107–2119
11. Cont G, Paviotti G, Montico M, et al. TAS2R38 bitter taste genotype is associated with complementary feeding behavior in infants. *Genes and Nutrition*, 2019;14:13.