



EGG ZOOMER



Egg Zoomer

To identify, monitor, and manage egg sensitivities at the peptide level



1(866) 364-0963
support@vibrant-wellness.com



www.vibrant-wellness.com



1360 Bayport Ave. Ste. B
San Carlos, CA 94070

| | | | |
|--------------------|------------------|---------------------|------------------|
| Final Report Date: | 08-10-2018 17:51 | Specimen Collected: | 11-30-2015 |
| Accession ID: | 1512010000 | Specimen Received: | 12-01-2015 00:00 |

| | | | | | |
|-----------|------------|-------------|--------|---------------|--------------|
| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

PATIENT

Name: PATIENT TESTNAME
 Date of Birth: 1994-10-10
 Gender: Female
 Age: 23
 Telephone #: 000-001-0002
 Street Address: 1021 HOWARD AVENUE SUITE B
 City: San Carlos
 State: CA Zip #: 94070
 Fasting: FASTING No. of hours: 12.0

PROVIDER

Practice Name: Demo Client, MD
Provider Name: Demo Client, MD (999994)
 Phlebotomist:
 Street Address: 1021 HOWARD AVENUE
 City: SAN CARLOS
 State: CA
 Zip #: 94070
 Telephone #: 800-842-7268
 Fax #: 222-222-2222

For doctor's reference

Vibrant Wellness is pleased to present to you the Egg Zoomer, to help you make healthy lifestyle and dietary choices in consultation with your healthcare provider. It is intended to be used as a tool to encourage a general state of health and well-being.

The Vibrant Egg Zoomer is an array of egg antigens which offers very specific antibody-to-antigen recognition. The panel is designed to assess an individual's IgG and IgA sensitivity to these antigens.

Interpretation of Report: The test results of antibody levels to the individual proteins are calculated by comparing the average intensity of the individual protein antibody to that of a healthy reference population. Reference ranges have been established using 192 healthy individuals. The results are displayed as Positive, Moderate Sensitivity or Negative. A Positive result indicates that you have an increased IgG/IgA reaction to the antigen with respect to the reference range. A Moderate sensitive result indicates that you have a moderate IgG/IgA reaction to the food antigen with respect to the reference range. A Negative or no sensitivity result indicates that you have a low IgG/IgA reaction to the food antigen with respect to the reference range. Vibrant utilizes proprietary fluorescent analysis which is designed to assay specific total IgG (subclasses 1, 2, 3, 4), and total IgA (subclasses 1, 2) antibodies. The classification of Positive to Moderate to Negative denotes the level of IgG and/or IgA antibodies detected through this analysis.

The Vibrant Wellness platform provides tools for you to track and analyze your general wellness profile. Testing for egg sensitivity offered by Vibrant Wellness is performed by Vibrant America LLC, a CLIA certified lab CLIA#:05D2078809. Vibrant Wellness provides and makes available this report and any related services pursuant to the Terms of Use Agreement (the "Terms") on its website at www.vibrant-wellness.com. By accessing, browsing, or otherwise using the report or website or any services, you acknowledge that you have read, understood, and agree to be bound by these terms. If you do not agree to accept these terms, you shall not access, browse, or use the report or website. The statements in this report have not been evaluated by the Food and Drug Administration and are only meant to be lifestyle choices for potential risk mitigation. Please consult your physician/dietitian for medication, treatment, or lifestyle management. This product is not intended to diagnose, treat, or cure any disease.

Please Note - It is important that you discuss any modifications to your diet, exercise and nutritional supplementation with your physician before making any changes. To schedule an appointment with Vibrant Clinical Dietitians please call: Toll-Free 866-364-0963.

