

Welcome

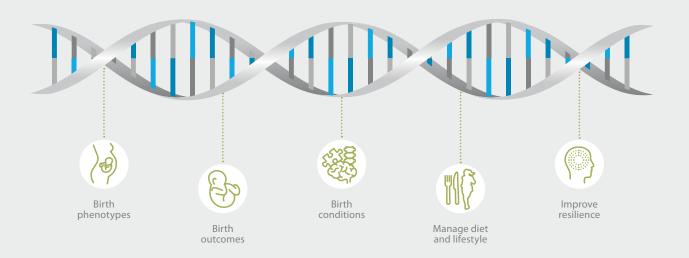
Example2 Example1

to your GrowBaby DNA report

Date of birth: 01 Jan 2001 Date reported: 07 May 2021 15:15 Sample Number: 12345678

Referring practitioner: Private

GrowBaby takes emerging genetic, nutrition and lifestyle science and blends accessible interventions placing them at your fingertips. It is designed to help identify maternal health risks and intervene with personalised diet, lifestyle and supplement advice, to optimise health outcomes for mother and baby.



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Genetics and personalised medicine

Genes are segments of DNA that contain the instructions your body needs to make each of the many thousands of proteins required for life. Each gene is comprised of thousands of combinations of "letters" (called bases) which make up your genetic code. The code gives the instructions to make the proteins required for proper development and function.

Genetic variations can affect the expression of a gene, thereby affecting metabolic processes that are important for maintaining cellular health and how we respond to environmental interventions such as diet, lifestyle, supplements, and medication.

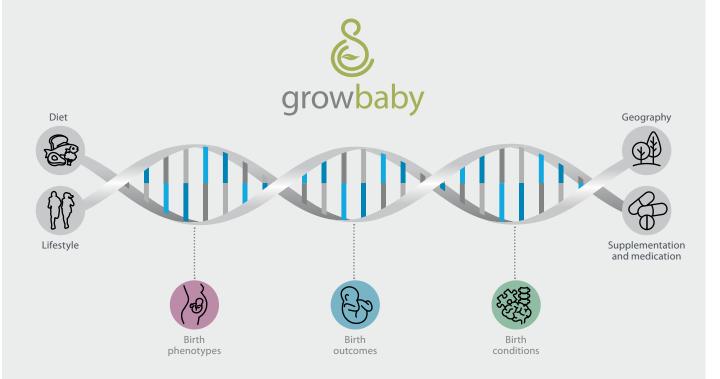
Knowledge of these genetic variations offers unparalleled insight into your biological systems, allowing your healthcare practitioner to recommend precise interventions aimed at helping you reach your goals and achieve optimal health.





Personalised medicine and maternal and fetal health

The GrowBaby test reports on five key fetal phenotypes and important maternal health risk factors to help you to manage and improve your maternal and fetal health outcomes.

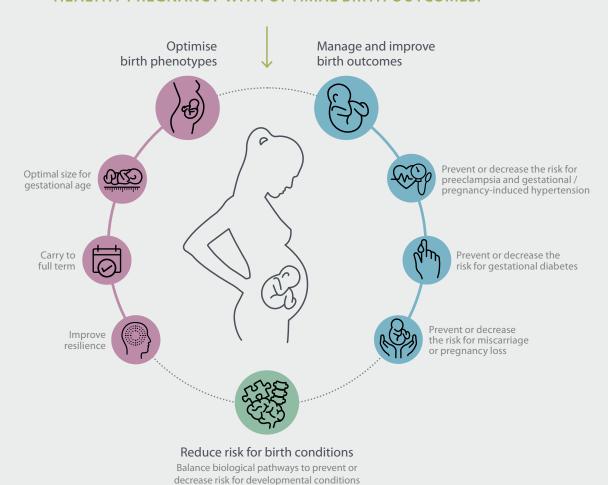


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Improving pregnancy and birth outcomes

It is essential to keep in mind that all of the genetic risk factors that are related to these pregnancy and birth outcomes have shown positive results when personalised diet and environmental interventions have been put in place. The benefit of improved pregnancy and birth outcomes extends beyond the perinatal time period through adulthood.

