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Overview; Pharmacogenetics and Personalized Medicine

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Announcement of completion of human genome sequence analysis in February of this year has shown tremendous impact not only on the advancement of the researches in biomedical field but also on understanding of our daily life. By knowing the sequences of the genes that may be involved in the genetic diseases in advance, outbreak of the disease can be prevented or ongoing disease can even be cured. The ability to analyze the entire human genome sequence enables us to enter revolutionary era of biomedical treatment. Information on the genetic variations of the individual can be used for accurate diagnosis of the disease and appropriate treatment of the patient for faster recovery of the disease. Even though detailed functions of the genes are yet to be studied, the sequence information of the genes in the human genome will facilitate the elucidation of the function of the genes. This will help predicting the phenotypes of the genes and will be the useful tools to develop the diagnostic methods or treatment of the diseases caused by the genetic alterations. Genetic variations of the individuals (0.1% of human genome) make difference in phenotypes. This difference is responsible for variable responses to the same drug. Detailed studies on the genetic variation of the individuals, so called "SNP (single nucleotide polymorphism)" and its relationship to difference in a drug response is now possible because of comparative studies on the sequences of the individual genome.

On the other hand identification of each gene function using the innovative technologies such as DNA chip or proteome analysis will facilitate discovery of a new drug targets for the specific disease. Elucidation of its role in the cells will expedite the development of the novel methods to detect the aberrant form of the gene function that may lead disease state of the cells or abnormal responses to the certain metabolites soon. The information obtained through functional and comparative genome analysis will change the paradigm of the medicine.

I will discuss the impacts of the results of future genome projects on our medical and pharmacogenetic responses of individual life. I will also introduce the future plans for the Korea's functional genome project and its impact on new drug target discovery and future revolution of medicine.