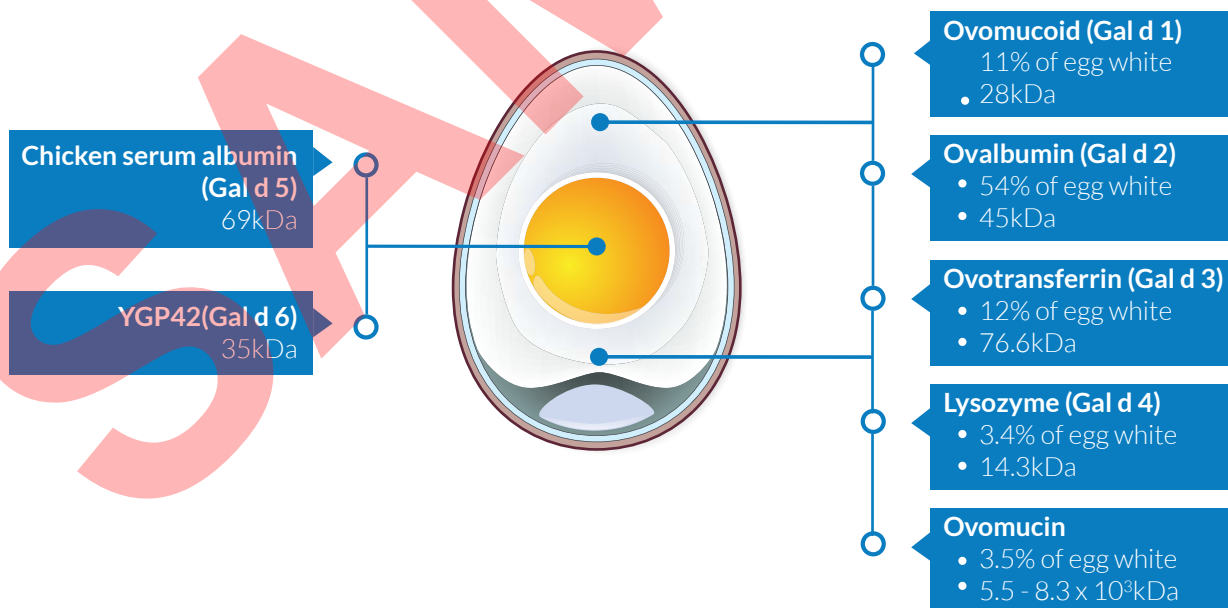
| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

INTRODUCTION

Egg sensitivity is one of the most common childhood sensitivities. In combination with peanut and cow's milk, they represent up to 80% of food sensitivity cases in infants. An increased sensitivity to egg has both industrial and clinical implications. In several developed countries, egg is the cause of most prevalent food hypersensitivities. The most common clinical manifestation is atopic dermatitis.

Eggs consist of 3 main components: eggshell (9–12%), egg white (60%), and yolk (30–33%). Proteins present in egg are distributed among the egg white and yolk, whereas lipids are mainly concentrated in the yolk. Most of the antigenic egg proteins are found in egg white. Two major proteins are present in eggs: ovalbumin (54%) and ovomucoid (11%). Other major proteins include ovotransferrin (12%) and lysozyme (3.4%). Proteins identified in egg yolk consist of alpha-livetin, lipovitellins, YGP42, vitellogenin-1, and apovitellenin.¹ There is significant positive correlation between the antigenicities of egg white and yolk. It has been speculated that this may be due to the common antigenic epitopes that some egg white and yolk proteins share.

The Vibrant™ Egg Zoomer enables simultaneous detection of antibodies to several peptides of all major antigens in egg. The peptide-based microarray technique eliminates the requirement of testing different forms of egg (raw vs. cooked) and removes the false positives caused by cross reactivity often seen in raw extracts.



| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

SUMMARY

Positive for IgG: Consider eliminating these foods from your diet in consultation with your healthcare provider.
Moderate for IgG: Consider rotation plan/eliminating these foods from your diet in consultation with your healthcare provider.
Positive/Moderate for IgA: Consider eliminating these foods from your diet in consultation with your healthcare provider.