IMPROVE YOUR CHANCES OF HAVING A HEALTHY PREGNANCY WITH OPTIMAL BIRTH OUTCOMES:



Put personalised diet and environmental interventions in place to manage and improve your pregnancy and birth outcomes



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Report recommendations summary

If your genotype results are associated with possible weaknesses in key biological areas that affect maternal and fetal health, the biological areas that require elevated support are indicated. Personalised recommendations for nutrition (your diet), nutrients (supplementation) and lifestyle, to support these areas, are summarised below.

Recommended support:



NUTRITION



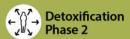
NUTRIENTS



LIFESTYLE



- Focus foods: Selenium, phosphatidylserine & taurine-rich foods
- · Consider: Selenium (200 mcg)
- Maintain baseline support

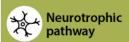


- Focus foods: Selenium & antioxidant-rich foods, cruciferous & allium vegetables & good quality protein sources
- Consider: Magnesium (6-10mg/kg of body weight)
- Supplementation with glutathione may also be beneficial
- Maintain baseline support



Methylation

- Focus foods: Vitamin B, choline, & betaine-rich foods & methylation adaptogens (any compound that helps to restore methylation balance)
- Avoid: Folic acid fortified in food & stimulants such as caffeine
- Support your gut with prebiotic/probiotic rich foods & adequate fiber
- High quality prenatal vitamin that includes methyl folate, plus B-complex
- Avoid: Folic acid in supplements
- Consider: SAMe supplementation
- Include: Stress management strategies through movement & music
- Limit: Environmental exposure of xenobiotics



- Focus foods: Mono- & polyunsaturated fats, vitamin B2-rich foods & curcumin
- Moderate: Total carbohydrate intake, with a focus on high quality carbohydrates & low glycemic index meals
- Maintain baseline support: High quality prenatal vitamin
- Exercise daily
- Focus on: Stress management & relaxation strategies daily
- Avoid: Maternal prenatal smoking



- Focus foods: Magnesium-rich foods, chamomile
- Eliminate: All caffeine and stimulants from the diet (fluids/food)
- Consider: Magnesium supplementation
- Maintain baseline support



- Focus foods: Most cold-water fish & mushrooms
- Consider: Vitamin D3 (1,000-5,000 IU's. More may be required in individual cases), Vitamin K2 (45 mcg)
- Ensure: Adequate sun exposure to improve vitamin D levels

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Result summary

Baseline support required • Elevated support required

BIOLOGICAL AREA	PRIORITY
Lipid metabolism	•
(inflammation	\circ
Detoxification – Phase 1	
Detoxification – Phase 2	•
Methylation	•
Monoamine oxidase metabolism	
Neurotrophic pathway	•
Progesterone metabolism	
Melatonin metabolism	•
Insulin sensitivity, secretion and metabolism	
Vitamin D requirements	•

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Genotype results

No Impact	Low Impact	Moderate Impact	High Impact	Beneficial Impact

BIOLOGICAL AREA	GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
Lipid metabolism	APOE	E2/E3/E4	E3/E2	••
		G>C	GG	0
		G>A	AA	••
(inflammation	IL-6	A>G	AA	0
		G>A	GA	
		C>T	CC	0
	AhR	Arg554Lys	GA	
Dotovification Phase 1	CYP1A1	Msp1 T>C	Π	0
Detoxification – Phase 1	CIPIAI	lle462Val A>G	AA	0
	CYP1A2	A>C	CA	
	GSTA1	C>T	CT	00
Detayifestion Dhase 2	GSTP1	313 A>G	AG	
Detoxification – Phase 2	GSTM1	Present/Absent	Absent	000
	GSTT1	Present/Absent	Absent	000
	CBS	G>A	GG	0
		G>T	π	
	CHDH	Leu78Arg	π	000
		472 G>A	AA	000
	COMT	C>G	CG	
	COMT	A>G	GG	0
Methylation		C>T	CC	0
	MTHED	677 C>T	СТ	••
	MTHFR	1298 A>C	AA	0
	MTHFD1	1958 G>A	GG	0
	MTRR	66 A>G	AA	0
	PEMT	C>T	CC	0
	TCN2	G>C	GG	••

