



growbaby

Welcome

Example

to your GrowBaby DNA report

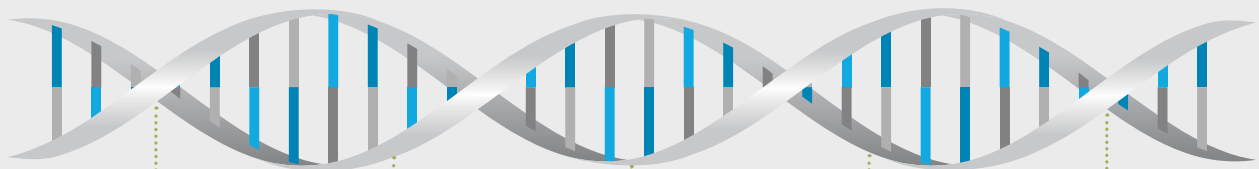
Date of birth:

Date reported: 18 Nov 2021

Sample Number: 12345678

Referring practitioner:

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.



Birth phenotypes



Birth outcomes



Birth conditions



Manage diet and lifestyle



Improve resilience

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.



NORMAL GENE

Genotype resulting in baseline potential for disease risk

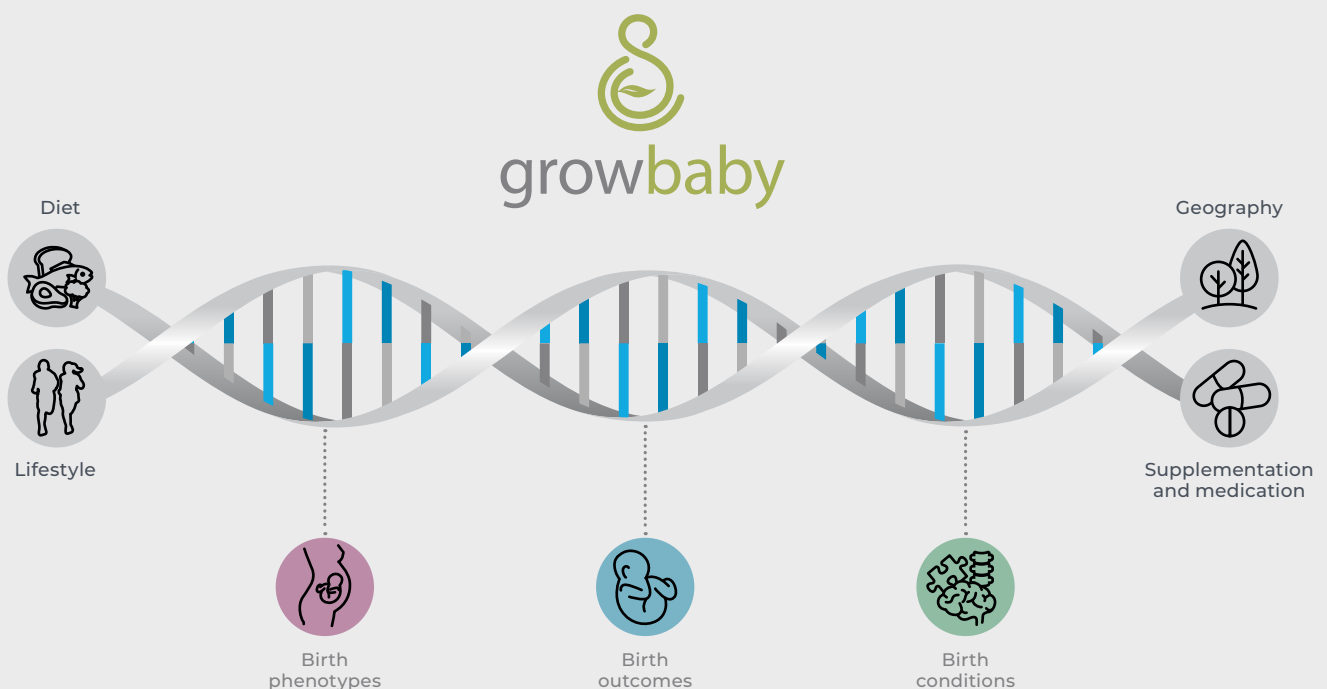


VARIANT GENE

Genotype resulting in increased potential for disease risk and need for personalised intervention

