VibrantWellness

| | | | |
|---|---|---|---|
| **Final Report Date:** | 06-15-2017 19:12 | **Specimen Collected:** | 11-30-2015 |
| **Accession ID:** | 1512010000 | **Specimen Received:** | 12-01-2015 00:00 |

| Last Name | First Name | Middle Name | Date of Birth | Gender | Physician ID |
|---|---|---|---|---|---|
| TESTNAME | PATIENT | | 1980-10-10 | Male | 999994 |

**PATIENT**

Name: PATIENT TESTNAME
Date of Birth: 1980-10-10
Gender: Male
Age: 36

Medical Record Number:
Telephone #: 1-866-364-0963
Street Address: 1021 HOWARD AVENUE SUITE B
City: SAN CARLOS
State: CA
Zip #: 94070

Email: support@vibrant-america.com

**PROVIDER**

Practice Name: Demo Client, MD
**Provider Name: Demo Client, MD (999994)**
Street Address: 1021 HOWARD AVENUE
City: SAN CARLOS
State: CA
Zip #: 94070
Telephone #: 1-800-842-7268
Fax #:

For doctor's reference

**Vibrant Wellness** is pleased to present to you, **Neural Zoomer** testing, to help you make healthy lifestyle choices in consultation with your physicians and dietitians. It is intended to be used as a tool to encourage a general state of health and well-being.

**Neural Zoomer** is a combination of serological and genetic microarray tests which offers very specific antibody-to-antigen recognition and potential risk to develop Neurological Autoimmune disease. Neural Zoomer aims to reduce the prevalence of neurological conditions by empowering patients and physicians with a vital resource for early risk detection and an enhanced focus on personalized primary prevention.

**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 The results are displayed in 3 columns surrounded by GREEN (In Control), **YELLOW (Moderate)** or **RED (High Risk)**

Ratings for the references are calculated based on the Impact Factor, Citations, and Study Population of the references. It is indicated based on a star based system (1 star – 5 stars) with 5 stars indicating the best correlation of the antibody with the potential associated risk. The Impact Factor of the journal in which the reference is published is the number of citations received by articles published in that journal during the two preceding years, divided by the total number of articles published in that journal during the two preceding years. Study population includes the number of samples tested along with gender, age and ethnicity of the population.

The Vibrant Wellness platform provides tools for you to track and analyze your general wellness profile. Testing for Neural Zoomer offered by Vibrant Wellness is performed by Vibrant America LLC, a CLIA certified lab CLIA#:05D2078809 and by Vibrant Genomics LLC, a CLIA certified lab CLIA#: 05D2098445.

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 life style management. This product is not intended to diagnose, treat, or cure any disease. A selection of clinical references are available with this report and the complete list of references can be found online at www.vibrant-wellness.com.

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.**

VibrantWellness

| | | | |
|---|---|---|---|
| **Final Report Date:** | 06-15-2017 19:12 | **Specimen Collected:** | 11-30-2015 |
| **Accession ID:** | 1512010000 | **Specimen Received:** | 12-01-2015 00:00 |

| Last Name | First Name | Middle Name | Date of Birth | Gender | Physician ID |
|---|---|---|---|---|---|
| TESTNAME | PATIENT | | 1980-10-10 | Male | 999994 |

**Demyelination antigens**

| Test name | In Control | Moderate | High Risk | In Control Range | Moderate Range | High Risk Range | Previous |
|---|---|---|---|---|---|---|---|
| Anti-Tubulin (IgG + IgA) | 5 | | | ≤10 | 11~20 | ≥21 | 6 08/20/2015 |
| Anti-Tubulin IgM | 5 | | | ≤10 | 11~20 | ≥21 | 6 08/20/2015 |
| Anti-Myelin basic protein (IgG + IgA) | 2 | | | ≤10 | 11~20 | ≥21 | 29 08/20/2015 |
| Anti-Myelin basic protein IgM | | 19 | | ≤10 | 11~20 | ≥21 | 23 08/20/2015 |

**Blood Brain barrier**

| Test name | In Control | Moderate | High Risk | In Control Range | Moderate Range | High Risk Range | Previous |
|---|---|---|---|---|---|---|---|
| Anti-s100b (IgG + IgA) | 10 | | | ≤10 | 11~20 | ≥21 | 8 08/20/2015 |
| Anti-s100b IgM | 3 | | | ≤10 | 11~20 | ≥21 | 5 08/20/2015 |