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Genotype results (continued)

○ No Impact ○ Low Impact ○ Moderate Impact ○ High Impact ○ Beneficial Impact

BIOLOGICAL AREA	GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
Monoamine oxidase	A 4 A O A	C>T	Π	⊘
metabolism	MAO-A	G>T	TT	
Neurotrophic pathway	BDNF	Val66Met	π	•••
Progesterone metabolism	PROGINS	C>T	CC	
Progesterone metabolism	PNOGINS	331 G>A	GA	••
(♣ Melatonin metabolism	MTNR1 B	C>G	GG	000
Welatoriii metabolisiii		C>T	CT	
	ENNP1	C>T	CC	0
Insulin sensitivity,	GCK	-30 G>A	GA	
secretion and metabolism	IGF2BP2	G>T	GG	0
	SLC30A8	G>A	GG	0
Vitamin D requirements		Fok1 T>C	Π	000
	VDR	C>T	CC	0
		A>G	GG	

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Gene results per biological area with personalised recommendations



Lipid metabolism

Apolipoprotein E has a multi-functional role in lipoprotein metabolism and is essential for the normal catabolism of triglyceride-rich lipoprotein constituents. Two SNPs result in three allelic isoforms, affecting the protein conformation and thus the receptor binding activity and lipoprotein preference of the APOE protein.



Results: Elevated support required

Your results show that the variant you carry in your APOE gene leads to altered lipid metabolism.

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
APOE	E2/E3/E4	E3/E2	

Potential areas of risk:





Recommendations:

NUTRITION



NUTRIENTS



LIFESTYLE



- Focus foods: Brazil nuts, Brewers yeast, Phosphatidylserine and Taurine-rich foods: soybeans, egg yolk, yogurt, low-mercury cold-water fish (salmon and mackerel), wild game
- Maintain baseline support: High quality prenatal vitamin
- Consider: Selenium (200 mcg)

· Maintain baseline support:

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An increasing number of lifestyle disorders, such as obesity, heart disease, arthritis and diabetes have been associated with chronic low-grade inflammation, which is influenced by the inflammation genes that you carry. Inflammation also plays a major role in maternal and fetal health. IL-6 encodes interleukin 6, a pro-inflammatory cytokine that plays a crucial role in inflammation and regulates expression of C-Reactive Protein (CRP).



Results: Baseline support required

Your inflammation genotype results indicate normal expression of these proinflammatory proteins.

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
IL-6	G>C	GG	0
	G>A	AA	
	A>G	AA	0
	G>A	GA	
	C>T	CC	0

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The detoxification process in the body aids the removal of harmful substances, such as pollution, alcohol, and drugs, from your body. This process can be said to work in two main phases; phase 1 detoxification, which is governed by your cytochrome P-450 family and known as your 'activator phase', and phase 2 detoxification, where the glutathione-S-transferase enzymes play an essential 'neutralising' role in getting rid of 'activated' toxins.



Detoxification phase 1 results: Baseline support required

Your phase 1 detoxification genotype results indicate that these enzymes are functioning at a normal level.

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
AhR	Arg554Lys	GA	
C)/D1 A 1	Msp1 T>C	π	0
CYP1A1	lle462Val A>G	AA	0
CYP1A2	A>C	CA	

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Detoxification phase 2 results: Elevated support required

Your genotype results for your phase 2 detoxification genes are linked to a decreased enzyme capacity.

