Depression and Pharmacogenetics: An Opportunity to Optimize Patient Care

by Saeed Alzghari, M.S., M.B.A. (HOM), Pharm.D. | Clinical Pharmacist Director at Gulfstream Diagnostics

Depression continues to be one of the leading public health issues currently encountered. Depression is defined as persistent sadness and sometimes irritability. Statistics showing the significance of the problem at hand show that more than 1 out of 20 Americans 12 years of age or older reported current depression as well as a greater percentage of those cases affecting women. Depression is associated with increased risk for death (e.g. from suicide or other causes), lower workplace productivity, and higher risk for other conditions such as anxiety and smoking. If depression is not treated effectively, it can become a long-term condition. Unfortunately, one experience with depression can increase the risk of experiencing another episode by 50%.

According to the American Psychiatric Association, diagnostic criteria for major depressive disorder includes five or more of the following symptoms below that are present nearly every day causing significant problems with daily activities for at least two weeks:

- Change in activity: psychomotor agitation (being more active than usual) or psychomotor retardation (being less active than usual)
- Change in weight or appetite (either increase or decrease)
- Difficulties concentrating and paying attention
- Feelings of guilt or worthlessness
- Feelings of sadness, hopelessness, depressed mood
- Feeling tired or not having any energy
- Insomnia (difficulty sleeping) or sleeping too much
- Loss of interest or pleasure in activities that used to be enjoyable
- Thoughts of death or suicide

A cornerstone for treating depression is the use of antidepressants. Selective serotonin reuptake inhibitors (SSRIs) such as citalopram, sertraline, and paroxetine are used to increase serotonin concentrations in brain synapses that ultimately improve a patient's mood. However, antidepressants may not provide adequate symptom relief in up to a third of patients while relapse rates for patients on antidepressant therapy may be as high as one in five patients. Therefore, are there tests available to help identify an antidepressant that will work best right from the start? Can we gather more information up-front for our patient to speed up the treatment process? The answer to both questions is a resounding yes.

Pharmacogenetics is a diagnostic tool that is playing an ever-increasing role in depression. Pharmacogenetics is the study of how genes affect a person’s response to medications. Enzymes known as cytochrome P450 (CYP450) break down (e.g. metabolize) SSRIs. However, these CYP450 enzymes may break down SSRIs faster than usual (e.g. ultra-rapid metabolizers) or break down SSRIs slower than usual (e.g. poor metabolizers) because of patient-specific gene changes. In turn, patients may have too much of a SSRI potentially leading to side effects or too little of a SSRI potentially leading to lack of effectiveness. Two CYP450 enzymes that are important in the breakdown of SSRIs are CYP2C19 and CYP2D6. The Clinical Pharmacogenetics Implementation Consortium (CPIC) is a group established to address the need for practice guidelines that enable the translation of genetic laboratory results to actionable prescribing decisions for specific medications.
Ultimately, pharmacogenetics can play a role in patients that may have genetic changes in CYP2C19 and CYP2D6 that can lead to improvements in therapy as well as side effects. Testing for either enzyme can be of benefit to a patient not responding to an SSRI. Pharmacogenetics can be another very important clinical tool for providers that may have difficult-to-treat patients with depression.

### ABOUT GULFSTREAM GENOMICS

Founded in 2015, Gulfstream Genomics is leading the way in providing actionable pharmacogenetic testing to clinicians that rely on cutting-edge evidence-based reports. Cardiologist, psychiatrist, family practitioners, and pain physicians utilize results from Gulfstream Genomics in their assessments to optimize patient care around the United States. Gulfstream Genomics provides access to consultant pharmacists and scientists willing to help with advanced patient cases as well as pharmacogenetic education. Gulfstream Genomics: Results that Shape Lives!
REFERENCES