**Optical and Autonomic**

| Test name | In Control | Moderate | High Risk | In Control Range | Moderate Range | High Risk Range | Previous |
|---|---|---|---|---|---|---|---|
| Anti-Neuron specific enolase (IgG + IgA) | 9 | | | ≤10 | 11~20 | ≥21 | 1 08/20/2015 |
| Anti-Neuron specific enolase IgM | 3 | | | ≤10 | 11~20 | ≥21 | 2 08/20/2015 |

**Peripheral Neuropathy**

| Test name | In Control | Moderate | High Risk | In Control Range | Moderate Range | High Risk Range | Previous |
|---|---|---|---|---|---|---|---|
| Anti-GM1 (IgG + IgA) | | | 21 | ≤10 | 11~20 | ≥21 | 29 08/20/2015 |
| Anti-GM1 IgM | | | 26 | ≤10 | 11~20 | ≥21 | 29 08/20/2015 |
| Anti-GM2 (IgG + IgA) | 3 | | | ≤10 | 11~20 | ≥21 | 8 08/20/2015 |
| Anti-GM2 IgM | 8 | | | ≤10 | 11~20 | ≥21 | 26 08/20/2015 |

VibrantWellness

| | | | |
|---|---|---|---|
| **Final Report Date:** | 06-15-2017 19:12 | **Specimen Collected:** | 11-30-2015 |
| **Accession ID:** | 1512010000 | **Specimen Received:** | 12-01-2015 00:00 |

| Last Name | First Name | Middle Name | Date of Birth | Gender | Physician ID |
|---|---|---|---|---|---|
| TESTNAME | PATIENT | | 1980-10-10 | Male | 999994 |

| | Test name | In Control | Moderate | High Risk | In Control Range | Moderate Range | High Risk Range | Previous |
|---|---|---|---|---|---|---|---|---|
| Brain Autoimmunity | Anti-HSV1 (IgG + IgA) | | 15 | | ≤10 | 11~20 | ≥21 | 30 08/20/2015 |
| | Anti-HSV1 IgM | 6 | | | ≤10 | 11~20 | ≥21 | 2 08/20/2015 |
| | Anti-Cerebellum (IgG + IgA) | 6 | | | ≤10 | 11~20 | ≥21 | 3 08/20/2015 |
| | Anti-Cerebellum IgM | | 20 | | ≤10 | 11~20 | ≥21 | 29 08/20/2015 |
| | Anti-Purkinje cell (IgG + IgA) | 6 | | | ≤10 | 11~20 | ≥21 | 2 08/20/2015 |
| | Anti-Purkinje cell IgM | 10 | | | ≤10 | 11~20 | ≥21 | 8 08/20/2015 |

VibrantWellness

| | | | |
|---|---|---|---|
| **Final Report Date:** | 06-15-2017 19:12 | **Specimen Collected:** | 11-30-2015 |
| **Accession ID:** | 1512010000 | **Specimen Received:** | 12-01-2015 00:00 |

| Last Name | First Name | Middle Name | Date of Birth | Gender | Physician ID |
|---|---|---|---|---|---|
| TESTNAME | PATIENT | | 1980-10-10 | Male | 999994 |

**Neural Genetics**

| Gene | Result | Comments |
|---|---|---|
| Apolipoprotein E | E3/E4 | Increased risk of developing AD |

VibrantWellness

## Glossary

**Autoimmunity** is a key component in several diseases of the nervous system. For reasons, still under research, the body attacks its own self and causes injury, along with other components of the immune system like cytokines, leading to disease. Symptoms associated with autoimmunity in the nervous system include

- Ataxia
- Diarrhea
- Muscle spasms
- Sensory loss
- Neuropathic pain
- Orthostatic hypotension
- Nausea or vomiting
- Muscle stiffness
- Photosensitivity

**Anti-Cerebellum** - The cerebellum is a region of the brain that plays an important role in motor control. The cerebellum does not initiate movement, but contributes to coordination, precision, and accurate timing. Anti-Cerebellum antibodies have been associated with autism and autism spectrum disorders.

**Anti-GM1** - Antiganglioside antibodies that react to self-gangliosides are found in autoimmune neuropathies. These antibodies were first found to react with cerebellar cells. Detection of Ganglioside M1 (GM1) antibody, usually of the IgM isotype, is associated with multi-focal motor neuropathy and lower motor neuropathy, characterized by muscle weakness and atrophy.

**Anti-GM2** - Antiganglioside antibodies that react to self-gangliosides are found in autoimmune neuropathies. These antibodies were first found to react with cerebellar cells. GM2 ganglioside is a potential peripheral nerve antigen for neuropathy-associated autoantibodies. Anti-GM2 IgM antibodies have been reported in samples with chronic motor or motor dominant neuropathy.