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
GSTA1	C>T	CT	
GSTP1	313 A>G	AG	
GSTM1	Present/Absent	Absent	000
GSTT1	Present/Absent	Absent	000

Potential areas of risk:









Recommendations:

vegetable intake with a focus on cruciferous

(broccoli and cauliflower), and allium

Gelatin, animal protein, low-mercury

cold-water fish, spirulina, eggs, beans,

vegetables (garlic, onion, leeks, scallions,

NUTRITION

shallots, chives).

walnuts



• Maintain baseline support:

NUTRIENTS

High quality prenatal vitamin that includes folate, B6, B12, betaine

 Consider: Magnesium supplementation (6-10mg/kg of body weight)

 Supplementation with glutathione may also be beneficial

LIFESTYLE



· Maintain baseline support:





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Methylation is a process that takes place in every cell in your body and plays an essential role in building certain hormones and neurotransmitters, balancing the levels of homocysteine, a potentially harmful amino acid, helping our DNA replicate properly, and protecting against neural tube defects, miscarriage, recurrent pregnancy loss and male factor infertility. For methylation to work properly, our methylation enzymes should be functioning properly, and we need to ensure adequate intake of key nutrients from the vitamin B family, including folate and vitamin B12. Choline is also an essential nutrient in this pathway.



Results: Elevated support required

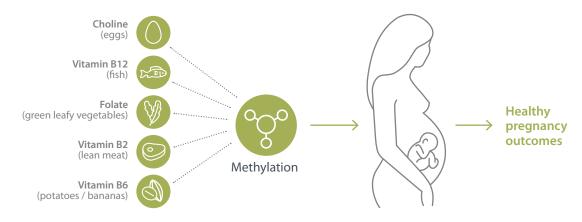
Your genotype results show that due to genetic variation in your methylation genes, your methylation enzymes may not be working as effectively as one would like.

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
CBS	G>A	GG	0
CD3	G>T	π	
CHDH	Leu78Arg	π	000
	472 G>A	AA	000
COMT	C>G	CG	
COIVII	A>G	GG	0
	C>T	CC	0
MTHFR	677 C>T	CT	
MILLEN	1298 A>C	AA	0
MTHFD1	1958 G>A	GG	0
MTRR	66 A>G	AA	0
PEMT	C>T	CC	0
TCN2	G>C	GG	

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Methylation (continued)

The process of Methylation is integral to healthy pregnancy outcomes, as are the many nutrients that support this process:



Potential areas of risk:



Preterm



Small for gestational age



Gestational / oregnancy-induced hypertension



Preeclampsia



Stress dysregulation phenotype



Miscarriage



NUTRIENTS

Recurrent pregnancy loss



Recommendations:

NUTRITION





- · Maintain baseline support: High quality prenatal vitamin that includes methylfolate, plus **B-complex**
- Avoid folic acid in supplements or fortified in food, and rather opt for natural folate sources and methylfolate as a supplement
- Consider: SAMe supplementation

LIFESTYLE



- · Include stress management strategies through movement and music
- · Limit environmental exposure of xenobiotics:
- Focus on limiting plastics
- Eat organically when possible
- Wash produce before consumption
- Choose low mercury seafood
- Use a water filter, and
- Check personal care products for top hormone disruptors

· Consider methylation adaptogens:

• Betaine-rich foods: Such as spinach, beets

• General methyl-rich foods: Dark leafy

greens, animal protein, nuts/seeds

legumes (peanuts) and fish

· Choline-rich foods: Eggs, soybeans,

(any compound that helps to restore methylation balance)

- In cooking: Cinnamon, rosemary, curcumin, thyme and parsley
- In the diet: Brussels sprouts, garden cress, mustard greens, turnips, savoy cabbage, kale, and broccoli
- Avoid stimulants: such as caffeine
- Support your gut with prebiotic/ probiotic-rich foods and adequate fiber: Addressing a healthy gut microbiota can help bring methylation back in balance



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Monoamine-oxidase pathway

Monoamine oxidase is an enzyme that plays a central role in the degradation process for various monoamines released by neurons and glia cells. These monoamines include dopamine, serotonin, and norepinephrine, which are all important in stress regulation.



