irma™

Comprehensive Reproductive Immunology Assessment

IRMA Report

Report ID

JENA041692F-IRMA

pregmune®

Science Delivers

Version 3.8

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Medical History

Individual

Name	ARIEL JENNIS
Patient ID	1007021
DOB	1992-04-16
Age	33
Height (in)	64
Weight (lbs)	107
BMI	18.4
Address	7319 Sanctuary Cove Dr SE
City	Owens Cross Roads
State	AL
Zip	35763
Email	arjennis.aj@gmail.com
Phone	9414474368

Partner/sperm donor

Name	IAN KRAMER
Patient ID	1007057
DOB	1993-02-19
Age	32
Height (in)	71.0000
Weight (lbs)	209.0000
BMI	29.1
Address	7319 Sanctuary Cove Dr SE
City	Owens Cross Roads
State	AL
Zip	35763
Email	iankramer@protonmail.com
Phone	8622666360

Patient Fertility and Medical History Summary

Type of infertility	Primary (never had a full pregnancy)
Duration of infertility (months)	36
Number of pregnancies	1
RPL	0
Stillbirths	0
Live births	0
Miscarriages	1
Terminations for medical reasons	0
Terminations for personal reasons	0
Failed IVF transfers	0
Any medical/autoimmune conditions?	Abdominal pain or digestive problems, Endometriosis
Any family medical/autoimmune conditions?	Abdominal pain or digestive problems, prostate cancer, High blood pressure, Heart condition (father), High blood pressure (maternal grandmother), Endometriosis, Eczema, Skin Problems (mother)
Is patient on fish oil or any medication?	EPA/DHA (600 mg), Vitamin D (1000 IU), Folic Acid (1 mg), Melatonin (5 mg), Myo Inositol (4100 mg)
Known allergies to medications	Augmentin, Amoxicillin, Fentanyl, Versed
Partner/sperm donor medical conditions?	High blood pressure
Embryos currently stored?	0
Number of embryos (if yes)	0
Number of genetically tested embryos	0
Number of genetically normal embryos	0

Report Summary

→ CLICK THE SECTIONS TO NAVIGATE THE REPORT

	LOW RISK/ NORMAL	MEDIUM RISK/ BORDERLINE	HIGH RISK/ ABNORMAL
Parental Histocompatibility			
Fetal HLA-C and Maternal KIR Interaction			
HLA Mismatches		■	
HY Immunity			
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Paternal Chromosomes			
Thrombophilia			
Prothrombin Factor II Alleles			
Leiden Factor V Alleles			
Plasminogen Activator Inhibitor Type I Alleles		■	
Homocysteine			
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Blood Count			
Cell Blood Count (CBC)			
Inflammation			
Total Immunoglobulin			■
Complement Activity			
Th1/Th2 Helper T Cell Ratio			
Natural Killer Cell Cytotoxic Activity (NKa)			
Regulatory T Cells			
Autoimmunity			
Antinuclear Antibodies (ANAs)			
Antiphospholipid Antibodies (APAs)			
CCP Antibodies and Rheumatoid Factor			
Autoimmunity Predisposition			
HLA Autoimmune Disease Predisposition			N/A
Thyroid Function			
Thyroid Function			
Metabolism			
Insulin Resistance and PCOS Assessment			
Nutrition			
Vitamin D			
Folic Acid			
Fatty Acid Profile		■	
Leptin Levels			

Next Step Options

Every proposed line of therapy addresses a specific issue and all options may have to be taken into consideration for full benefit.

Immunological/Fertility Consideration

ACOG/ESHRE standard consideration

No recommendations

Other considerations (Based on published clinical trials)

The patient and their partner/donor have a partial lack of HLA class II mismatches which increases the risk for pregnancy failure; the patient may benefit from using G-CSF (Neupogen) to promote immune tolerance.

Hormonal/Metabolic Consideration

Hormonal

No recommendations

Nutritional Consideration

Nutrional

The patient's fatty acid profile is medium risk and they may benefit from EPA/DHA (fish oil) supplementation. We recommend starting with 4g per day for 2 weeks, followed by 3g per day as a maintenance dose.
Because the patient has a history of one miscarriage, the patient may benefit from using antioxidant therapy (resveratrol, pycnogenol, and coenzyme Q10) to improve egg quality if they will pursue a natural pregnancy or plan on future egg retrievals.

Further Evaluation

Further

No recommendations

Additional Comments

No additional comments

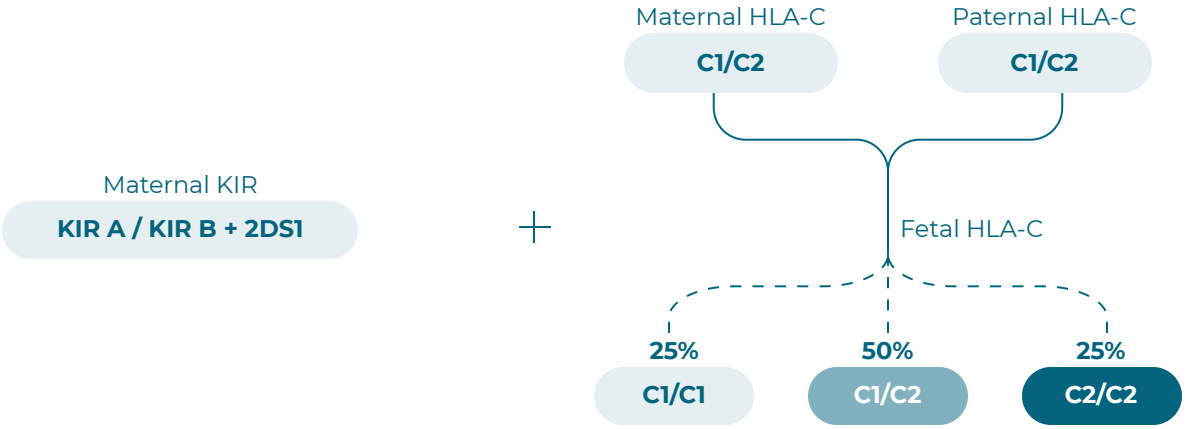
Parental Histocompatibility

This section of the report examines the impact of human leukocyte antigens (HLAs) on pregnancy. HLAs are diverse proteins displayed on human cells like a barcode - unique for everyone. The immune system uses HLAs to differentiate “self” from “non-self.” This section includes paternal test results because half of a developing embryo’s HLAs come from their father. These compatibility tests are designed to evaluate how the patient’s immune system may interact with the developing embryo and affect pregnancy.

Fetal HLA-C and Maternal KIR Interaction

RISK

Lower Risk



LEGEND

KIR A / KIR A	Poor C2 Compatibility
KIR A / KIR B -2DS1	Weak C2 Compatibility
KIR A / KIR B +2DS1	Good C2 Compatibility
KIR B / KIR B	Good C2 Compatibility

LEGEND

Higher C2	Fetal C2 > Maternal C2
Equal C2	Fetal C2 = Maternal C2
Lower C2	Fetal C2 < Maternal C2

WHY WE TEST THIS

A developing embryo’s unique HLAs are recognized by the mother’s uterine natural killer cells using receptors called killer immunoglobulin-like receptors (KIRs). Some maternal KIRs respond better than others to embryos displaying HLA-C2, which influences how much oxygen and nutrition is sent through the placenta (through spiral artery remodeling). Additionally, if the embryo has more (or in some cases the same number of) HLA-C2 alleles than the mother, this could also pose a risk. This test examines the patient’s HLA-C2 content, the predicted embryo’s HLA-C2 content, and whether the maternal KIRs are a good match for HLA-C2. **Learn more →**

WHAT THESE RESULTS MAY MEAN

There are no compatibility concerns between the patient’s KIR genes and fetal HLA-C alleles.