**Anti-HSV1** - Herpes simplex virus 1 (HSV-1) is a members of the herpesvirus family, Herpesviridae, that infect humans. HSV-1 (which produces most cold sores) is ubiquitous and contagious. As neurotropic and neuroinvasive virus, HSV-1 persists in the body by becoming latent and hiding from the immune system in the cell bodies of neurons. Seropositivity to Herpes Simplex Virus antibodies has been correlated with increased risk of Alzheimer's disease.

**Anti-Myelin basic protein** - Myelin basic protein (MBP) is a protein which is important in the process of myelination of nerves in the nervous system. The myelin sheath is a multi-layered membrane, unique to the nervous system that functions as an insulator to greatly increase the velocity of axonal impulse conduction. Serum samples with increased titers of anti-MBP antibodies are at increased risk for Multiple Sclerosis and other neurological disorders.

**Anti-Neuron specific enolase** - Neuron specific enolase is a protein enzyme that is encoded by the ENO2 gene. It is found in mature neurons and cells of neuronal origin. Antibodies against neuron specific enolase are found in samples with optical neuropathies.

**Anti-Purkinje cell** - Purkinje cells, or Purkinje neurons, are a class of GABAergic neurons located in the cerebellum. Purkinje cells are aligned like dominos stacked one in front of the other. Their large dendritic arbors form nearly two-dimensional layers through which parallel fibers from the deeper-layers pass. Purkinje cell antibodies including anti-metabotropic glutamate receptor 1, anti-Homer protein homolog 3, and anti-carbonic anhydrase-related protein VIII have been associated with cerebellar ataxia.

**Anti-s100b blood brain barrier** - S100 calcium-binding protein B (S100B) is a protein of the S-100 protein family. S100 proteins are localized in the cytoplasm and nucleus of a wide range of cells, and involved in the regulation of a number of cellular processes such as cell cycle progression and differentiation. Blood-brain barrier integrity breach and sub-concussive episodes leads to the production of this antibody. Extravasation of S100B may trigger a pathologic autoimmune reaction linking systemic and CNS immune responses.

**Anti-Tubulin** - Tubulin, one of the major constituents of microtubules, is a dimeric protein consisting of an alpha and beta chain.Alpha and Beta tubulins polymerize into microtubules, a major component of the eukaryotic cytoskeleton. Anti-Tubulin antibodies play an important role in the development of inflammatory demyelination, neurodegeneration and chronic inflammatory demyelinating polyneuropathy.

**Apolipoprotein E** Apolipoprotein E (APOE) is a class of apolipoprotein found in the chylomicron and Intermediate-density lipoprotein (IDLs) that is essential for the normal catabolism of triglyceride-rich lipoprotein constituents. Genome-wide association studies have indicated that the 4 allele of APOE is the strongest genetic risk factor for Alzheimer disease (AD).

**Blood brain barrier** - The blood–brain barrier (BBB) is a highly selective semipermeable membrane barrier that separates the circulating blood from the brain extracellular fluid in the central nervous system (CNS). The blood–brain barrier is formed by brain endothelial cells, which are connected by tight junctions.

**Demyelination** - A demyelinating disorder is a disorder of the nervous system in which the myelin sheath of neurons is damaged. This damage impairs the conduction of signals in the affected nerves.

**Neuropathy** - It is the term used to describe nerve damage which usually occurs in the '**peripheral** nervous system' (typically hands and feet) as opposed to the '**central** nervous system' (the brain and spinal cord). Neuropathy is seen with a number of different underlying medical conditions.

