

Pharmacogenomic Testing Improves Psychiatric Drug Selections for Treatment-Intolerant or Treatment-Resistant Patients

Drug efficacy test results inform alternative medication selections when first-line treatment is ineffective with no guidelines for drug substitutions

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Kong-based Rainbow Genomics

launches the Rainbow Psycho-Pharmacogenomic(TM) Testing

Services enabling physicians to

improve outcomes of treatment-resistant or treatment-intolerant patients. By combining experience-based evidence with genomic-based drug response and adverse drug reaction profiles, psychiatrists can make informed decisions on choosing alternative medications.



Evidence-Based Pharmacogenomic Testing

Suboptimal treatment responses including side-effects and lack of effectivity are common in psycho-pharmacology. For example, only 50% of patients respond to initial antidepressant treatment. Specifically, about 30%-50% of patients affected by depressive disorder, bipolar disorder, and schizophrenia do not respond to their first antidepressant. These non-responders have a 15% likelihood of suicide ideation, and insufficient treatment of psychosis could also manifest as violent and aggressive behaviors.

What to Do When There Are No Guidelines

Most psychopharmacologic treatment guidelines emphasize first-line therapy selection, and not what to do when several options are ineffective or are not tolerated. Plus, only a handful of randomized, controlled trials of treatment-resistant or treatment-intolerant patients exist. In these situations of "no guidelines, no evidence", physicians commonly rely on time-consuming, trial-and-error approaches (experience-based evidence) to choose alternative medications, delaying a desirable treatment outcome.

Integrative Psycho-Pharmacogenomics Strategy

Each individual possesses a number of genetic changes that can significantly affect the body's ability to process a drug, resulting in different responses to medications. Pharmacogenomic testing categorizes two classes of drugs for each patient: drugs that can be taken at normal dosages with expected efficacy, and drugs that are likely to be processed slower or faster than normal, along with medications that can cause severe drug hypersensitivity reactions.

Our test enables physicians to combine drug efficacy data and patient tolerance profiles to rapidly select alternative psychiatric medications - achieved by simultaneous reduction in drug trial and error, and minimization of medication side effects.

Determines 100 Alleles in 27 Genes to Reduce False Negative Results

Alleles are different versions of genes. Asians carry certain alleles at much higher frequencies compared with other populations. To significantly reduce false negative results, a trusted pharmacogenomic test must be validated to determine sufficient alleles and genes specific to Asian patients. The Rainbow Pharmacogenomic test covers 100 alleles, including copy number variants (CNVs), in 27 genes specific to Asians, Caucasians, and mixed-race populations. Over 180 drugs are covered by the test. Most pharmacogenomic tests available in the market do not cover these numbers of alleles and genes, and CNVs are usually not tested, resulting in false negative reports.

Example 1: CYP2C19 Gene Variations and Anti-Depressant Choices

Citalopram and sertraline are commonly used antidepressants in children and adults. Asian patients are twice as likely to have CYP2C19 *2 and *3 alleles compared to European and U.S. patients. The Asian patients are poor metabolizers, resulting in increased exposure (and side effects) for these drugs at the normal dosages. The Clinical Pharmacogenetics Implementation Consortium guideline recommends that doses of citalopram and sertraline for poor metabolizers be reduced by 50%, or the physician may select an alternative drug not predominantly metabolized by CYP2C19. The Rainbow test determines six alleles for the CYP2C19 gene, and confirms if the patient is a slow metabolizer. Simultaneously, the Rainbow test report recommends alternative antidepressant medications for which the patients can metabolize at a normal rate (for example, escitalopram at normal dose). The results enable physicians to make timely choices of alternative medications, or retaining original drug selection, but at the correct dosages according to current clinical guidelines.

Example 2: Importance of Comprehensive Testing CYP2D6 Gene Alleles

CYP2D6 enzyme by itself contributes to the metabolism of 25% of the most commonly prescribed medications including tricyclic anti-depressants, opioids, anti-psychotics, tamoxifen, cough suppressants and anti-arrhythmics. CYP2D6 gene variants (alleles) account for drug side effects in a large percentage of the general population. The Rainbow test comprehensively

detects 42 alleles and copy number variants (CNVs) in the CYP2D6 gene.

“Point-of-Prescription” Real-Time Physician Support System

Our “Point-of-Prescription” Physician Support System enables doctors with no prior pharmacogenomic experience to quickly determine alternative medications in real time. The system also provides evidence of drug-drug interactions to improve prescriptions for patients who are taking multiple drugs simultaneously.

“There are over 200,000 mental patients in Hong Kong, and many of them have serious physiological issues including a tendency towards violence,” said Dr. Ting Sik Chuen, clinical psychiatrist and the vice chairman of the Hong Kong Mental Health Foundation. “Using pharmacogenomics to reduce medication trial and error, and minimize side effects will not only improve medication adherence, thus reducing injury incidences, but also improve the economic efficiency of the healthcare system.”

“We are pleased to provide ethnic-population-specific pharmacogenomic testing with the industry’s most comprehensive coverage of genes and alleles relevant to Asian, Caucasian and mixed-race patients.” Said Daniel Siu, CEO of Rainbow Genomics. “In addition, our “Point-of-Prescription” physician support system provides “real-time” efficacy, adverse drug reaction and alternative medication data, enabling physicians to improve prescribing efficiency and patient outcomes. This “Point-of-Prescription” support system is currently unique in Asia.”

About the Dr. Ting Sik Chuen Clinic

Dr. Ting Sik Chuen is a clinician specialized in child, geriatric and forensic psychiatry, as well as behavioral therapy for panic and social anxiety disorders (<http://www.mentalhealth-pro.com>). He is an honorary clinical associate professor at the Chinese University of Hong Kong. Dr. Ting is also the vice chairman of the Hong Kong Mental Health Foundation, and the former chairman of the Hong Kong Society of Psychiatrists.

About Rainbow Genomics

Rainbow Genomics (www.rainbowgenomics.com) is committed to providing clinically-validated genomic testing to Asian, Caucasian, mixed-race, and local minority populations. The company delivers high diagnostic success for physicians, enabling timely-treatment for patients that can benefit from immediate medical interventions.

Utilizing a multi-technology-platform approach, including whole genome, whole exome, RNA, long-read, methylation, single cell and Sanger sequencing, high-resolution microarray testing, and high-density DNA array genotyping, and through multiple international collaborations, Rainbow Genomics delivers a diagnostic yield meeting or exceeding the highest standards reported by leading U.S. and European medical institutions.

All Rainbow Genomics tests are performed in CLIA-certified and CAP-accredited high-complexity clinical laboratories. Patient privacy is protected by Rainbow's HIPAA-compliant clinical testing process.

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