Personalised medicine and maternal and fetal health

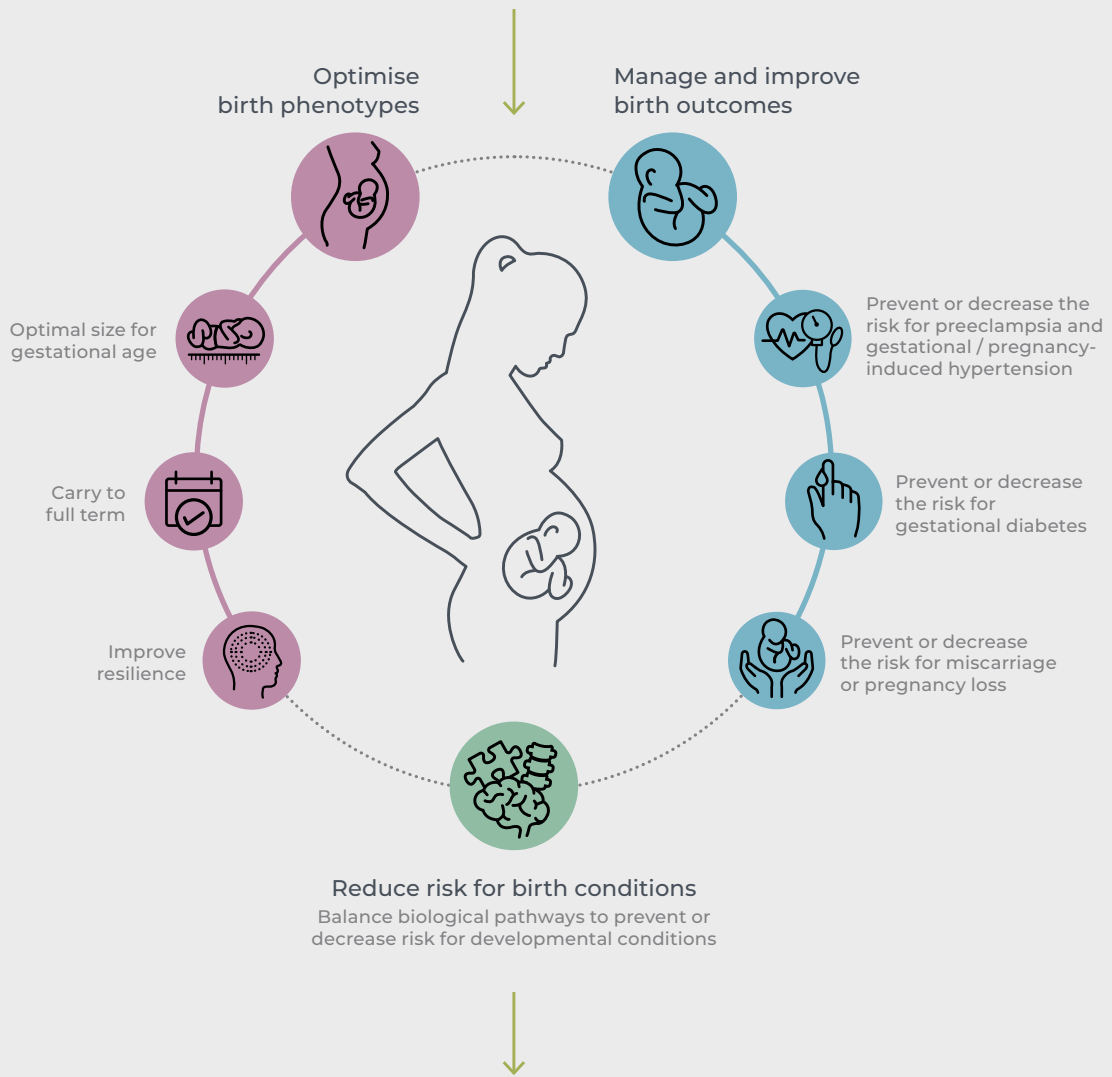
The GrowBaby test reports on five key fetal phenotypes and important maternal health risk factors to help you to manage and improve your maternal and fetal health outcomes.