HLA Mismatches

RISK

Medium Risk

HLA Class II Mismatches **: 1 of 6**

DQ Alpha | DQ Beta | HLA-DRB1

Supertype Mismatches **: 0 of 2**

HLA-DRB3/4/5

LEGEND

- Total lack of mismatch
- Partial mismatch
- Full mismatch

WHY WE TEST THIS

A mother's immune system needs to develop tolerance to the embryo to maintain a healthy pregnancy. Part of this process lies in recognizing that the embryo is genetically unique. However, if the embryo inherits paternal HLAs that are too similar to the maternal HLAs, the immune system might not develop a strong tolerance. This test determines if there are enough mismatches between the maternal and paternal HLA Class II alleles. **Learn more →**

WHAT THESE RESULTS MAY MEAN

With fewer than 4 mismatches, there is a moderate risk that the similarity of HLA class II alleles could impair the maternal immune system from generating a tolerance towards the embryo. The patient and their healthcare provider might want to explore immune modulating treatments to help promote immune tolerance.

HY Immunity

RISK

Lower Risk

HY Restricting Alleles
1

Previous birth to a boy / XY baby
NO

WHY WE TEST THIS

Embryos with a Y chromosome have proteins called HY antigens (male specific minor histocompatibility antigen) on their cells. Occasionally, when a mother gives birth to a boy / baby with a Y chromosome, the mother's immune system can generate an immune response against these HY antigens and interfere with future pregnancies. The mother's HLAs are responsible for initiating this immune response, and some HLA alleles increase the likelihood of this happening. This test determines if the patient carries these higher-risk HY restricting alleles, which might put the patient at higher risk if they've previously given birth to a boy. (An allele is an alternate version of a gene at a specific location of the chromosome.)
Learn more →

WHAT THESE RESULTS MAY MEAN

There is a moderate concern that the patient's HLAs put them at increased risk for generating an immune response against HY antigens. The patient and their healthcare provider might want to explore immune modulating treatments to help decrease alloantibodies (antibodies to "others").

HLA Antibodies

RISK

Lower Risk

Partner-Specific HLA-C Antibodies
NO

Previous Full-Term Pregnancy
NO

Previous Blood Transfusion(s)
0

Previous Lymphocyte Immunization Therapy
0

HLA Class I Antibodies

Antibodies detected: **1**
High concentration (>4K MFI): **0**
Partner-specific antibodies: **0**

No partner specific Class I antibodies found, including HLA-C

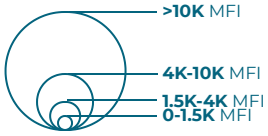
HLA Class II Antibodies

Antibodies detected: **0**
High concentration (>4K MFI): **0**
Partner-specific antibodies: **0**

No partner specific Class II antibodies found

LEGEND

Circle area: concentration



Circle color

Partner specific

Partner specific and HLA-C

WHY WE TEST THIS

Sometimes, a person's immune system can develop antibodies to HLAs. These antibodies can target HLAs from previous full-term pregnancies or blood transfusions, or they can specifically target a partner's HLAs - which the embryo will inherit. HLA antibodies are common and aren't necessarily a problem, but partner-specific HLA-C antibodies (a subtype of Class I antibodies) can pose a considerable risk and are associated with early miscarriages and secondary infertility. This test measures how much and what type of HLA antibodies a patient carries, if any. **Learn more →**

WHAT THESE RESULTS MAY MEAN

HLA antibodies were low. HLA antibodies are not a concern.

Parental Chromosome Analysis

Although many chromosomal abnormalities are debilitating or fatal, sometimes the only indication of a parent's chromosomal abnormality is reproductive difficulty. Abnormalities can include deletions, duplications, and genetic rearrangements where sections of chromosomes have been shuffled around. This section of the report uses cytogenetic analysis to visually examine the patient's and their partner's/donor's chromosomes.

Parental Chromosome Analysis

MATERNAL STATUS	PATERNAL STATUS
Normal	Normal

MATERNAL CHROMOSOME ANALYSIS

Total Chromosomes
46

Sex Chromosomes
XX

Findings
Normal female karyotype

PATERNAL CHROMOSOME ANALYSIS

Total Chromosomes
46

Sex Chromosomes
XY

Findings
Normal male karyotype

WHY WE TEST THIS

Despite being otherwise healthy, parents with chromosomal abnormalities might have trouble producing eggs or sperm with a full set of normal chromosomes. This test visually examines the parents' chromosomes for any major structural anomalies. Please note that the visual nature of this test only detects large chromosomal changes containing multiple genes; it is not a genetic analysis that will detect gene-specific mutations. **Learn more →**

WHAT THESE RESULTS MAY MEAN

No chromosomal abnormalities were observed.

Thrombophilia

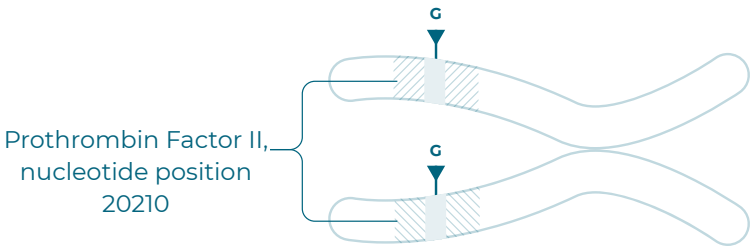
While pregnant, a person's risk for blood clots in their veins (venous thromboembolism) increases 5- to 6-fold. If they have hereditary thrombophilia, that risk can increase more than 30-fold. Additionally, thrombophilia increases the chance of blood clots in the placenta, which increases the likelihood of pregnancy loss. These tests examine the patient's risk for thrombophilia to determine if anticoagulants could help improve chances for pregnancy success.

Prothrombin Factor II Alleles

RISK LEVEL

Lower Risk

High risk alleles: **0 out of 2**



LEGEND

A Allele - mutation

G Allele - no mutation

WHY WE TEST THIS

Prothrombin (blood coagulation factor II) has an important role in blood clot formation. The “A” allele of prothrombin increases a person’s prothrombin levels, which then increases the risk of thrombophilia and pregnancy complications. This test determines if the patient carries the higher risk “A” allele. **Learn more →**

WHAT THESE RESULTS MAY MEAN

Prothrombin factor II is not a concern.

DISCLAIMER

Please note that this is not a complete thrombophilia assessment. Our limited thrombophilia panel is a combination of three genetic tests designed to provide evidence of inherited gene mutations that are associated with an increased risk for developing thromboembolism (blood clot formation) and experiencing recurrent pregnancy losses. Individuals who have inherited a pathogenic variant for one of these genes may have a predisposition to excessive blood clot formation and miscarriages. In addition, we test for both hyperhomocysteinemia as a risk factor for venous thrombosis and for bleeding disorder by assessing the patient's clotting factors.

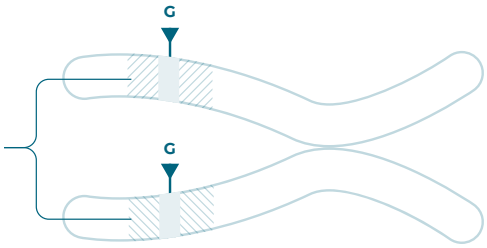
Leiden Factor V Alleles

RISK LEVEL

Lower Risk

High risk alleles: **0 out of 2**

Factor V gene, nucleotide position 1691



LEGEND

A Allele - mutation

G Allele - no mutation

WHY WE TEST THIS

Factor V has an important role in blood clot formation. The Leiden mutation, or “A” allele, causes factor V to remain active longer, which increases the risk of thrombophilia and pregnancy loss. This test determines if the patient carries the higher risk “A” allele. **Learn more →**

WHAT THESE RESULTS MAY MEAN

Leiden factor V is not a concern.