Results: Baseline support required

Your MAO-A genotype results are not associated with increased risk for stress dysregulation.

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
MAA	C>T	π	⊘
MAO-A	G>T	π	⊘

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Neurotrophic pathway

Neurotrophins are a family of trophic factors involved in differentiation and survival of neural cells. Neurotrophin function and signalling play an important role for neural development and additional higher-order activities such as learning and memory, as well as motivation. BDNF, encoding brain derived neurotrophic factor, is a member of the nerve growth factor family of proteins. It is proposed that this gene may take part in the regulation of the stress response. Multiple factors including age, weight, exercise, urbanicity, genetic polymorphisms, pregnancy status, and gestational age (lowest in the 3rd trimester) all affect BDNF levels. Initiating modifiable interventions within the pregnancy and postpartum time that increase maternal BDNF levels seem to have profound effect for the overall health of baby, too.



Results: Elevated support required

Due to the genetic variation that you carry in your BDNF gene, there is decreased expression of this protective protein.

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
BDNF	Val66Met	π	000

Potential areas of risk:



Recommendations:

NUTRITION



NUTRIENTS



LIFESTYLE



- Focus on: Healthy fats (avocados, olive oil, nuts/seeds) and fatty fish (increasing DHA) with a moderate total, but high quality carbohydrate intake (fruits/veggies, whole grains, starchy veggies, legumes). Pair high quality carbohydrate snacks and meals with protein and fat. Make dinner the smallest meal of the day, paying close attention to a balanced dietary intake earlier in the day
- Curcumin and Vitamin B2-rich foods

• Maintain baseline support: High quality prenatal vitamin

 BDNF significantly increases in response to exercise:
Start exercises if you do not.

Start exercising if you do not exercise already, and make movement a part of your daily routine

- Avoid: Maternal prenatal smoking
- Focus on: Stress management and relaxation strategies daily. Increase time outdoors in nature and get adequate sunlight exposure

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Progesterone metabolism

Progesterone is a hormone that is produced in the ovaries, brain, placenta, and adrenal glands, and plays a central role in maintaining pregnancy in early gestation, as well as in controlling ovulation and mammary glands development. The PROGINS gene encodes the progesterone receptor. Progesterone acts by binding to this receptor.



Results: Baseline support required

Your PROGINS genotype results are associated with normal functioning of the progesterone receptor.

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
C>T	C>T	CC	⊘
PROGINS	331 G>A	GA	

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Melatonin metabolism

MTNR1B encodes the melatonin receptor type 1B, which has a high affinity for melatonin. The receptor plays an important role in mediating the reproductive and circadian actions of melatonin. MTNR1B receptors function throughout the body to slow cell activity and promote the onset of sleep.



Results: Elevated support required

Your results in this area show that due to the genetic variation that you carry in your MTNR1B gene, there is altered functioning of the melatonin receptor. A genetic variant in the MTNR1B gene is associated with an increased risk of glucose dysregulation and influences insulin secretion in accordance with the cycle between day and night.

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
MTNR1 B	C>G	GG	000
	C>T	СТ	

Potential areas of risk:



NUTRITION



Recommendations:

Magnesium-rich foods: Herbs, spices, bran, pumpkin seeds, cocoa, flaxseeds, Brazil nuts, sunflower seeds, sesame seeds and seaweed (agar)

- Chamomile has been shown to be beneficial
- Eliminate all caffeine and stimulants from diet (fluids/food)

NUTRIENTS



LIFESTYLE



- Maintain baseline support: High quality prenatal vitamin
- Consider: Magnesium supplementation

Maintain baseline support

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Insulin sensitivity, secretion and metabolism

This area discusses the genes involved in insulin sensitivity – how sensitive the body is to insulin, insulin secretion - the a process that primarily occurs in response to glucose levels in the blood becoming elevated, and insulin metabolism – enhancing the uptake of glucose from the blood into the liver, kidneys, and skeletal muscle cells.