VibrantWellness

## References

| | PROTEIN | REFERENCE/ABSTRACT | RATING |
|---|---|---|---|
| Demyelination antigens | Anti Tubulin | **Tamara Vyshkina and Bernadette Kalman. "Autoantibodies and neurodegeneration in multiple sclerosis."** The Study shows the role of anti-tubulin antibodies in the development of inflammatory demyelination and neurodegeneration in patients carrying LHON mtDNA mutations. | ★★★★ |
| | | **Connolly AM, Pestronk A. "Anti-tubulin autoantibodies in acquired demyelinating polyneuropathies."** Analysis of 7 human sera with monoclonal anti-tubulin autoantibodies showed that the epitopes recognized by these antibodies are within central, conserved regions of tubulin. Selective polyclonal anti-tubulin autoantibodies with low reactivity to other neural antigens are found in about one-half of patients with Chromic inflammatory demyelinating polyneuropathy. | ★★★ |
| | Anti Myelin basic protein | **Berger T, Rubner P, Schautzer F, Egg R, Ulmer H, Mayringer I, Dilitz E, Deisenhammer F, Reindl M. "Antimyelin antibodies as a predictor of clinically definite multiple sclerosis after a first demyelinating event."** A total of 103 patients with a clinically isolated syndrome, positive findings on cerebral MRI, and oligoclonal bands in the cerebrospinal fluid were studied. At base line, serum samples were collected to test for anti-MOG and anti-MBP antibodies with Western blot analysis, and the lesions detected by cerebral MRI were quantified.Patients with anti-MOG and anti-MBP antibodies had relapses more often and earlier than patients without these antibodies. The adjusted hazard ratio for the development of clinically definite multiple sclerosis was 76.5 for both antibodies | ★★★★★ |
| | | **de Rosbo NK, Ben-Nun A. "T-cell responses to myelin antigens in multiple sclerosis; relevance of the predominant autoimmune reactivity to myelin oligodendrocyte glycoprotein."** High titres of anti-MOG autoantibodies have been detected in paediatric patients with a variety of demyelinating inflammatory diseases. | ★★★★ |
| Blood Brain barrier disruption | Anti s100b - blood brain barrier | **Erin Bargerstock,et. al. "Is Peripheral Immunity Regulated by Blood-Brain Barrier Permeability Changes?"** Extravasation of S100B into the systemic circulation can r a pathologic autoimmune reaction with circulating antibodies that may re-enter the CNS to initiate an autoimmune response . S100B can be viewed as an astrocytic endokine that can act as an immunoregulator to participate in inflammation and autoimmunity. | ★★★★ |
| | | **Dyck RH, Van Eldik LJ, Cynader MS. "Immunohistochemical localization of the S-100 beta protein in postnatal cat visual cortex: spatial and temporal patterns of expression in cortical and subcortical glia."** S-100 is primarily synthesized in the brain by the end feet process of the astrocytes and is quickly released from the brain in the blood when the BBB is disrupted. | ★★★★ |
| Optical and Autonomic Nervous System Disorders | Anti Neuron specific enolase | **Ikeda Y, Maruyama I, Nakazawa M, Ohguro H. "Clinical significance of serum antibody against neuron-specific enolase in glaucoma patients."** Serum autoantibody against NSE was examined by Western blot analysis in 143 patients with glaucoma 45 cases; primary open angle glaucoma (POAG) 98 cases.Maximum IOP in the serum anti-NSE antibody-positive patients was significantly lower than that in the negative patients. The current observation suggest that the presence of serum autoantibody against NSE clinically useful for predicting the progression of visual field loss in POAG patients. | ★★★ |
| | | **Grazyna Adamus, Lori Brown, Jade Schiffman,and Alessandro Iannaccone. "Diversity in autoimmunity against retinal, neuronal, and axonal antigens in acquired neuro-retinopathy."** 209 patients (whose visual disorders were due to autoimmune in nature) were tested for anti-optic nerve autoantibodies, 55% showed specific neuronal autoantibodies among which 25% seropostive patients showed high levels and enolases Autoantibodies. | ★★★ |
| Peripheral Neuropathy | Anti-GM1 | **Ogino M, Orazio N, Latov N. "IgG anti-GM1 antibodies from patients with acute motor neuropathy are predominantly of the IgG1 and IgG3 subclasses."** In this study, the IgG anti-GM1 and GA1 antibodies from patients with acute motor neuropathy were predominantly IgG1 and IgG3. | ★★★★ |
| | | **Lee GH1, Lee KW, Chi JG. "Peripheral neuropathy as a hypereosinophilic syndrome and anti-GM1 antibodies."** The authors experienced a dramatic case with acute peripheral neuropathy, hypereosinophilia in peripheral blood, and the positive anti-GM1 antibodies. | ★★ |
| | Anti-GM2 | **Hugh J. Willison, Nobuhiro Yuki. "Peripheral neuropathies and antiglycolipid antibodies."** The review article discuss the understanding between acute motor axonal neuropathy and antibodies to GM1, GD1a, GM1b and GalNAc-GD1a, and between the cranial, bulbar and sensory variants of GBS and antibodies to the disialylated gangliosides GQ1b, GT1a, GD1b and GD3. | ★★★ |
| | | **O'Hanlon GM, Veitch J, Gallardo E, Illa I, Chancellor AM, Willison HJ. "Peripheral neuropathy associated with antiGM2 ganglioside antibodies: clinical and immunopathological studies."** AntiGM2 antibodies are found in cases of chronic motor or motor dominant neuropathy. In this study, two chronic neuropathy cases were identified with highly elevated antiGM2 IgM titres. | ★★★ |
| Brain Autoimmunity | Anti-Cerebellum | **Paula Goines, Lori Haapanen, Robert Boyce et.al. "Autoantibodies to cerebellum in children with autism associate with behavior"** Results autoantibodies specific for a 45kDa cerebellar protein in children were associated with a diagnosis of autism (p=0.017) while autoantibodies directed towards a 62kDa protein were associated with the broader diagnosis of autism spectrum disorder (ASD) (p=0.043). | ★★★ |
| | Anti-HSV1 | **Luc Letenneur , Karine Pérès, Hervé Fleury, Isabelle Garrigue, Pascale Barberger-Gateau, Catherine Helmer, Jean-Marc Orgogozo, Serge Gauthier, Jean-François Dartigues "Seropositivity to Herpes Simplex Virus Antibodies and Risk of Alzheimer's Disease: A Population-Based Cohort Study"** The authors describe the reactivation of HSV seropositivity which is highly correlated with incident AD. IgM-positive subjects showed a significant higher risk of developing AD (HR=2.55; 95% CI [1.38–4.72]). | ★★★★ |
| | Anti-Purkinje cell | **S. Jarius and B. Wildemann "'Medusa head ataxia': the expanding spectrum of Purkinje cell antibodies in autoimmune cerebellar ataxia. Part 1: Anti-mGluR1, anti-Homer-3, anti-Sj/ITPR1 and anti-CARP VIII"** This review article discusses the role of the antigens in spinocerebellar ataxia and focuses specifically on anti-metabotropic glutamate receptor 1-, anti-Homer protein homolog 3-, and anti-carbonic anhydrase-related protein VIII-associated autoimmune cerebellar ataxia (ACA) | ★★★★ |