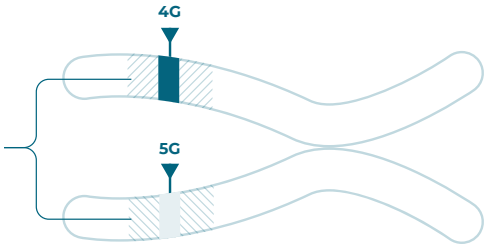
Plasminogen Activator Inhibitor Type I (PAI-1) Alleles

RISK LEVEL

Medium Risk

High risk alleles: **1 out of 2**

Promoter region of PAI-1 gene



LEGEND

4G Allele – mutation

5G Allele – no mutation

WHY WE TEST THIS

Plasminogen activator inhibitor type 1 (PAI-1) is a protein that inhibits a process that prevents blood clots. In other words, less PAI-1 equals better protection against thrombosis. The high risk 4G allele increases levels of PAI-1 and by doing so can increase a person’s risk for blood clot and miscarriage. This test determines if the patient carries the higher risk 4G allele. **Learn more →**

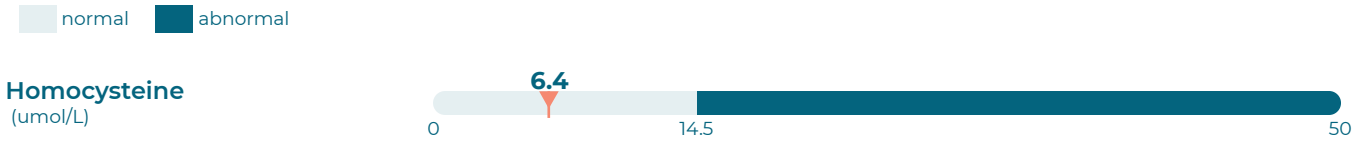
WHAT THESE RESULTS MAY MEAN

The patient has one high risk allele for PAI-1 which might put them at a slightly increased risk for thrombosis and miscarriage. The risk increases if combined with other high risk alleles in factor II or factor V.

Homocysteine

STATUS

Normal



WHY WE TEST THIS

Homocysteine is a metabolic by-product. High homocysteine levels (hyperhomocysteinemia) can indicate a vitamin B12, B6, or folate deficiency, and is a risk factor for thrombosis and cardiovascular disease as well as adverse pregnancy outcomes. **Learn more →**

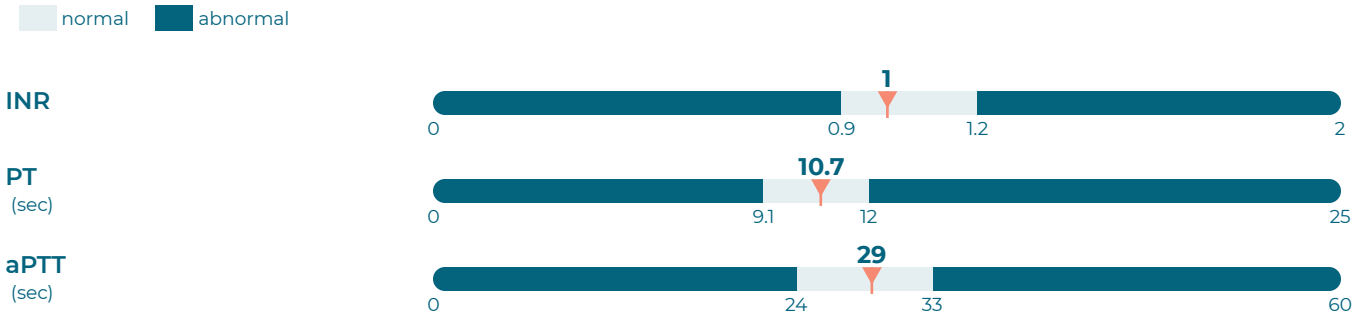
WHAT THESE RESULTS MAY MEAN

The patient's homocysteine levels are normal and do not pose a risk.

Blood Clotting Measurements

STATUS

Normal



WHY WE TEST THIS

PT (prothrombin time), aPTT (activated partial thromboplastin time), and INR (international normalized ratio) are all different measures of a person's blood clotting reaction. PT measures how quickly a patient's blood clots when exposed to an injury like a cut and INR is simply the ratio of the patient's PT to an average population's PT. aPTT measures how quickly a patient's blood clots when exposed to internal vascular damage. If a patient's blood clots too quickly, it could indicate an increased risk of thrombosis. **Learn more →**

WHAT THESE RESULTS MAY MEAN

The patient's clotting results appear normal.

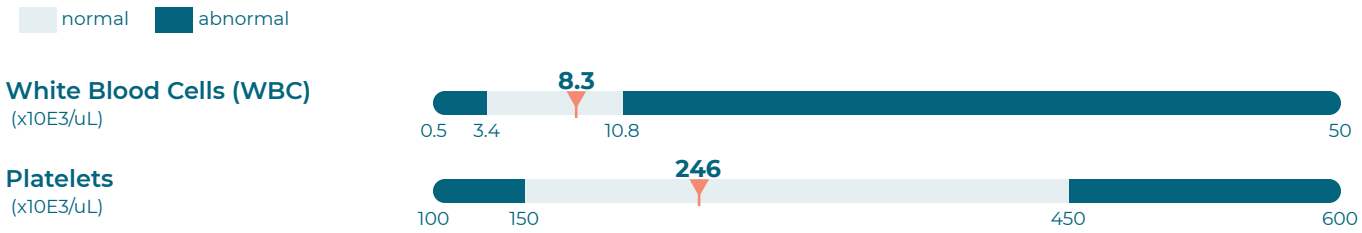
Blood Count

The cells that travel through a person's bloodstream include red blood cells that carry oxygen, white blood cells that belong to the immune system, and platelets that initiate blood clots. Because of the diversity of blood cell functions, these test results contribute to both a patient's thrombophilia assessment and inflammation assessment.

Cell Blood Count (CBC)

STATUS

Normal



WHY WE TEST THIS

A high white blood cell count can indicate that the body is fighting an infection or inflammation. A high platelet count could impact a person's thrombosis risk. These measures might be important to track if the patient undergoes certain immunological treatments like neupogen or prednisone. **Learn more →**

WHAT THESE RESULTS MAY MEAN

The patient's white blood cell count and platelet count are within the normal range.

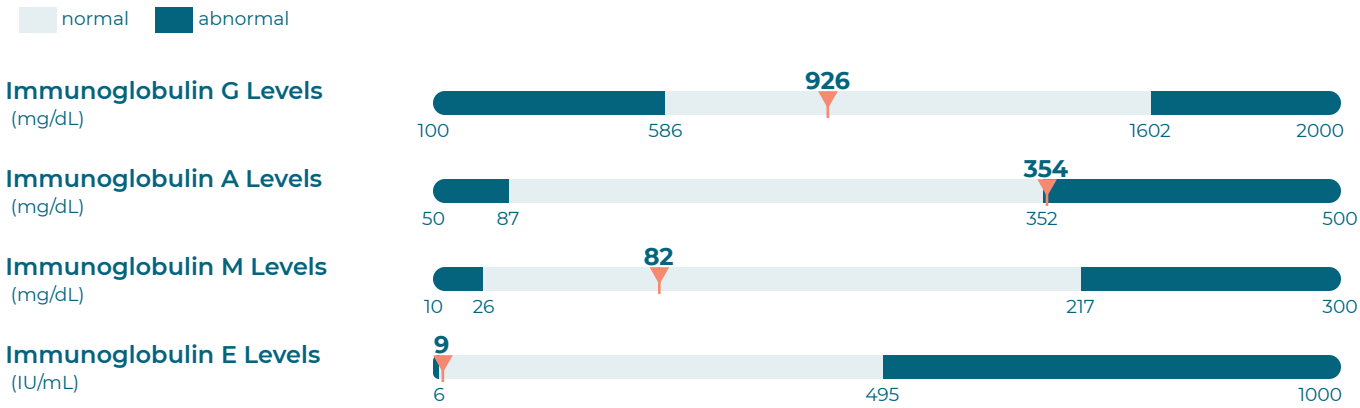
Inflammation

Whether caused by an autoimmune condition, infection, allergies, or another source, different inflammatory markers have been associated with reproductive challenges. During a healthy pregnancy, the body must be able to shift to a relatively anti-inflammatory state to maintain the pregnancy. The following tests are some of the most established markers of inflammation in reproductive immunology. These results can be used to determine if treatments to reduce inflammation could help improve a patient's chances of reproductive success.