Results: Baseline support required

Your genotype results in this area indicate that your genes involved in insulin sensitivity, secretion, and metabolism are not related to abnormal functioning.

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
ENNP1	C>T	CC	0
GCK	-30 G>A	GA	
IGF2BP2	G>T	GG	0
SLC30A8	G>A	GG	0

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Vitamin D pathway

VDR encodes the vitamin D receptor, which is a steroid hormone that mediates the action of vitamin D by regulating the transcription of many genes. Vitamin D deficiency and alterations in the VDR gene have been strongly related to abnormalities in calcium metabolism, cell proliferation and immune function.



Results: Elevated support required

Due to the genetic variations that you carry in the VDR gene, there is a decreased receptor function.

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
VDR	Fok1 T>C	Π	
	C>T	CC	0
	A>G	GG	

Potential areas of risk:



Preterm



Recommendations:

NUTRITION



NUTRIENTS



LIFESTYLE



- Focus foods: Mackerel, herring, most cold-water fish and mushrooms
- Vitamin D3: 1,000-5,000 IU's (more may be required in individual cases)
- Vitamin K2: (45 mcg)

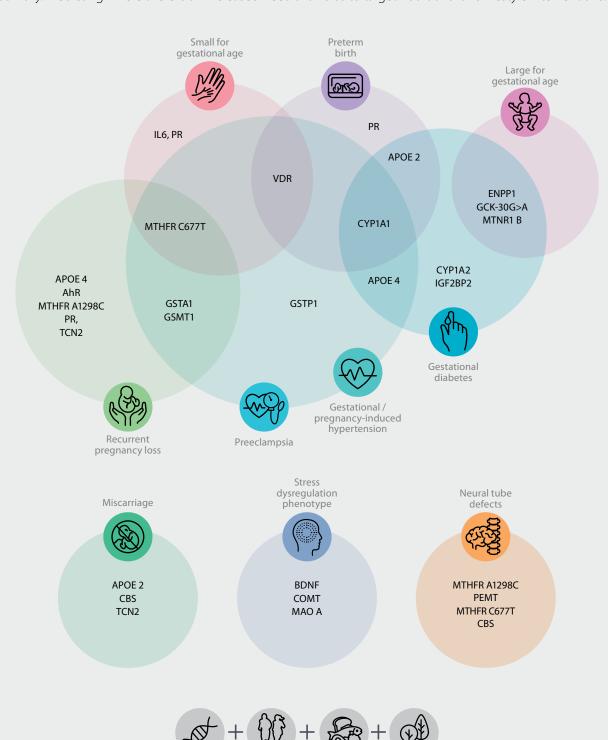
 10A-4P peak UVB exposure outdoors from 10-45 minutes based on skin type:

Generally speaking, with darker skin pigmentation, more sun exposure is needed. Once you have reached your sun exposure for the day, use a non-toxic sunscreen, wear a hat, and cover your body as appropriate to avoid burning.

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The relationship between genes and maternal and fetal health outcomes

No gene variant acts alone. These Venn diagrams illustrate the commonality of gene variants that predispose to common maternal and birth phenotypes that ultimately predict health resilience or disease vulnerability throughout the life cycle. The proteins created by these genes require a common and synergistic nutrient base to function optimally. Predicting where there is an increased need allows us to target nutritional and lifestyle interventions.



Genes

Lifestyle

Geography

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Key terms explained



Small for Gestational Age (SGA)

describes a baby that is smaller than the average size for the week of pregnancy.



Large for Gestational Age (LGA)

describes a baby that is larger than the average size for the week of delivery.