| | GENE | REFERENCE/ABSTRACT | RATING |
|---|---|---|---|
| Neural Genetics | ApoE | **Chia-Chen Liu, Takahisa Kanekiyo, Huaxi Xu, and Guojun Bu. "Apolipoprotein E and Alzheimer disease: risk, mechanisms, and therapy."** Genome-wide association studies have confirmed that the ε4 allele of APOE is the strongest genetic risk factor for AD. The frequency of AD and mean age at clinical onset are 91% and 68 years of age in ε4 homozygotes, 47% and 76 years of age in ε4 heterozygotes, and 20% and 84 years in ε4 noncarriers,7, 20 indicating that APOE ε4 confers dramatically increased risk of development of AD with an earlier age of onset in a gene dose-dependent manner. | ★★★★ |
| | | **Farrer LA et.al. "Effects of age, sex, and ethnicity on the association between apolipoprotein E genotype and Alzheimer disease. A meta-analysis. APOE and Alzheimer Disease Meta Analysis Consortium."** Among Caucasian subjects from clinic- or autopsy-based studies, the risk of AD was significantly increased for people with genotypes ε2/ε4 (OR=2.6, 95% CI=1.6-4.0), ε3/ε4 (OR=3.2, 95% CI=2.8-3.8), and ε4/ε4 (OR=14.9, 95% CI= 10.8-20.6); whereas, the ORs were decreased for people with genotypes ε2/ε2 (OR=0.6, 95% CI=0.2-2.0) and ε2/ε3 (OR=0.6, 95% CI=0.5-0.8). | ★★★★ |

## Risk and Limitations

Neural Zoomer testing is performed at Vibrant America and Vibrant Genomics (for ApoE testing), both CLIA certified laboratories, and utilizes ISO-13485 developed technology. However, laboratory error can occur, which might lead to incorrect results. Some of them may include sample mislabeling or contamination, operational error or failure to obtain data for certain proteins. Vibrant's laboratory may need a second sample to complete the testing.

The labs have 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 protein 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.

Tested individuals should not change their diet, physical activity, or any medical treatments they are currently using based on the test results without consulting their personal health care provider.

Tested individuals may find their experience is not consistent with Vibrant's selected peer reviewed scientific research findings of relative improvement for study groups. The science in this area is still developing and many personal health factors affect diet and health. Since subjects in the scientific studies referenced in this report may have had personal health and other factors different from those of tested individuals, results from these studies may not be representative of the results experienced by tested individuals. Further, some recommendations may or may not be attainable, depending on the tested individual's physical ability or other personal health factors.

A limitation of this testing is that many of these scientific studies may have been performed in selected populations only. The interpretations and recommendations are done in the context of these studies, but the results may or may not be relevant to tested individuals of different or mixed ethnicities.

Based on test results and other medical knowledge of the tested individual, health care providers might consider additional independent testing, or consult another health care provider.