Total Immunoglobulin

STATUS

Abnormal



WHY WE TEST THIS

Immunoglobulins, also known as antibodies, are key mediators of the immune system that identify and neutralize pathogens and other targets. Antibody levels can help indicate allergies and other inflammatory reactions. **Learn more →**

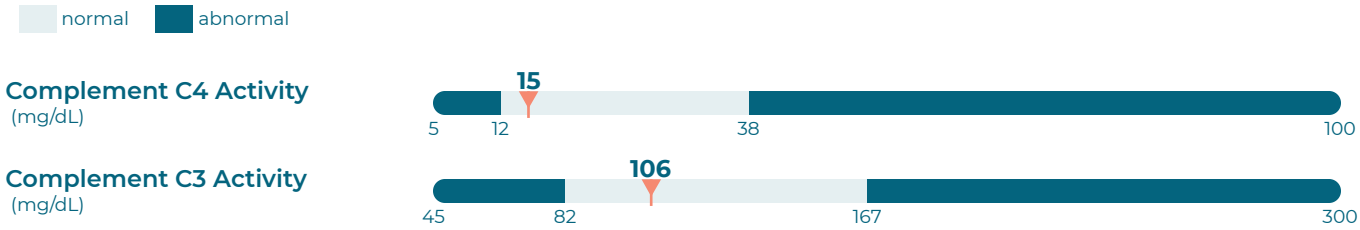
WHAT THESE RESULTS MAY MEAN

The patient has a borderline elevated Total IgA level.The patient and their healthcare provider may want to discuss follow up tests or recommendations.

Complement Activity

STATUS

Normal



WHY WE TEST THIS

The complement system is part of the innate immune system and, when activated, is a strong inducer of inflammation. C3 and C4 are two key proteins in the complement system. Complement activation has been linked to pregnancy complications like pre-eclampsia. **Learn more →**

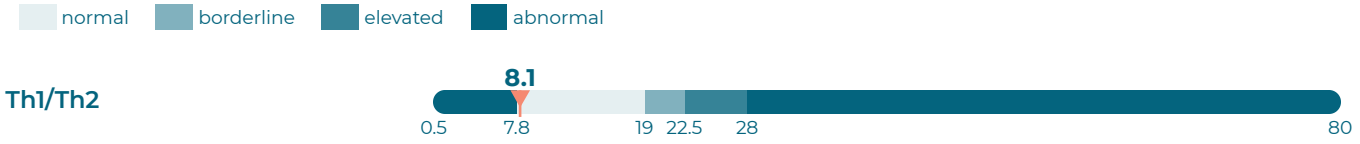
WHAT THESE RESULTS MAY MEAN

The patient's C3 and C4 complement levels are within the optimal range reflecting a complement activity within the normal range.

Th1/Th2 Helper T Cell Ratio*

STATUS

Normal



WHY WE TEST THIS

Some immune cells, like T helper cells, produce molecules that tell the immune system to either kick into high gear (pro-inflammatory) or calm down (anti-inflammatory). Th1 cells are T helper cells that produce pro-inflammatory molecules, while Th2 cells produce anti-inflammatory molecules. The ratio of Th1 to Th2 can help determine the patient's inflammation levels. **Learn more →**

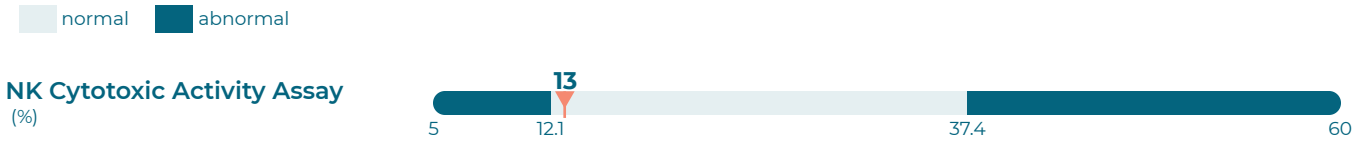
WHAT THESE RESULTS MAY MEAN

The patient has a normal Th1/Th2 ratio.

Natural Killer Cell Cytotoxic Activity (NKa)*

STATUS

Normal



WHY WE TEST THIS

Natural killer (NK) cells are immune cells that have a bad reputation as “killers.” However, in addition to killing cells (through cytotoxic activity), NK cells can do many other things like encouraging healthy placental development in the uterus. This test measures how much the patient’s NK cells are primed towards killing. High NK cytotoxic activity has been associated with recurrent pregnancy loss. **Learn more →**

WHAT THESE RESULTS MAY MEAN

The patient's NK cytotoxic activity levels are within the normal range.

Regulatory T Cells*

STATUS

Normal

WHY WE TEST THIS

Regulatory T cells (Treg cells) are specialized immune cells that suppress inflammation and are essential for preventing the uterus from rejecting the embryo. Low Treg levels in the uterus are linked to infertility, recurrent miscarriage, and pregnancy complications. This test measures the patient’s circulating Treg cell levels, which can be used to help estimate recruitment of Treg cells to the uterus during pregnancy. **Learn more →**

WHAT THESE RESULTS MAY MEAN

The patient's Treg cell levels are within the normal range.

***DISCLAIMER**

In the field of reproductive immunology, some functional assays are described which reflect the immune capacity of peripheral blood derived natural killer cells (NK cells) or regulatory T cells. Recent data clearly show that the composition of the immune cells locally in the placenta, where the relevant immune regulation of an ongoing pregnancy takes place, is significantly different from that in the peripheral blood. Nevertheless, data are available showing that increased NK levels in the peripheral blood are associated with pregnancy failure. However, there is no evidence that these peripheral NK cells are directly responsible for the failure. The phenotypic characteristics and function of uterine Natural Killer cells are completely different from those of the peripheral blood derived NK cells. Similarly, scientific literature shows a difference in immune regulation by regulatory T cells in the peripheral blood versus the placenta, in which partner specific regulatory T cells are induced. Thus we don't think there is enough evidence to consider the NK cytotoxic activity or peripheral regulatory T cell function as independent factors to predict failure. Nevertheless, these provide valuable information and are part of the predictive pregnancy success algorithm.