| Positive | | Moderate | | Negative | | | |
|----------|--|----------|---|--------------|----------|----------------|---------------|
| IgG | IgA | IgG | IgA | | | | |
| | Egg White antigens Ovalbumin | | Egg White antigens Ovotransferrin | Ovomucoid | Ovomucin | Lysozyme | Avidin |
| | | | Egg yolk antigens Alpha Livetin | Lipovitellin | YGP42 | Vitellogenin-1 | Apovitellenin |

| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

LIFESTYLE CONSIDERATIONS

- Strict avoidance or elimination of eggs from the diet is the most common recommendation upon discovery of egg sensitivity. This step should be taken under the supervision of a qualified healthcare provider.
- Patients with egg sensitivity should avoid food with labels that say, “may contain” eggs. People with egg sensitivity can safely consume other food products that have no eggs or egg proteins. However, the omnipresence of egg-derived components in prepackaged or prepared foods makes it difficult to fully eliminate eggs from the diet. Nutrients in eggs can also be found in other animal proteins, and, therefore, no special supplementation should be required.

To avoid eggs, it is also important to know other egg ingredients. Sometimes egg protein is listed as an ingredient under the following names:

- ❑ *Albumin or albumen*
- ❑ *Globulin*
- ❑ *Lecithin*
- ❑ *Livetin*
- ❑ *Lysozyme*
- ❑ *Vitellin*
- ❑ *Other words starting with “ova” or “ovo,” the prefix for ovum, which is Latin for egg*

- Digestive enzymes, secreted by the salivary glands, stomach, pancreas, and the small intestine help break down food into simple components. Enzyme therapy is especially effective because enzymes can break down proteins and block the process that causes an adverse clinical reaction. Individuals with low pancreatic enzyme output may have an increased chance of suffering from food sensitivities. Enzyme supplements can help augment the body's own pancreatic enzymes. Specific enzymes work on specific foods. For example, proteases break down proteins found in meats, nuts, eggs, and cheese. They break the long chain-like molecules of proteins into shorter fragments (peptides) and eventually into amino acids. Ask your healthcare provider if digestive enzymes are an appropriate supplement for you based on your test results.



| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

EGG WHITE PROTEINS:

Ovomucoid (Gal d 1)

Ovomucoid is a protein found in high concentrations in egg whites. It is acid resistant and heat stable. Ovomucoid can induce reactions in susceptible individuals who consume baked goods. The significance of this protein is due to its unique characteristics like relative stability against heat and digestion and its strong antigenicity compared with other egg white components. Ovomucoid has trypsin-inhibiting ability, which can prevent enzymes from breaking down certain egg white proteins.²



Ovalbumin (Gal d 2)

Ovalbumin is a protein found in egg white. It is heat labile (i.e. it breaks down at high temperatures). Hence, people who are sensitive to ovalbumin can often tolerate cooked eggs. Heating at 350 degrees for 30 minutes causes this protein to lose some of its original properties, and the body no longer identifies it as an antigenic egg protein. The potential role of ovalbumin is transport and storage of metal ions, as well as the source of nutrition for the growing embryo.^{2,3} It is widely used as an antigen for immunization research. Ovalbumin does not have protease inhibitory activities.



Ovomucin

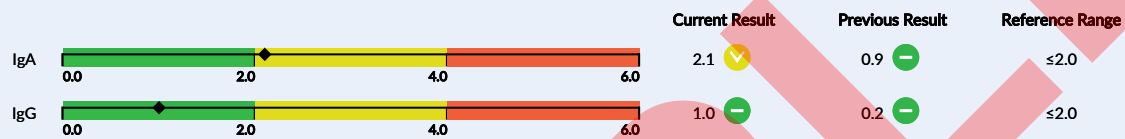
Ovomucin is another major egg white protein, which accounts for 3.5% of the total egg white protein. It is responsible for the foaming of egg white when it is shaken. Ovomucin is stable in heat and is easily soluble in water and mild saline solutions. It is a highly glycosylated protein and approximately 33% of ovomucin is made up of carbohydrates. Hence, ovomucin is considered a good source of nutrients that can supply two vital nutrients: proteins and carbohydrates. It has a strong antimicrobial effect against foodborne pathogenic bacteria, and because of this, it is used in the food industry as a food preservative. Ovomucin also has good emulsifying and foaming characteristics which are essential in the bakery industry.



| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

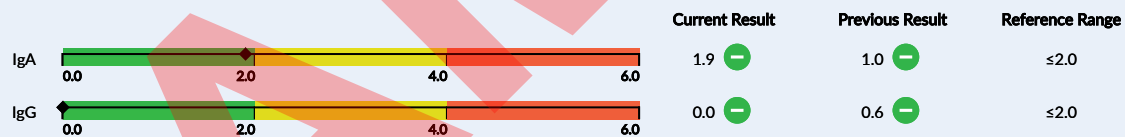
Ovotransferrin (Gal d 3)

Ovotransferrin accounts for 12% of the total egg white protein. It was previously called conalbumin but was renamed as ovotransferrin after findings that it can bind to iron. One molecule of ovotransferrin can bind two iron molecules and transports iron in the body. It functions as a metal-chelating protein, binding minerals such as iron and copper. It is the main antimicrobial compound in egg whites, protecting the yolk from bacterial contamination. Ovotransferrin has similar functions to lactoferrin found in milk, and both have iron scavenging and iron delivery functions. It is known to have a strong antimicrobial activity and, thus, can be used to improve the safety of foods. Ovotransferrin has been used to produce valuable bioactive peptides.³



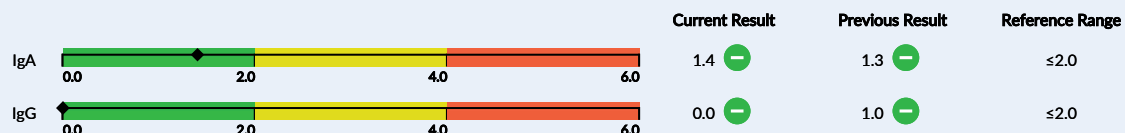
Lysozyme (Gal d 4)

Lysozyme is another important soluble protein found in egg white. It is a ubiquitous enzyme that can hydrolyze the β -linkage between N-acetylneuraminic acid and N-acetylglucosamine in the bacterial cell wall.^{2,3} It is also found in many human tissues, including tears. The function of lysozyme in both egg whites and in human tears is to act as a potent bactericidal agent by binding and dissolving bacterial cell walls. It forms strong complexes with other egg white proteins including ovomucin, ovalbumin, and ovotransferrin. Lysozyme and the complexes it forms with other egg white proteins can cross the intestinal barrier and may interact with the immune system.⁵



Avidin

Avidin makes up 0.05 % of egg white protein (approximately 1.8 mg per egg). Although it is present in small quantities, it has a strong ability to bind biotin, or vitamin B7. It is a tetrameric biotin-binding protein produced in the oviducts of birds, reptiles, and amphibians and deposited in their egg whites. When egg whites are eaten raw, avidin binds to biotin, which can cause biotin deficiency. Cooking an egg inactivates the avidin.⁶ It is also widely used as a tool in several affinity-based separations, in biochemical diagnostic assays, and in a variety of other applications.



| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

EGG YOLK PROTEINS:

Lipovitellin

Lipovitellin is the major lipid-protein complex found in the yolk of egg-laying animals and is involved in lipid and metal storage. It is one of the two lipoproteins contained in hen's egg yolk and comprises about one sixth of the yolk solid. It is spherical in shape and is composed of about 80% protein and 20% lipid. Lipovitellin has a great affinity for phosvitin (a yolk protein that is important in sequestering calcium, iron, and other cations).⁷



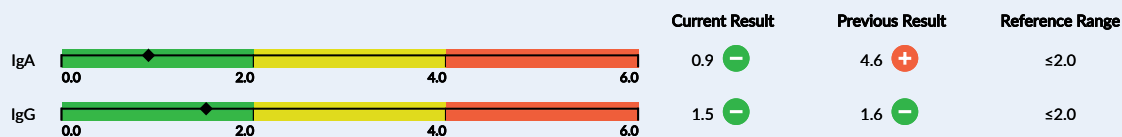
YGP42 (Gal d 6)

