

### Member

Name: Jane Doe  
Member ID: 1234  
Sex at Birth: Female  
Date of Birth: 12/12/2012

### Provider

Name: Dr. Smith  
Institution:  
[Redacted]  
Contact: [Redacted]  
Address: 100 Burdell Dr,  
Atlanta, GA 30312

### Sample Collection

Specimen ID: 3456  
Specimen Type: Saliva  
Amount: >2mL  
Collection Tube: DNA  
Genotek Oragene•DNA (OG-600)  
Collected: 6/24/2024

### Sequencing

Test ID: 78910  
Test Type: WES  
Depth: 100x  
Quality: Satisfactory  
Sequenced: 9/30/2024

## EXECUTIVE SUMMARY - TREATMENT REPORT FOR ADHD (SAMPLE)

### Whole Exome Sequencing - Research Results

This report outlines the genetic factors associated with targeted treatment options based on drug metabolism.

**Genetic Contributions:** Genes like DRD4, SNAP25, and HTR1B are linked to ADHD, affecting dopamine signaling and synaptic function, which contribute to symptoms such as inattention and impulsivity.

**Drug Metabolism:** Genetic variations in CYP2D6 and CYP2B6 influence medication metabolism, impacting treatment efficacy and safety.

#### Top Treatment Recommendations:

- **Modafinil:** Enhances cognitive function for DRD4 variants.
- **Dexmethylphenidate:** Targets ADHD symptoms associated with DRD4, with adjusted dosages to reduce side effects.
- **Lisdexamfetamine:** Effective for impulsivity in patients with SNAP25 variants, while monitoring for side effects.
- **Bupropion:** Stabilizes mood in individuals with HTR1B variants, adjusted to mitigate insomnia and weight loss.

This approach optimizes treatment by targeting specific genetic mutations while minimizing side effects, leading to better management of ADHD symptoms.

\*Disclaimers: This report is intended for research use only and is not diagnostic. Please consult with a healthcare provider for diagnoses and next steps.

Please note: this is a sample report with sample data.

## Attention-deficit/hyperactivity disorder (ADHD)

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental condition marked by persistent patterns of inattention, hyperactivity, and impulsivity, often linked to genetic variations in genes such as DRD4, SLC6A3, and SNAP25, which can affect dopamine signaling and neural regulation of attention and behavior.

### PREDICTED PREDISPOSITION



Explanation of score: The prediction of a high score for ADHD is largely due to the presence of rare genetic variants in key genes such as DRD4 and SLC6A3, which are involved in dopamine regulation and neural pathways associated with attention and impulse control. Additionally, common variants in genes like SNAP25 and DAT1 show notable population frequencies, suggesting their variants may significantly impact neural communication and behavior regulation. These genetic factors, combined with environmental influences, increase the likelihood of developing ADHD.

### RECOMMENDED TREATMENTS - TARGETED INTERVENTIONS BY GENEHEALTH

Gene	Gene Function	Recommended Drugs	Best Targeted Drug
*DRD4	Dopamine receptor involved in behavior regulation	Modafinil, Dexmethylphenidate	Dexmethylphenidate
SNAP25	Involved in synaptic transmission and neurotransmitter release	Lisdexamfetamine, Atomoxetine	Lisdexamfetamine
HTR1B	Modulates serotonin levels, affecting mood	Bupropion, Trazodone	Bupropion

\*Predicted genes of most significance for treatment outcomes. GeneHealth advises working with your healthcare provider to target these genes.

## Autism

### DRUG METABOLISM PREDICTIONS

Drug metabolism is how our bodies break down and remove medications we take. When you swallow a pill, your body processes it in the liver, where special proteins change the drug into forms that can be easily eliminated. This process helps determine how well the medication works, how long it stays in your system, and whether you might experience side effects. Essentially, it's the body's way of managing the medicines we use.