Autoimmunity

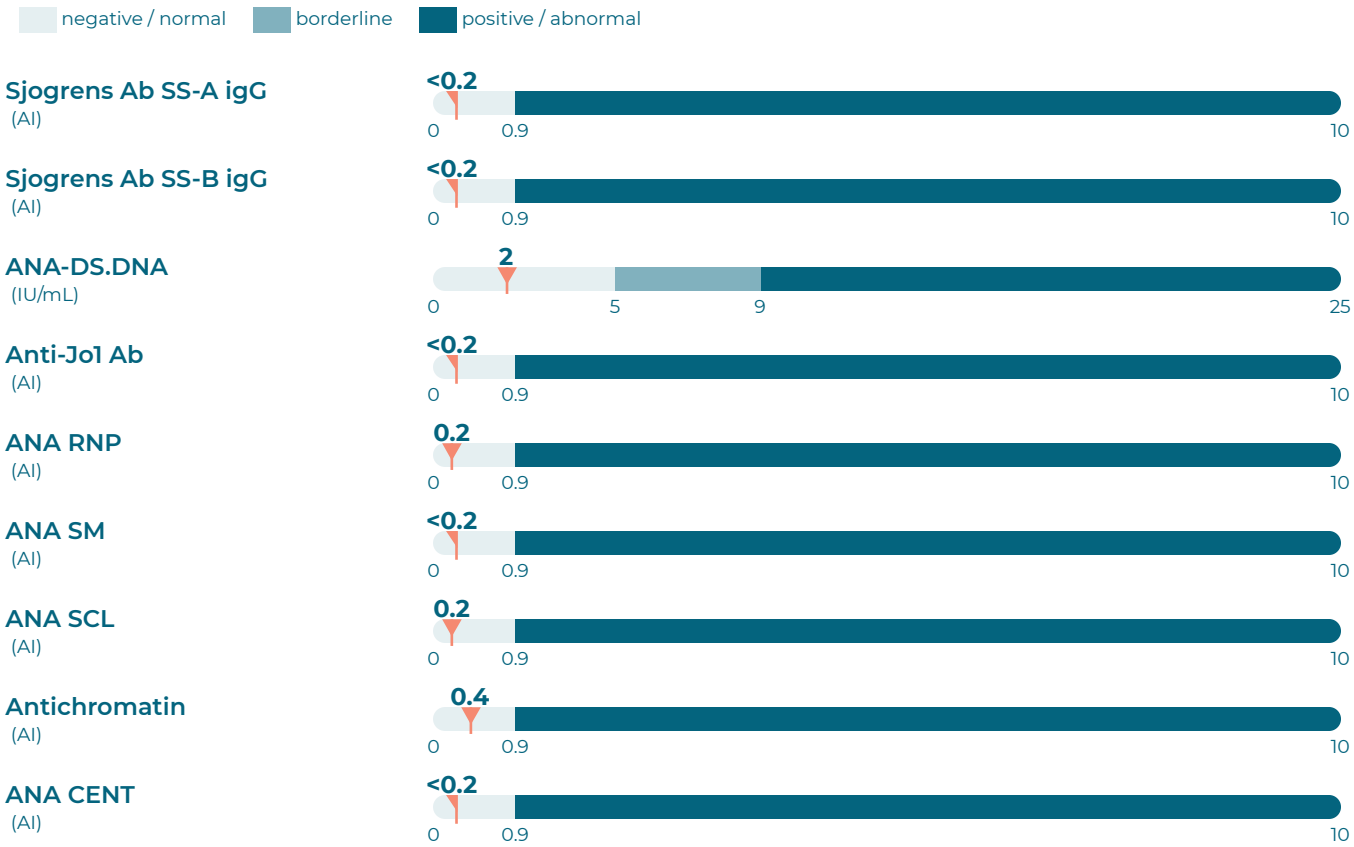
Many autoimmune diseases can raise a patient's chances for adverse pregnancy outcomes, which is why expectant mothers with antiphospholipid syndrome, lupus, rheumatoid arthritis, and other autoimmune disorders are considered high-risk pregnancies.

However, many people remain undiagnosed for autoimmune conditions. These tests help determine a patient's risk for various autoimmune conditions, which are each treated accordingly.

Antinuclear Antibodies (ANAs)

STATUS

Normal



WHY WE TEST THIS

The nucleus of a cell contains DNA and diverse proteins required to keep the cell functioning. Sometimes, a person's immune system will begin to attack proteins in the nucleus by developing antinuclear antibodies (ANAs). When present in high concentrations, ANAs could indicate an autoimmune disease such as lupus. These tests assess the presence of different ANAs. **Learn more →**

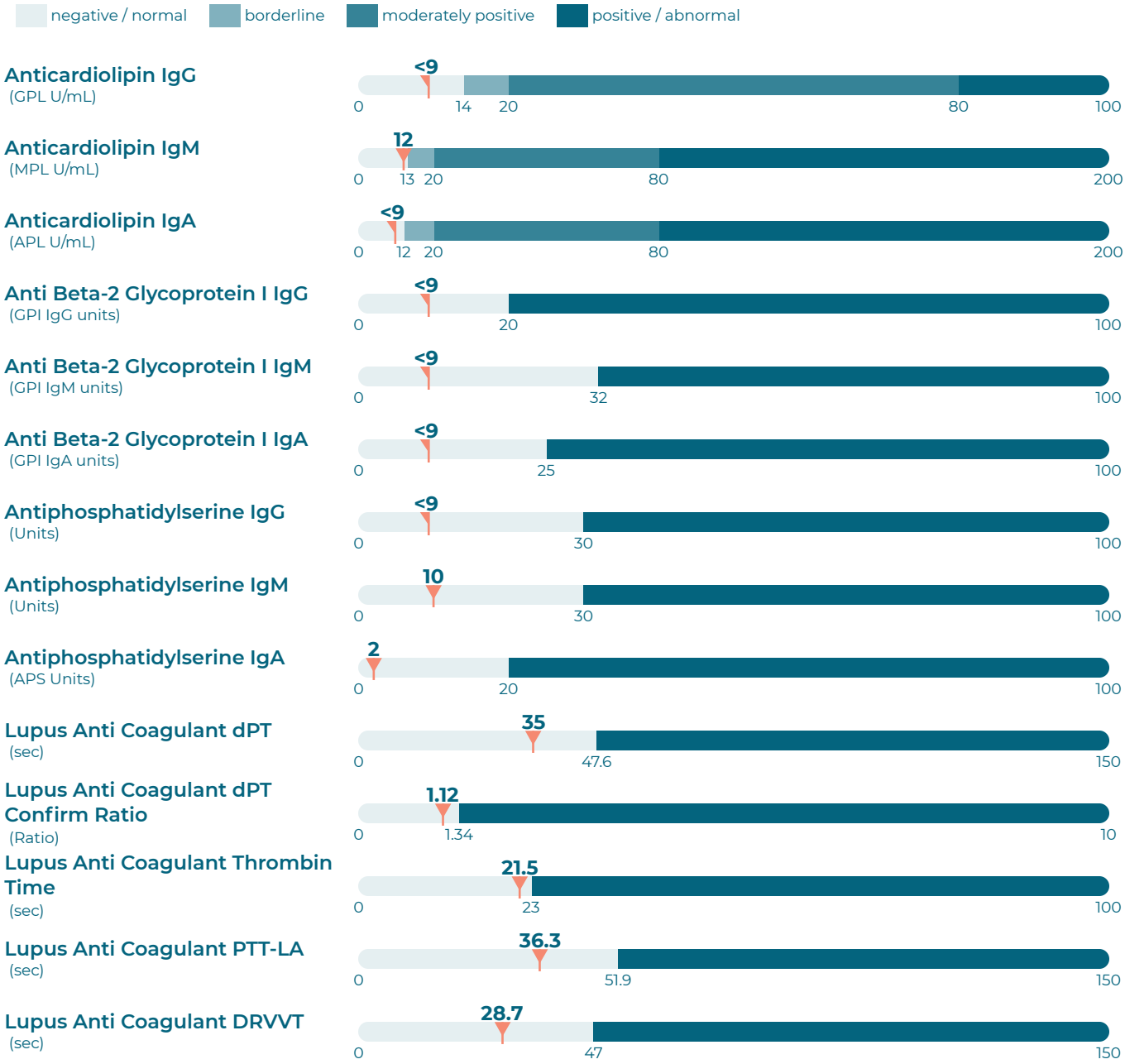
WHAT THESE RESULTS MAY MEAN

The patient is negative for all ANAs tested.

Antiphospholipid Antibodies (APAs)

STATUS

Normal



WHY WE TEST THIS

Phospholipids are integral components of human cell membranes. Sometimes, a person's immune system will begin to attack its own phospholipids by developing antiphospholipid antibodies (APAs). Because blood cells contain phospholipids, APAs can lead to blood clots, miscarriages, or pregnancy complications. These tests assess the presence of different APAs. **Learn more →**

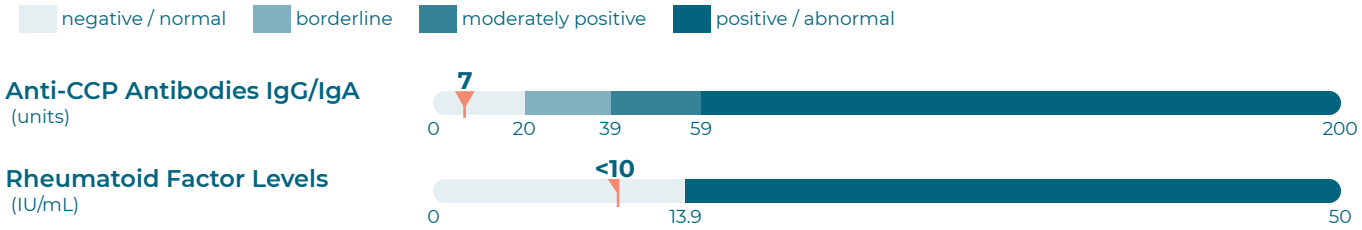
WHAT THESE RESULTS MAY MEAN

The patient is negative for all APAs tested.