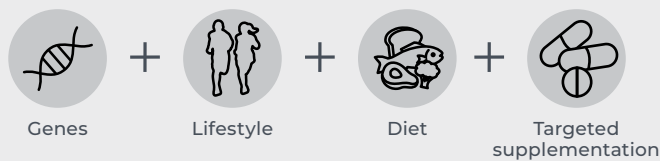
Improving pregnancy and birth outcomes

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**



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






Result summary

Baseline support required Elevated support required

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







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	
 Inflammation	IL-6	G>C	GG	
		G>A	AA	
		A>G	AA	
		G>A	GA	
		C>T	CC	
 Detoxification – Phase 1	AhR	Arg554Lys	GA	
	CYP1A1	MspI T>C	TT	
		Ile462Val A>G	AA	
	CYP1A2	A>C	CA	
 Detoxification – Phase 2	GSTA1	C>T	CT	
	GSTP1	313 A>G	AG	
	GSTM1	Present / Absent	Absent	
	GSTT1	Present / Absent	Absent	
 Methylation	CBS	G>A	GG	
		G>T	TT	
	CHDH	Leu78Arg	TT	
	COMT	472 G>A	AA	
		C>G	CG	
		A>G	GG	
		C>T	CC	
	MTHFR	677 C>T	CT	
		1298 A>C	AA	
	MTHFD1	1958 G>A	GG	
	MTRR	66 A>G	AA	
	PEMT	C>T	CC	
TCN2	G>C	GG		

Genotype results (continued)

No Impact
 Low Impact
 Moderate Impact
 High Impact
 Beneficial Impact

BIOLOGICAL AREA	GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
 Monoamine oxidase metabolism	MAO-A	C>T	TT	
		G>T	TT	
 Neurotrophic pathway	BDNF	Val66Met	TT	
 Progesterone metabolism	PROGINS	C>T	CC	
		331 G>A	GA	
 Melatonin metabolism	MTNR1 B	C>G	GG	
		C>T	CT	
 Insulin sensitivity, secretion and metabolism	ENNP1	C>T	CC	
	GCK	-30 G>A	GA	
	IGF2BP2	G>T	GG	
	SLC30A8	G>A	GG	
 Vitamin D requirements	VDR	FokI T>C	TT	
		C>T	CC	
		A>G	GG	

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.

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	



Inflammation

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).

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

Genotype result table:

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



Detoxification

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.

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

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
AhR	Arg554Lys	GA	
CYP1A1	Msp1 T>C	TT	
	Ile462Val A>G	AA	
CYP1A2	A>C	CA	

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	
GSTT1	Present / Absent	Absent	





Methylation

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.

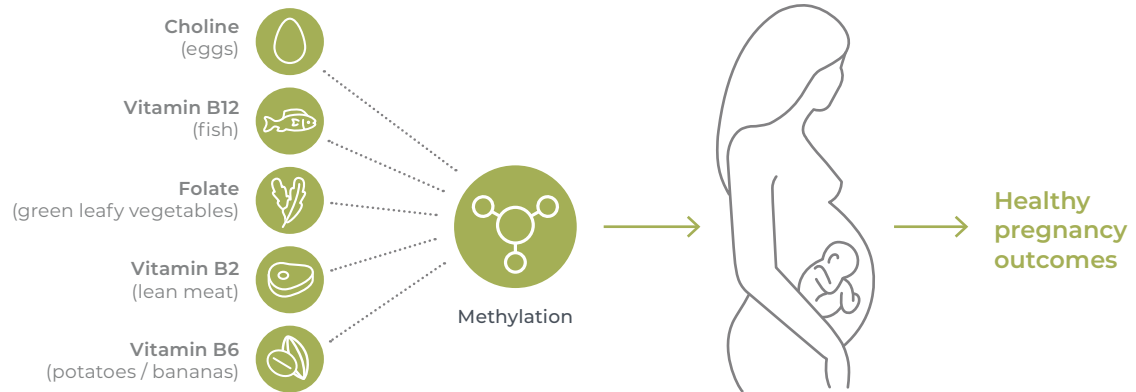
Your genotype results show that due to genetic variation in your methylation genes, your methylation enzymes may not be working as effectively as one would like.

Genotype result table:

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

Methylation (continued)

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





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.

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

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
MAO-A	C>T	TT	
	G>T	TT	



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.

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	TT	



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.

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

Genotype result table:

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



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.

