The risk score reported is calculated by an algorithm that integrates the genotype of the patient with data on the patient’s ethnicity, weight, height and family history of diabetes. If ethnicity information is not provided by the patient, a global algorithm will be applied that uses average predictive values across populations for each of the genetic polymorphisms analyzed. If information on family history, weight or height is not provided by the patient, an algorithm will be applied that does not integrate those factors.
2 copies of risk polymorphisms have been detected in the genes: WFS1, SLC30A8, ADCYS, HHEXIDE, PPARG; such polymorphisms are associated with an increased genetic risk of developing type 2 diabetes. In addition, 1 copy of other polymorphisms also associated to type 2 diabetes has been detected in the genes: JAZF1, KCNJ11, TCF7L2, CDKN2AB, FTO.

**Methodology.** 16 genetic variants (polymorphisms) were genotyped using TaqMan OpenArrays high-precision methodology. These 16 variants are relevant in the development of type 2 diabetes (T2D) and are associated to an increased genetic risk of T2D. The genetic information is integrated with the patient’s information of weight, height and parental history of T2D by an algorithm which calculates the % of the combined risk of T2D.

**This test does not diagnose type 2 diabetes.** A doctor must diagnose type 2 diabetes. These results do not mean that you or your family will necessarily develop type 2 diabetes. These results must be evaluated along with a complete individual and family medical history as well as other laboratory tests results. This test analyses and informs only about certain genetic variants associated to the genetic risk of type 2 diabetes. This genetic test does not exclude that you or your family might develop other diseases.

**REFERENCES**
Report date: 06/12/19  
Test: Genotyping  
Specimen: Buccal swab  
Collection date: 04/02/19  
Provider: Validation Test  
Sample ID: PATIA-05  
Name: PATIA-05  
D.O.B.: 01/01/79  
Ethnicity: Caucasian  
Parental history T2D: Yes  
BMI (Body Mass Index): 29.39 kg/m²

GENERAL RECOMMENDATIONS* POST-TEST BASED ON GENOTYPE

<table>
<thead>
<tr>
<th>Gene</th>
<th>SNP</th>
<th>Genotype</th>
<th>Lifestyle</th>
<th>Laboratory Tests &amp; Further Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFS1</td>
<td></td>
<td>GG</td>
<td>Genistein</td>
<td>Aerobic exercise</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inquire about age – early onset diabetes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inquire about kidney health, hearing and vision</td>
</tr>
<tr>
<td>SLC30A8</td>
<td></td>
<td>GG</td>
<td>Zinc</td>
<td>Diet rich in Zinc (beef, beans)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Antioxidant diet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inquire about age – early onset diabetes</td>
</tr>
<tr>
<td>PPARG</td>
<td></td>
<td>CC</td>
<td>Long chain omega-3 fatty acid</td>
<td>Individuals with the CC genotype are more likely to lose weight in weight loss programs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Decosahexaenoic Acid (DHA) Chromium</td>
<td>Mediterranean diet, Low carbohydrate, Low SFA (saturated fatty acids, in butter and cheese)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low-3 polyunsaturated fatty acids (Fish and fish oil, avocados, olive oil)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Apple polyphenols</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low carbohydrate diet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Aerobic exercise</td>
</tr>
<tr>
<td>ADCY5</td>
<td></td>
<td>TT</td>
<td>Yoga practice, Meditation practice</td>
<td>Induce exercise</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sleep 7-8 hours per night, Manage stress</td>
<td>Indicate about dyskinesia (twitches, tremors) increased muscle tension and low birth weight</td>
</tr>
<tr>
<td>HHEXIDE</td>
<td></td>
<td>CC</td>
<td>Yoga practice, Meditation practice. Sleep 7-8 hours per night</td>
<td>Indicate about liver function</td>
</tr>
<tr>
<td>KCNJ11</td>
<td></td>
<td>TC</td>
<td>Potassium rich diet (squash, sweet potato, white beans, broccoli)</td>
<td>Measure HbA1c, Sulfonylureas tend to be more effective Age of diabetes onset tends to be younger</td>
</tr>
<tr>
<td>TCF7L2</td>
<td></td>
<td>TC</td>
<td>Mediterranean diet (see below, table footnotes)</td>
<td>Indicate about diabetes, mood disorders, nicotine and alcohol addiction</td>
</tr>
<tr>
<td>FTO</td>
<td></td>
<td>CT</td>
<td>Caloric restriction (1,500 kcal/day)</td>
<td>Mediterranean diet, Low milk intake</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Long chain omega-3 fatty acid (DHA), Docosahexaenoic acid, Docosahexaenoic acid (Fish, sardines)</td>
<td>Diet rich in potassium (squash, sweet potato, white beans, broccoli)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High protein diet (&gt;90%)</td>
<td>Check HbA1c, High protein/high omega 3 diet can reduce appetite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Apple polyphenols (abundant in apple skin)</td>
<td>Indicate about appetite, This gene regulates appetite and satiety</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aerobic exercise</td>
<td>High protein/high omega 3 diet can reduce appetite</td>
</tr>
</tbody>
</table>