CCP Antibodies and Rheumatoid Factor

STATUS

Normal



WHY WE TEST THIS

Cyclic citrullinated protein (CCP) antibodies and rheumatoid factor are antibodies that can indicate rheumatoid arthritis and some other autoimmune diseases. These tests assess the presence of these antibodies. **Learn more →**

WHAT THESE RESULTS MAY MEAN

The patient is negative for both Rheumatoid Factor and Anti-CCP antibodies.

Autoimmunity Predisposition*

Autoimmune diseases are thought to arise from a combination of a person's genetics and environment. Although being genetically predisposed to autoimmunity might raise a person's chances for developing an autoimmune disease, it is not a guarantee.

HLA Autoimmune Disease Predisposition

RISK LEVEL

N/A

HLA Alleles Associated with Autoimmune Disease

DQB1*02:01, DQB1*06:02, DRB1*03:01, DRB1*15:01

Associated Autoimmune Diseases

Autoimmune hepatitis, Inclusion body myositis, Multiple sclerosis, Myasthenia gravis, Narcolepsy, Sarcoidosis, Systemic lupus erythematosus

WHY WE TEST THIS

Human Leukocyte Antigen (HLA) genes play an integral role in activating the immune response. Some HLA alleles change the features of a person's HLAs to make them more likely to inappropriately trigger the immune response and develop an autoimmune condition. This genetic test looks at different alleles of the patient's HLA genes which might predispose the patient to autoimmune issues than can interfere with a healthy pregnancy. **Learn more →**

WHAT THESE RESULTS MAY MEAN

The patient harbors several HLA alleles that confer genetic predispositions to many conditions that may affect one's fertility.

***DISCLAIMER**

Please note that being predisposed to certain diseases does not mean a patient will actually develop the disease. Besides genetics, the risk for developing a particular condition is linked to a person's family history (indicating an increased risk) and other factors including environmental factors and lifestyle that may trigger the development of an autoimmune condition.

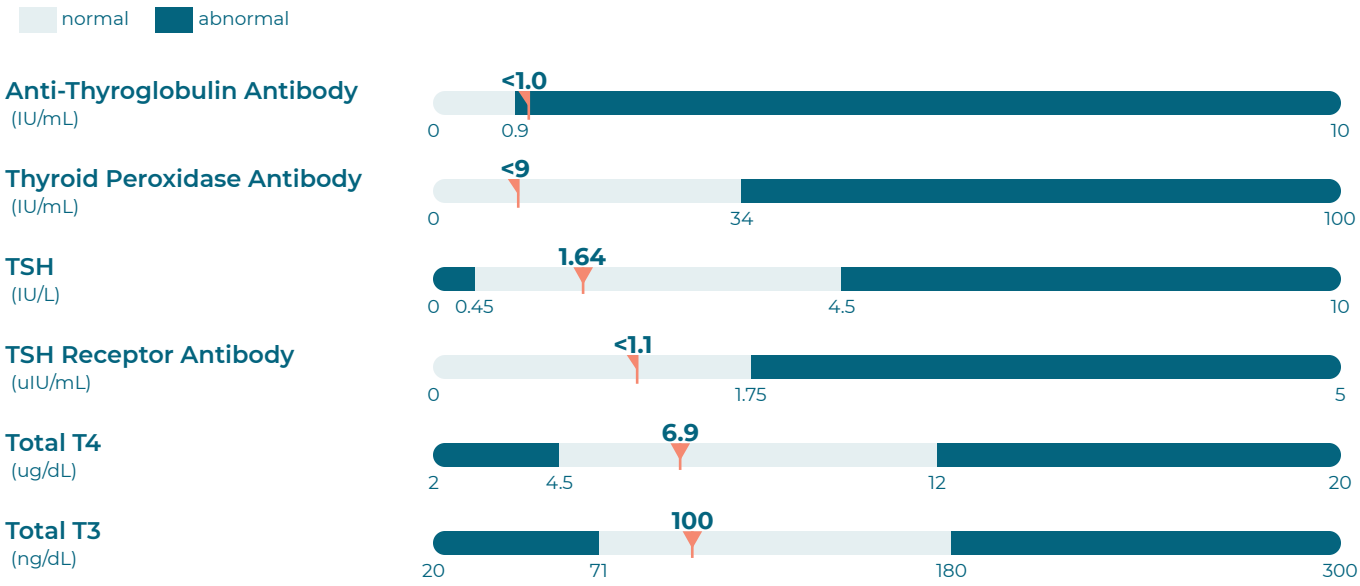
Thyroid Function

The thyroid is a butterfly-shaped gland located in the neck. It secretes hormones that regulate metabolism, body temperature, the cardiovascular system, and the digestive system. The thyroid's proper function is crucial when pregnant because the mother's thyroid hormones affect fetal growth and brain development.

Thyroid Function

STATUS

Normal



WHY WE TEST THIS

Thyroid disorders can contribute to pregnancy complications, miscarriage, or a person's ability to get pregnant. Thyroid disorders sometimes arise from autoimmune problems where a person develops antibodies to specific parts of the thyroid. These tests look for thyroid antibodies as well as measure hormone levels related to healthy thyroid functioning.

Learn more →

WHAT THESE RESULTS MAY MEAN

The patient's thyroid hormones are normal, and no thyroid antibodies have been detected.