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	
	C>T	CT	



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.

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

Genotype result table:

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



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.

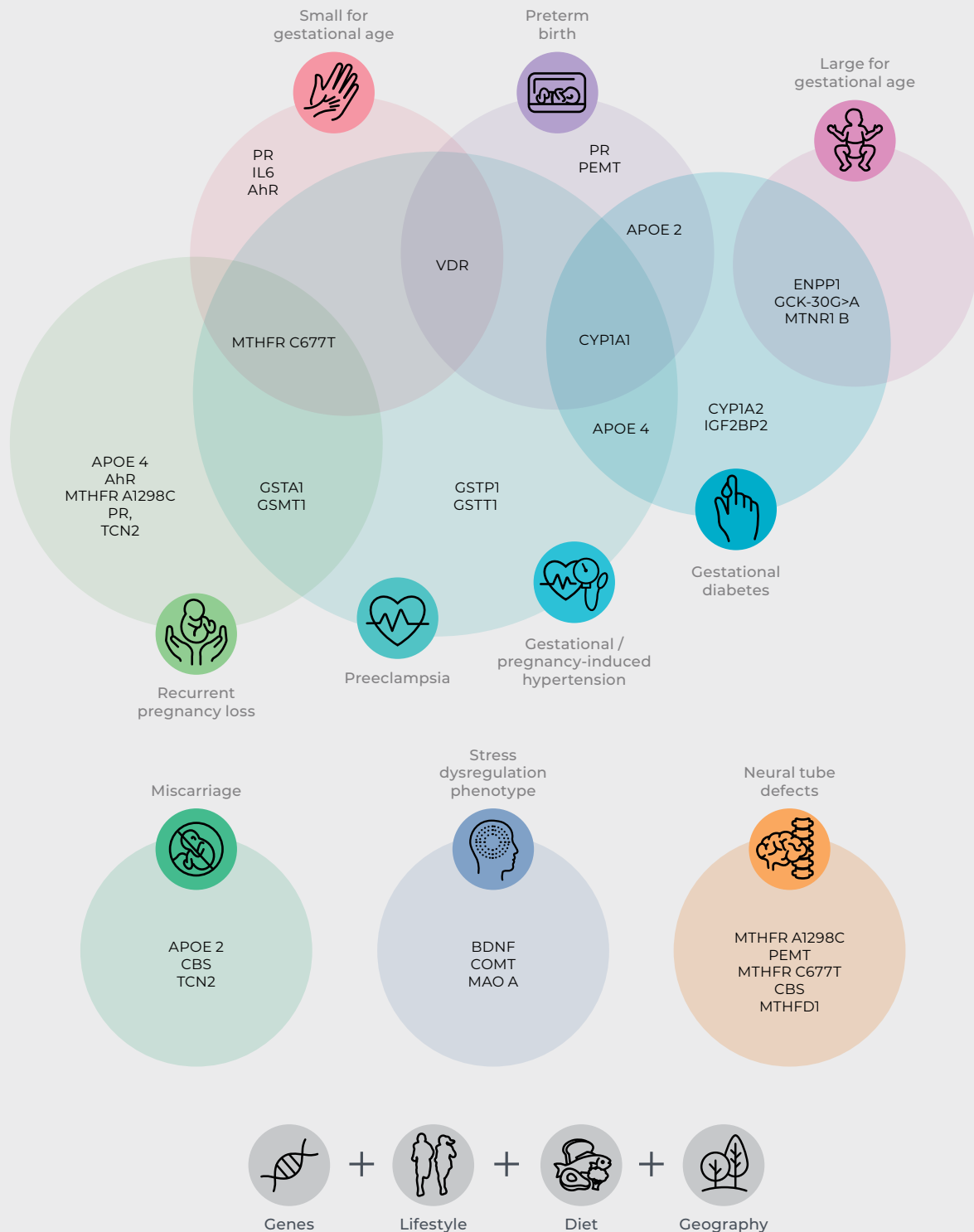
Due to the genetic variations that you carry in the VDR gene, there is a decreased receptor function.

Genotype result table:

GENE NAME	GENE VARIATION	RESULT	GENE IMPACT
VDR	FokI T>C	TT	
	C>T	CC	
	A>G	GG	

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.



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 ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg) at ≥ 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.