*These recommendations should be evaluated in conjunction with the evaluation made by a doctor based on personal and family history, the results of physical examinations and other clinical and laboratory tests. These recommendations are based on a broad literature review. Patia has not conducted clinical studies to support them. Prevention of type 2 diabetes and obesity must include an integrative approach that considers diet, exercise, sleep and rest, emotional health and stress.

MEDITERRANEAN DIET: focus on whole grains, lean protein, and moderate amounts of dairy products and olive oils.  
ANTIOXIDANT DIET: Goji berries, blueberries, dark chocolate, artichoke, beans.  
GENISTEIN: Flavonoid in legumes and herbs; promotes beta cell function, cAMP signaling, reduces obesity-induced low-grade inflammation.  
AEROBIC EXERCISE (also known as cardio): fast walking, running, spinning, swimming, dancing, aerobic classes, kickboxing 30 min 5 days a week or 50 min 3 days a week.  
ANAEROBIC EXERCISE: weightlifting, push-ups, squats, sprints, high intensity interval training.  
MIND-BODY PRACTICES: meditation, Yoga, Tai-Chi.  
METFORMIN: improves insulin sensitivity by increasing peripheral glucose uptake and utilization. Recommended when tendency to insulin resistance.
**BIBLIOGRAPHY FOR RECOMMENDATIONS**


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Fu Z. Genistein Induces Pancreatic -Cell Proliferation through Activation of Multiple Signaling Pathways and Prevents Insulin-Deficient Diabetes in Mice. Endocrinology 2010; 151(7):3026-3037.


Raveendran AV. Therapeutic Role of Yoga in Type 2 Diabetes. Endocrinol Metab. 2018 Sep; 33(3):307-317.


**METHODOLOGY AND LIMITATIONS**

Testing for genetic variation/mutation on listed genes was performed using ProFlex PCR and Real-Time PCR with TaqMan® allele-specific probes on the QuantStudio 12K Flex. All genetic testing is performed by GX Sciences, 4150 Freidrich Lane, Ste H, Austin, TX 78744. This test will not detect all the known alleles that result in altered or inactive tested genes. Test results do not rule out the possibility that this in individal could be a carrier of other mutations/variants not detected by this gene mutation/variation panel. Rare mutations surrounding these alleles may also affect our detection of genetic variations. Thus, the interpretation given is a probability. Therefore, this genetic information shall be interpreted in conjunction with other clinical findings and familial history for the administration of specific nutrients. Patients should receive appropriate genetic counseling to explain the implications of these test results. Details of assay performance and algorithms leading to clinical recommendations are available upon request. The analytical and performance characteristics of this laboratory developed test (LDT) were determined by GX Sciences' laboratory pursuant to Clinical Laboratory Improvement Amendments (CLIA) requirements.

CLIA #: 45D2144988

This test was developed, and its performance characteristics determined by GX Sciences. It has not been cleared or approved by the FDA. The laboratory is regulated under CLIA and qualified to perform high-complexity testing. This test is used for clinical purposes. It should not be regarded as investigational or for research. rsIDs for the alleles being tested were obtained from the dbSNP database (Build 142). Report contents and report recommendations are created and approved by GX Sciences/Patia. Sole responsibility for the proper use of the information on the GX Sciences report rests with the user, or those professionals with whom the user may consult. Diabetes Predict testing is not *Designated Health Services* covered by Medicare or Medicaid and may not be reimbursed under any state or Federal health care program.

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