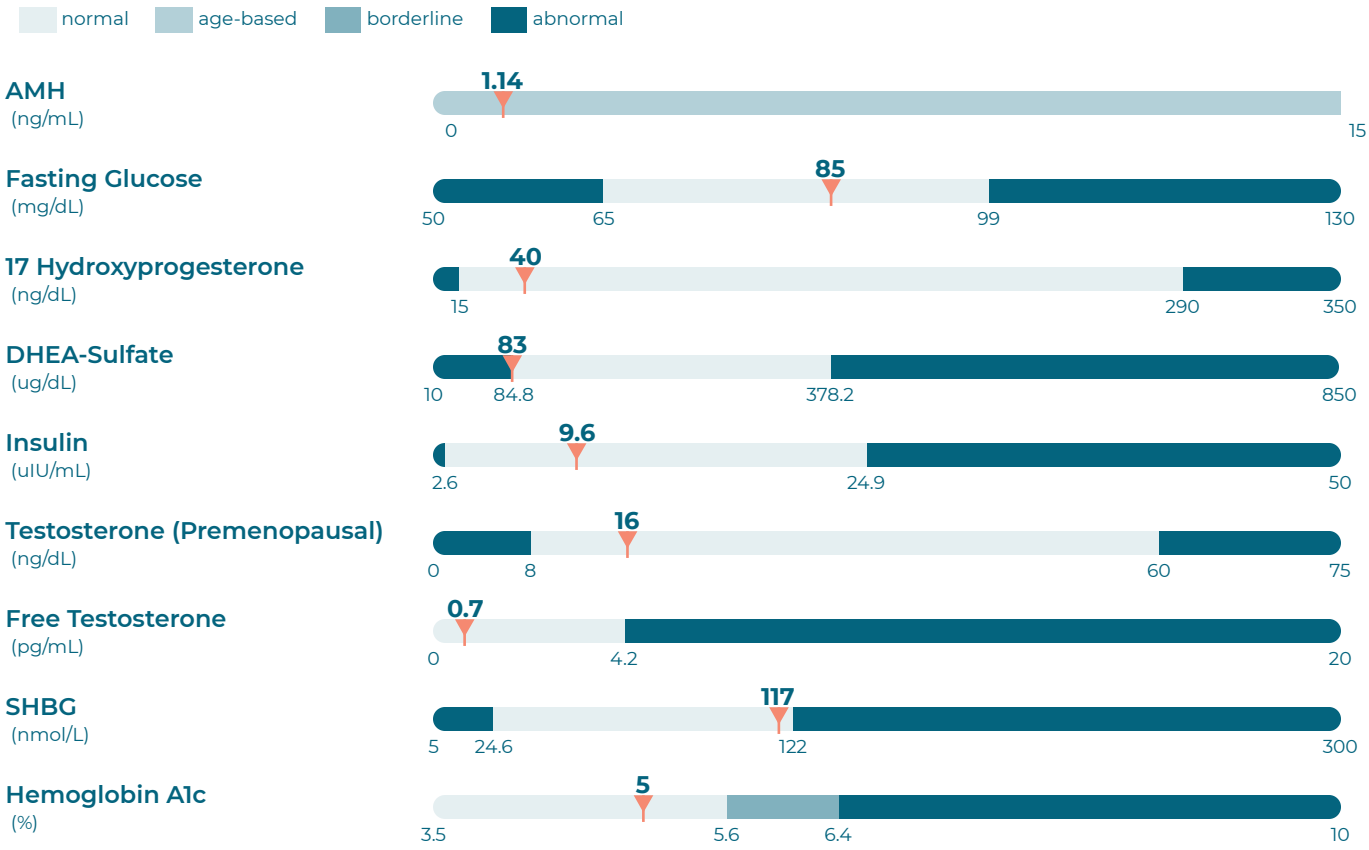
Metabolism

Metabolic disorders, like diabetes and PCOS, can increase a person's chance for infertility and miscarriage. When these disorders are properly diagnosed, studies indicate that taking metformin and/or getting blood sugar levels under control could help reduce chances of miscarriage or pregnancy complications. These tests look for signs of metabolic problems.

Insulin Resistance and Polycystic Ovarian Syndrome (PCOS) Assessment

RISK LEVEL

Lower Risk



WHY WE TEST THIS

Polycystic ovarian syndrome (PCOS) is a common endocrine condition, characterized by high levels of androgens and resistance to insulin. People with PCOS are at an increased risk for infertility and pregnancy complications such as gestational diabetes and hypertension. These tests look for signs of insulin resistance and hormonal dysregulation. **Learn more →**

WHAT THESE RESULTS MAY MEAN

Results are normal. There is no indication of insulin resistance or type 2 diabetes. Based on the Rotterdam criteria, the patient is not likely to have PCOS.

Nutrition

Diet can impact a person's ability to get pregnant and deliver a healthy baby. Certain dietary deficiencies can increase the risk of pregnancy complications or birth defects, while other dietary imbalances can lead to increased levels of inflammation. These tests examine a few of the most important nutritional markers for pregnancy to help determine if a dietary supplement or other dietary action could help.

Vitamin D

STATUS

Normal

normal | borderline low | abnormal

25 Hydroxy Vitamin D levels
(ng/mL)

WHY WE TEST THIS

Vitamin D has an essential role in immune health and calcium absorption. Low levels of vitamin D are linked to recurrent pregnancy loss and numerous pregnancy complications. **Learn more →**

WHAT THESE RESULTS MAY MEAN

The patient has healthy vitamin D levels and does not require supplementation.

Folic Acid

STATUS

Normal

normal | abnormal

Folic Acid levels
(ng/mL)

WHY WE TEST THIS

Folic acid, also known as vitamin B-9, is naturally found in many foods. It is added to prenatal vitamins and many fortified foods such as cereal. Folic acid is a crucial nutrient during early pregnancy and can help reduce the risk of birth defects. **Learn more →**

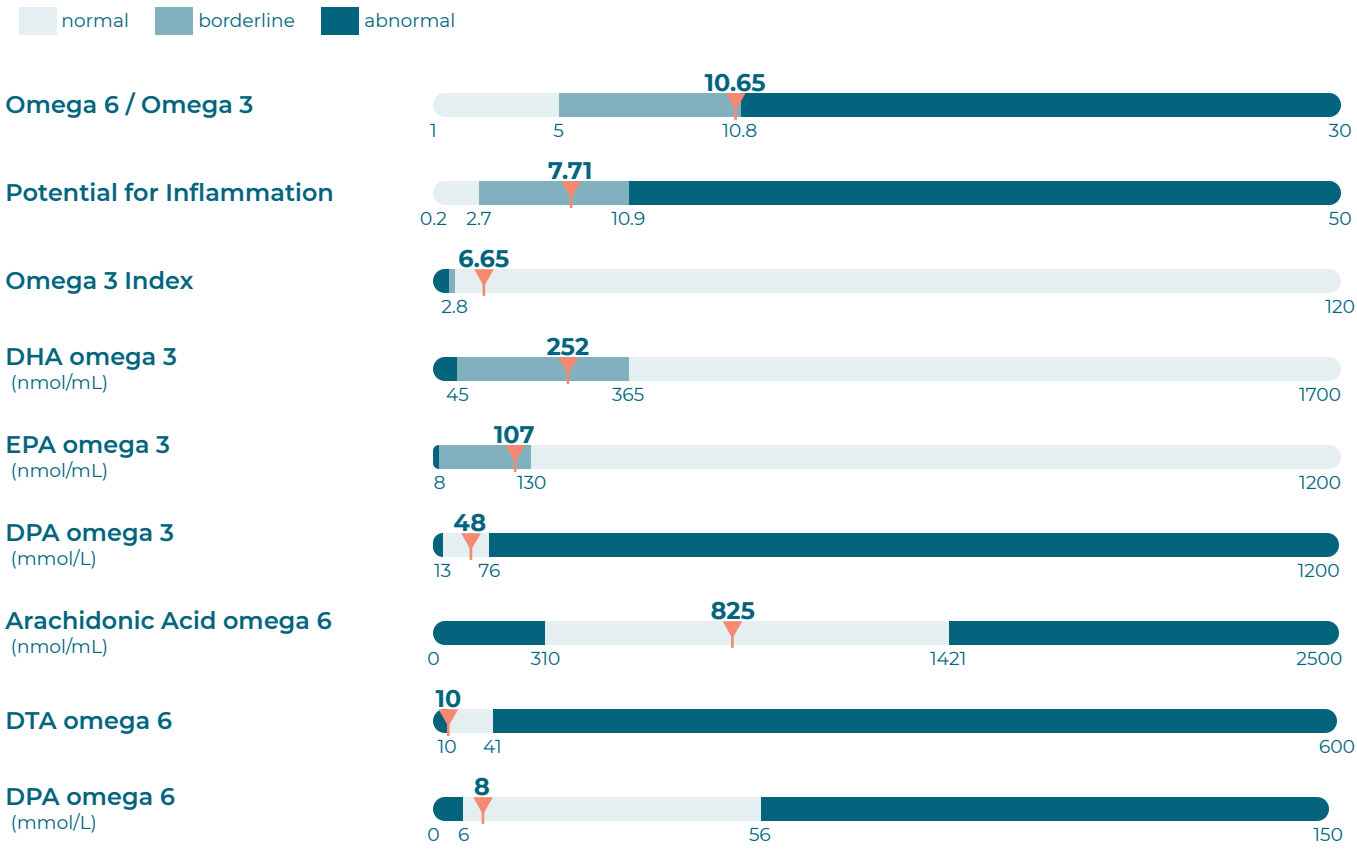
WHAT THESE RESULTS MAY MEAN

The patient has healthy folic acid levels.

Fatty Acid Profile

RISK LEVEL

Medium Risk



WHY WE TEST THIS

Omega 3 and omega 6 fatty acids are important classes of dietary fats. Omega 3 fatty acids, like EPA and DHA, are well known for their anti-inflammatory properties and have been found to help lower the risk of pregnancy complications. Omega 6 fatty acids aren't inherently bad, but without a healthy intake of omega 3 fatty acids, could promote inflammation. These tests look at omega 3 levels and determine if they're sufficient to counterbalance omega 6 levels.