YGP42 is the yolk glycoprotein. It is a fragment of vitellogenin-1, which is enzymatically cleaved in the hen's egg yolk to produce the mature protein. It is heat-resistant but digestible by pepsin. Heating and reduction treatments do not affect its antigenicity. Digestion with gastric fluid diminishes the IgE-binding capacity of this antigen.⁸



Vitellogenin-1

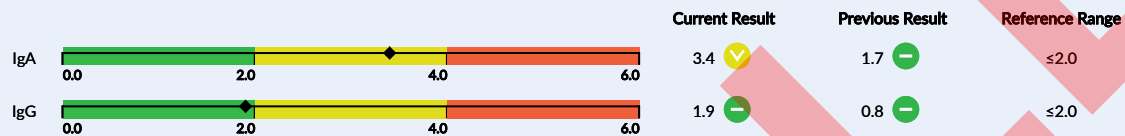
Vitellogenins are egg yolk protein precursors and are sources of nutrients during early development of egg laying organisms. They are produced by the liver and secreted into the blood where they are generally cleaved, giving rise to the respective yolk components. Cleavage of vitellogenin 1 and 2 in the yolk produces apolipovitellins and phosvitins, which are components of the water insoluble yolk granular lipoproteins. It also produces yolk glycoproteins YGP40 and YGP42, which are major components of the yolk plasma.¹⁰



| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

Alpha-livetin (Gal d 5)

Alpha-livetin is the major antigen in egg yolk and is involved in bird-egg syndrome. Bird-egg syndrome occurs when the individual is first sensitized to bird antigens through inhalation and subsequent cross-reactive antibodies are formed upon egg yolk ingestion. Chicken serum albumin is the same protein as that designated alpha-livetin in egg yolk.⁹ Chicken albumin (Gal d 5) is a partially heat-labile antigen. Reactivity to chicken serum albumin can be reduced by 88% after heating at 90 degrees C (194 degrees F) for 30 min.¹⁰



Apovitellenin

Apovitellenin (I & VI) is an egg yolk antigen. It is a protein component of the very low-density lipoprotein (VLDL). It prevents the loss of triglycerides from VLDL on their way from the liver to the growing oocytes.^{11,12}



| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

Allergenicity

the property of being allergenic

Antigen

is a molecule capable of inducing an immune response in the host organism

Antibody

a blood protein produced in response to and counteracting a specific antigen. Antibodies combine chemically with substances that the body recognizes as alien, such as bacteria, viruses, and foreign substances in the blood.

Amino Acids

building blocks of proteins

Cross reactivity

an antibody directed against one specific antigen is successful in binding with another, different antigen

Epitope

a molecular region on the surface of an antigen capable of eliciting an immune response

Gene

a unit of heredity that is transferred from a parent to offspring

Glycoprotein

class of proteins that have carbohydrate groups attached to the polypeptide chain

Glycosylation

the process of adding glycosyl radicals to a protein to form a glycoprotein

Heterogeneous

diverse in character or content

Oocyte

a cell in an ovary that may undergo meiotic division to form an ovum

Peptide

a compound consisting of two or more amino acids linked in a chain

Proteins

are made of long chains of amino acids

| LAST NAME | FIRST NAME | MIDDLE NAME | GENDER | DATE OF BIRTH | ACCESSION ID |
|-----------|------------|-------------|--------|---------------|--------------|
| TESTNAME | PATIENT | | FEMALE | 1994-10-10 | 1512010000 |