Preterm Birth (PTB) refers to a delivery that occurs between 20 and 37 weeks of gestation (a delivery before 20 weeks is a miscarriage in the United States, although the upper gestational age threshold for miscarriage varies worldwide).



Stress Dysregulation Phenotype (SDP)

is a key term coined by GrowBaby's Dr. Leslie Stone. SDP describes the layers of stress vulnerability (medical history, Adverse Childhood Experiences (ACE) score, genetic polymorphisms, environmental toxins, socioeconomic factors) that mediate the maternal and fetal environment affecting both maternal and birth phenotypes.



Gestational Diabetes Mellitus (GDM)

is defined as a type of diabetes that is developed during pregnancy in women who were not previously diabetic. Common contributing factors to developing GDM include: Obesity (≥30 BMI), excessive gestational weight gain (>40 lbs), and advanced for maternal age (>35 years old).



Gestational Hypertension (GH) or Pregnancy-Induced Hypertension (PIH)

is a clinical diagnosis defined by the new onset of hypertension (defined as systolic blood pressure \geq 140 mmHg and/or diastolic blood pressure \geq 90 mmHg) at \geq 20 weeks of gestation in the absence of proteinuria or new signs of end-organ dysfunction.



Preeclampsia (PE)

is a multisystem progressive disorder characterised by the new onset of hypertension and proteinuria or the new onset of hypertension and significant end-organ dysfunction with or without proteinuria in the last half of pregnancy or postpartum.



Miscarriage is defined as a nonviable, intrauterine pregnancy within the first & second trimesters (up to 20 weeks from the last menstrual period) and is the most common complication of early pregnancy. Contributing factors for miscarriage include genetics, teratogenic substance intake, increasing age, certain infections, certain medical conditions, autoimmune disease, chronic stress and social determinants of health, environmental factors, and exposures.



Recurrent Pregnancy Loss (RPL) describes two or more pregnancy losses, diagnosed by either serum or urine human chorionic gonadotropin (HCG) levels.



Neural Tube Defects (NTD) are relatively common congenital anomalies that develop when a portion of the neural tube fails to close normally during the third and fourth weeks after conception (the fifth and sixth weeks of gestation). The resulting defect may involve the vertebrae, spinal cord, cranium, and/or brain.

Required support explained



Baseline support required

Population-based (or epidemiological evidence) that informs common nutrients or lifestyle factors needed to support the perinatal time period.

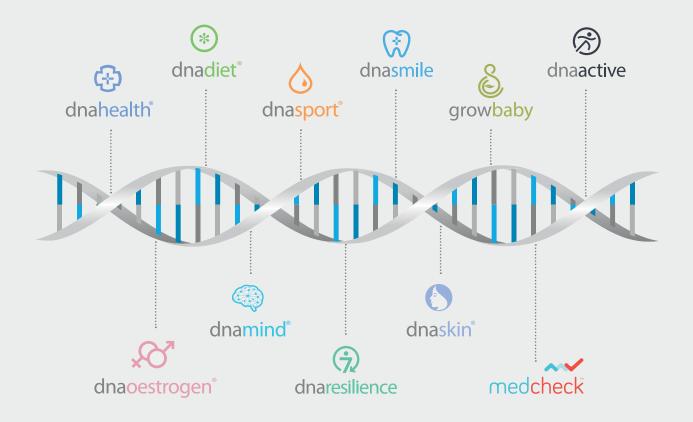


Elevated support required

Maintaining baseline support, individual assessment of key modifiable lifestyle factors and nutrient needs that optimise maternal and birth phenotypes. Adjust your nutrition based on genotype focus foods. Practical quidelines for targeted diet, nutrient and lifestyle recommendations are provided for 'elevated support' areas.

A lifetime of optimal health awaits you

Your genes do not change, which means our laboratories will only ever need one cheek swab sample from you. Throughout your life, as your health goals and priorities change, we can continue to provide valuable health insights from this single cheek swab to support your unique health journey.



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