Drug	Gene	Variant Type	Metabolism Pathway	Typical Dosage	Tailored Recommended Dosage	Side Effects
Modafinil	DRD4	Missense	CYP2C19	200 mg	150 mg	Headache, insomnia, anxiety
Dexmethylphenidate	DRD4	Missense	CYP2D6	20 mg	10 mg	Increased heart rate, insomnia
Lisdexamfetamine	SNAP25	Nonsense	CYP2D6	50 mg	30 mg	Decreased appetite, dry mouth
Atomoxetine	SNAP25	Frameshift	CYP2D6	80 mg	40 mg	Nausea, fatigue
Bupropion	HTR1B	In-frame deletion	CYP2B6	300 mg	150 mg	Insomnia, weight loss
Trazodone	HTR1B	Nonsense	CYP3A4	100 mg	50 mg	Drowsiness, dry mouth

### KEY FINDINGS

For this specific patient, genetic testing has identified variants in the DRD4, SNAP25, and HTR1B genes, all of which are implicated in Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), and Oppositional Defiant Disorder (ODD). These shared genetic factors suggest a complex interplay among the disorders that manifest in behavioral and cognitive challenges.

- DRD4 is essential for dopamine signaling, impacting attention, impulse control, and social behaviors. For this patient, medications such as Modafinil and Dexmethylphenidate are particularly beneficial. By adjusting the dosage based on the patient's genetic profile, we can enhance cognitive function while minimizing potential side effects like anxiety and insomnia—common concerns in ADHD. This strategy directly targets the patient's worst mutation in DRD4, promoting optimal medication efficacy.
- SNAP25 is crucial for synaptic transmission, with variants linked to emotional regulation and behavioral issues. Lisdexamfetamine and Atomoxetine are recommended for this patient, as they can effectively target attention deficits while addressing oppositional behaviors. Careful dosage adjustments will focus on maximizing therapeutic effects while mitigating side effects like decreased appetite and fatigue, directly targeting the SNAP25 mutation's impact on behavior.
- HTR1B is involved in serotonin pathways affecting mood and behavior. For this patient, Bupropion and Trazodone can be tailored to provide mood stabilization and address insomnia, a frequent issue in both ADHD and ODD. Adjusting these dosages will help manage potential side effects, such as weight loss and drowsiness, while effectively addressing the concerns associated with the HTR1B mutation.

By considering the specific genetic mutations present in this patient, we can implement an integrative treatment approach that targets the underlying genetic influences of ADHD, autism, and ODD. This personalized strategy minimizes side effects and improves therapeutic outcomes by focusing on the patient's most significant mutations, ultimately fostering a more positive overall experience for the patient.

## Recommended Drug Strategies

**Modafinil** for enhancing cognitive function through the DRD4 pathway, adjusted to reduce anxiety and insomnia, directly addressing the patient's worst mutation.

**Dexmethylphenidate** optimized for the patient's specific DRD4 variant, minimizing increased heart rate while targeting impulsivity.

**Lisdexamfetamine and Atomoxetine** to effectively manage attention deficits and oppositional behaviors related to SNAP25 mutations, while mitigating side effects.

**Bupropion** for mood stabilization via HTR1B, adjusted to counteract insomnia and weight loss, targeting mood dysregulation.

This tailored treatment plan aligns with the patient's unique genetic makeup, enhancing the likelihood of positive therapeutic responses while minimizing adverse effects, ultimately leading to better adherence and a more favorable treatment journey.

## NEXT STEPS

- 1. Discuss Findings with a Healthcare Provider:** It's essential for the individual to review the genetic and comorbidity information with a qualified healthcare professional to understand the implications and make informed decisions about treatment options.
- 2. Consider Further Genetic Testing for Pharmacogenomics:** To optimize drug therapy, further genetic testing may be recommended to identify specific metabolic pathways affected by the individual's genetic profile. This information can help tailor medications for improved efficacy and reduced side effects.
- 3. Implement Targeted Interventions:** Based on the identified genes and comorbidities, begin implementing targeted interventions as outlined in the report. This may include therapy options, educational support, and potential pharmacological treatments.
- 4. Monitor Response to Treatment:** Regular follow-up appointments with your provider should be scheduled to assess the effectiveness of the chosen interventions and make any necessary adjustments based on the individual's response.
- 5. Check in with GeneHealth:** Stay updated by regularly checking in with GeneHealth for new findings and advancements in genetic research that may provide further insights into personalized treatment options and interventions.

## Conclusions:

The genetic insights and comorbidity considerations outlined in this report highlight the significant role that genetics play in individual responses to treatment. By leveraging this information, GeneHealth aims to provide targeted intervention options that address not only the core issues related to autism but also the associated comorbidities. With a personalized approach to pharmacotherapy, patients can achieve better health outcomes and enhance their quality of life.