Learn more →

WHAT THESE RESULTS MAY MEAN

The patient's fatty acid levels present a moderate risk, and an EPA/DHA supplement could help restore their omega balance. A good strategy would be to start with 4g per day for 2 weeks, followed by a maintenance dose of 3g per day.

Leptin Levels

STATUS

Normal

WHY WE TEST THIS

Leptin is a hormone released by fat cells that regulates hunger and many aspects of pregnancy. High leptin levels are linked to multiple reproductive issues including impaired egg production, pregnancy failures and complications. Low leptin levels might be linked to miscarriage. **Learn more →**

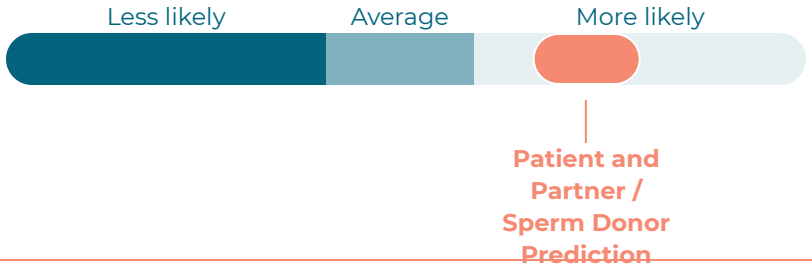
WHAT THESE RESULTS MAY MEAN

The patient's leptin levels are within the normal range.

IRMA Prediction

IRMA is a holistic examination of different blood markers and genetic traits that have been found in scientific studies to contribute to implantation failure, miscarriage, or pregnancy complications. Some tests (histocompatibility and chromosome analysis) involve both parents when a partner or sperm donor is available for testing. The remaining tests check the patient for signs of an autoimmune condition or high inflammation levels, as well as assess the patient's thyroid, metabolism, thrombophilia risk, nutrition status, and hormones.

LIKELIHOOD OF A SUCCESSFUL BIRTH



ABOUT THIS VALUE

This is an AI-generated risk stratification model of the likelihood that the patient and their partner/sperm donor will have a successful pregnancy and birth using their own eggs and sperm while following our recommendations. E.g., when likelihood is 0.7, that means we expect 7 successful pregnancies out of 10 embryo transfers for patients with the same conditions. It is calculated based on a comparison against data from over 700 fertility clinic patients with an average success rate of 55%. The fertility clinic patients were aged 45 or younger and typically had a history of recurrent pregnancy loss, implantation failure, or infertility. This prediction is based on patient history, genetics, and immunological factors. Because this prediction was created from a database of patients aged 45 or younger, this calculation will be less accurate for patients over the age of 45, and in some cases will not be calculated.

WHAT IMPACTS THIS PREDICTION

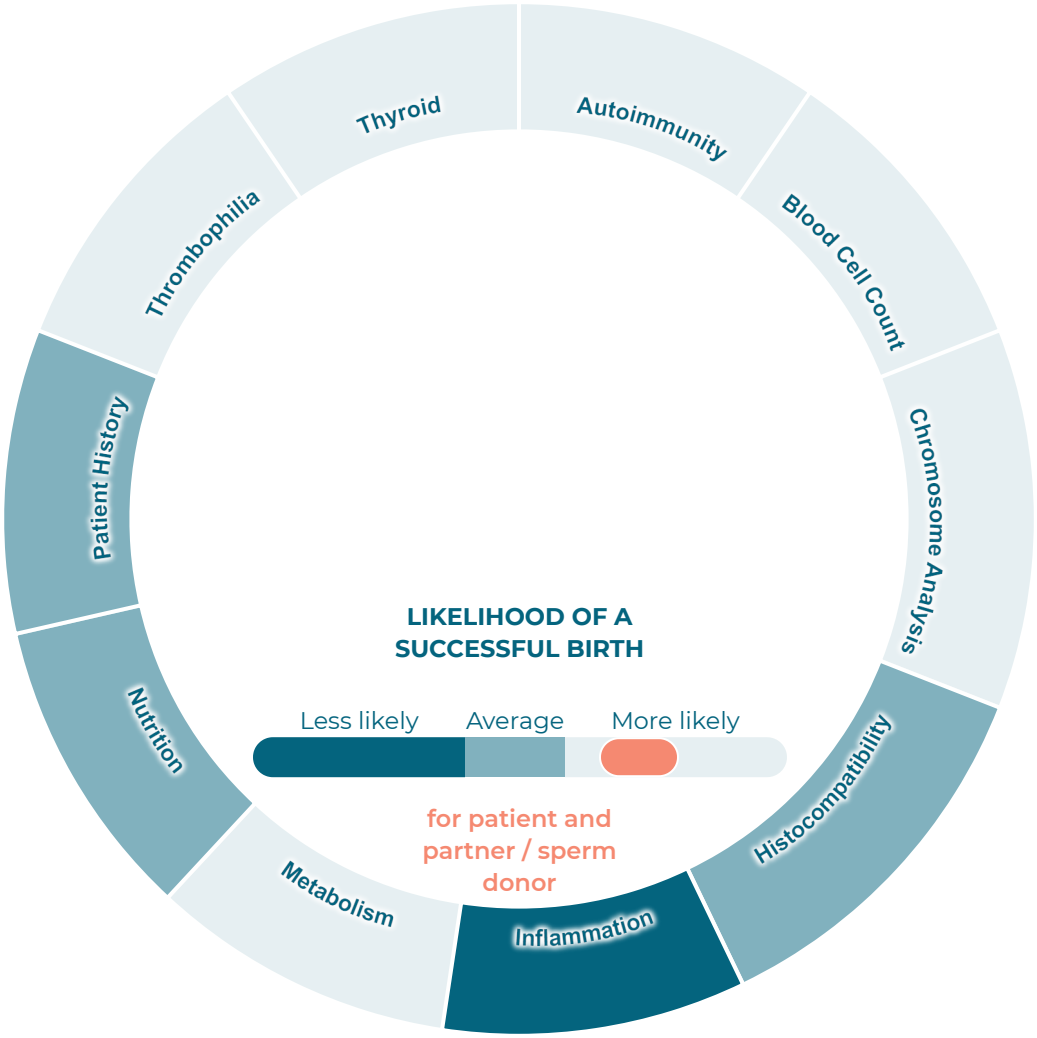
The patient history and test results that most impact this prediction are presented on the following page. Not all individual IRMA test results that are high risk or abnormal will impact this prediction as they may not present a significant risk for pregnancy failure. Similarly, some IRMA test results that are normal may impact this prediction but should not be factored into treatment decisions. The IRMA prediction algorithm considers all factors as they relate to one another, which means a factor that is important for one person may not be important for someone else who is, for example, a different age. Because it is an AI-generated model, factor importance may change over time. Treatment decisions should be based on the provider's clinical judgment and unique patient circumstances and should not be solely based on factor importance in the IRMA prediction.

***DISCLAIMER**

The IRMA Prediction and other predictions contained in this Report ("Predictions") are for informational purposes only and should not be viewed or relied upon as any form of assurance or guarantee. The Predictions are estimates generated by statistical models and related technology used to analyze the limited data provided to Pregmune. Various factors may impact this analysis including information about the patient that is not included within the data provided to Pregmune and changes to the patient's health status that may cause the Predictions to be incomplete or incorrect. Pregmune does not assume any liability for these Predictions and makes no warranties, nor express or implied representations whatsoever regarding the accuracy, completeness, or timeliness of any of these Predictions.

Color: Risk Level
Overall risk assessment for each section included in IRMA

- High Risk
- Medium Risk
- Low Risk



Report Review

Patient Name	**ARIEL JENNIS**	Physician	**Dr. Richard Burney**
DOB	**1992-04-16**	NPI	**1003958083**
Partner/Sperm Donor Name	**IAN KRAMER**	Report ID	**JENA041692F-IRMA**
DOB	**1993-02-19**		

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Date

DISCLAIMER

Please note that this Assessment is to be considered of high complexity and will be billed accordingly. This Assessment is to be considered complete with the creation of this IRMA report and of the forwarding of this report to the ordering physician.