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Editorial:

PHARMACOGENETICS: THE WAY TO PERSONALIZED MEDICINE

Teresa Cabaleiro and Francisco Abad-Santos

Service of Clinical Pharmcology

Hospital Universitario de la Princesa

fabad.hlpr @ salud.madrid.org

Version española

Genetic variability in drug response is unquestionable. In last years there have been identified genetic variants associated with disease risk (diabetes, cardiovascular diseases, asthma, neurodegenerative diseases), with drug response (schizophrenia and olanzapine, hypertension and tiazide, rheumatoid arthritis and anti-TNF), and with adverse effects (liver toxicity by ximelagatran, osteonecrosis by biphosphonates, myopathy by statins, or hepatic disease by flucloxacillin).

Patient´s pharmacogentic profile may allow a priori to assess which drug show optimal balance between its efficiency and the risk of adverse effects. Among pharmacogenetic analysis benefits, there is a decrease in adverse effects, a more safety drug choice, a better adherence, higher therapeutic success probability and a reduced cost for the health system. These potential benefits have motivated the incorporation of pharmacogenetic data to clinical research.

Patient analysis before starting therapy to assess capacity to metabolize different drugs is a key and emergent research area. Although having an

incipient development, there are currently tests for molecular diagnosis by which physicians can select drugs and doses for each patient. One area where pharmacogenetics has made most progress in recent years has been studying the process of drug metabolism, which determines the activity and much of the adverse drug reactions. In this sense, some genetic polymorphisms on cytochrome P450 enzymes were associated with higher or lower risk of disease: CYP3A4*1B allele increases the risk of lung cancer in smoker men, homozygotes for functional alleles of CYP2D6 have higher risk of developing liver cancer. On the other hand, the genetic test for HLA-B*5701 allele in patients who are going to initiate abacavir treatment has spread, and it eliminates related hypersensitivity cases. Moreover, the association between thiopurine-S-methyl transferase genotype and thiopurine response have allowed genotypic analysis for adjusting dose and reducing adverse effects.

Incorporation of personalized medicine in the structure of the health care system can help to resolve many inefficiencies, such as trial-and-error dose adjustment, hospitalization of patients because of severe drug adverse events, or delayed diagnostics. The integration of pharmacogenetic tests to medical practice in the future will largely depend on the acceptance of tests by physicians and patients. The information in the patient's personal genome will allow physicians to develop a more dynamic and personalized therapeutic approach, based on the patient's susceptibility to different diseases and the possible treatment response. Unravelling the increasing complexity of the human genome and understanding how genetic variability affects people in their response to drugs remains a challenge for the coming decades.

CORRESPONDENCE:

Dr. Francisco Abad-Santos
Service of Clinical Pharmacology
Hospital Universitario de la Princesa
Mail: fabad.hlpr @ salud.madrid.org