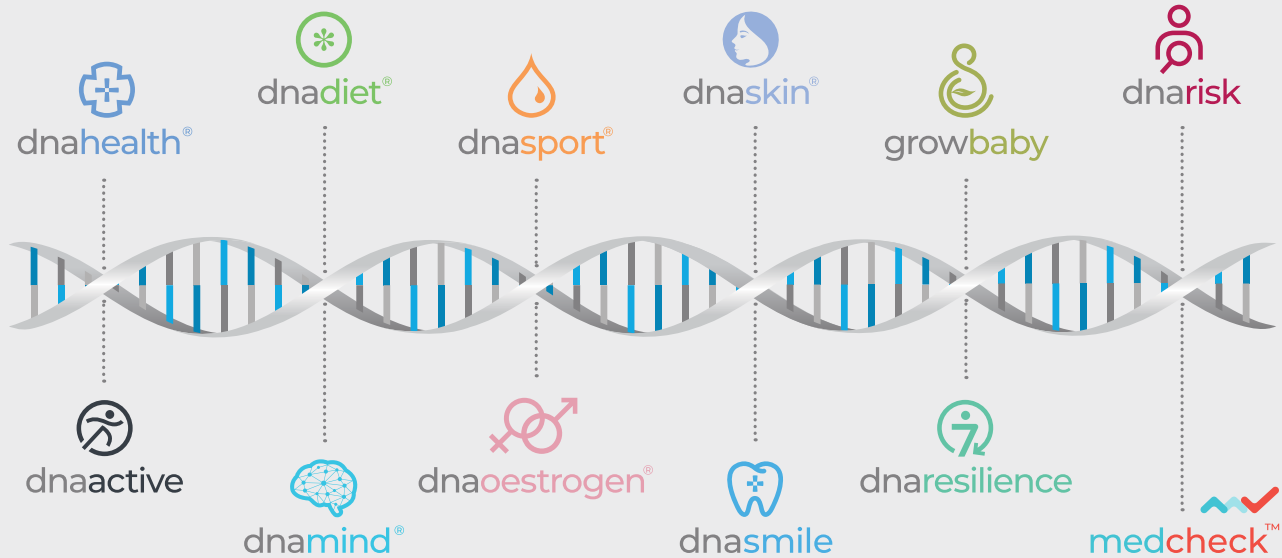


Elevated support required

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 guidelines 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 sample* from you. Throughout your life, as your health goals and priorities change, we can continue to provide valuable health insights from this single sample* to support your unique health journey.



*Requires finger prick blood spot sample collection

Our Commitment

DNAlysis Biotechnology is continuously developing new tests with the highest standards of scientific rigour. Our commitment to ensuring the ethical and appropriate use of genetic tests in practice means that gene variants are only included in panels once there is sound motivation for their clinical utility and their impact on health outcomes.

ADVANCED | **ACTIONABLE** | **APPROPRIATE**
technology | interventions | use in practice

From the laboratories of:

DNALYSIS
Biotechnology

For more information:

011 268 0268 | admin@dnalysis.co.za | www.dnalysis.co.za

Approved by:

Thenusha Naidoo - Medical Scientist
Larisa Naguriah - Medical Technologist
Danny Meyersfeld (PhD) - Laboratory Director

Denmark Office: Nygade 6, 3.sal · 1164 Copenhagen K · Denmark | **T:** +45 33 75 10 00

South Africa Office: North Block · Thrupps Centre · 204 Oxford Rd · Illovo 2196 · South Africa | **T:** +27 (0) 11 268 0268

UK Office: 11 Old Factory Buildings · Battenhurst Road · Stonegate · E. Sussex · TN5 7DU · UK | **T:** +44 (0) 1580 201 687

Risks and Limitations:

DNAlysis Biotechnology has a laboratory with standard and effective procedures in place for handling samples and effective protocols in place to protect against technical and operational problems. However as with all laboratories, laboratory error can occur; examples include, but are not limited to, sample or DNA mislabelling or contamination, failure to obtain an interpretable report, or other operational laboratory errors. Occasionally due to circumstances beyond DNAlysis Biotechnology's control it may not be possible to obtain SNP specific results.

Distributed by:

dnalife | **Nordic Laboratories**

info@dnalife.healthcare | www.dnalife.healthcare