Proteases

enzymes that aid the breakdown of proteins

Protease inhibitors

are molecules that inhibit the function of proteases

SAMPLE

Citations/Sources

- [1] Mine Y, Yang M. Recent Advances in the Understanding of Egg Allergens: Basic, Industrial, and Clinical Perspectives. *J. Agric. Food Chem.* 2008; 56:4874–4900.
- [2] Caubet J-C, Wang J. Current understanding of egg allergy. *Pediatric clinics of North America.* 2011;58(2):427-443.
- [3] Abeyrathne E, Lee H, Ahn D. Egg white proteins and their potential use in food processing or as nutraceutical and pharmaceutical agents—A review. *Poultry Science.* 2013;92(12):3292–3299.
- [4] Benarafa C, Remold-O'Donnell E. The ovalbumin serpins revisited: Perspective from the chicken genome of clade B serpin evolution in vertebrates. *Proceedings of the National Academy of Sciences of the United States of America.* 2005;102(32):11367-11372.
- [5] Hashida S, Ishikawa E, Nakamichi N, Sekino H. Concentration of egg white lysozyme in the serum of healthy subjects after oral administration. *Clin Exp Pharmacol Physiol.* 2002;29(1-2):79-83.
- [6] Miranda JM, Anton X, Redondo-Valbuena C, et al. Egg and Egg-Derived Foods: Effects on Human Health and Use as Functional Foods. *Nutrients.* 2015;7(1):706-729.
- [7] Anderson TA, Levitt DG, Banaszak LJ. The structural basis of lipid interactions in lipovitellin, a soluble lipoprotein. *Structure.* 1998;6(7):895 – 909.
- [8] Amo A1, Rodríguez-Pérez R, Blanco J, Villota J, Juste S, Moneo I, Caballero ML. Gal d 6 Is the Second Allergen Characterized from Egg Yolk. *J Agric Food Chem.* 2010;58(12):7453-7.
- [9] de Blay F, Hoyet C, Candolfi E, Thierry R, Pauli G Identification of alpha livetin as a cross reacting allergen in a bird-egg syndrome. *Allergy Proc.* 1994;15(2):77-8.
- [10] Quirce S, Maranon F, Umpierrez A, de las Heras M, Fernandez-Caldas E, Sastre J. Chicken serum albumin (Gal d 5*) is a partially heat-labile inhalant and food allergen implicated in the bird-egg syndrome. *Allergy* 2001 Aug;56(8):754-62
- [11] Tey D., Heine R.G. Egg allergy in childhood: An update. *Curr. Opin. Allergy Clin. Immunol.* 2009; 9:244–250.
- [12] Uniprot website. Accessed at <http://www.uniprot.org/uniprot/P02659> on Jan 2018
- [13] Kuehn A, Codreanu-Morel F, Lehnert-Weber C, et al. Cross-reactivity to fish and chicken meat - a new clinical syndrome. *Allergy.* 2016 Dec;71(12):1772-1781.
- [14] Hemmer W, Klug C, Swoboda I. Update on the bird-egg syndrome and genuine poultry meat allergy. *Allergo Journal International.* 2016; 25:68-75.

Risk and Limitations

This test has been developed and its performance characteristics determined by Vibrant America LLC., a CLIA certified lab. These assays have not been cleared or approved by the U.S. Food and Drug Administration.

Quantification of specific IgG and IgA antibodies is not FDA- recognized diagnostic indicator of allergy.

Egg sensitivity testing is performed at Vibrant America, a CLIA certified laboratory, and utilizes ISO-13485 developed technology. Vibrant America has effective procedures in place to protect against technical and operational problems. However, such problems may still occur. Examples include failure to obtain the result for a specific antigen due to circumstances beyond Vibrant's control. Vibrant may re-test a sample in order to obtain these results but upon re-testing the results may still not be obtained. As with all medical laboratory testing, there is a small chance that the laboratory could report incorrect results.

A tested individual may wish to pursue further testing to verify any results. The information in this report is intended for educational purposes only. While every attempt has been made to provide current and accurate information, neither the author nor the publisher can be held accountable for any errors or omissions.

Vibrant Wellness makes no claims as to the diagnostic or therapeutic use of its tests or other informational materials. Vibrant Wellness reports and other information do not constitute medical advice and are not a substitute for professional medical advice. Please consult your healthcare practitioner for questions regarding test results, or before beginning any course of supplementation or dietary changes.