Genomic Medicine Research in Academia Sinica, Taiwan

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As a part of the Taiwan biotechnology-based economy building initiative, the Government of Taiwan has launched a National Research Program in Genomic Medicine in January of 2002. The Academia Sinica has played a major role in leading the genomic medicine research in Taiwan. High throughput and state of the art core facilities, including MALDI-TOF based MassARRAY single nucleotide polymorphism genotyping, microarray/biochip, ENU mouse mutagenesis, bioinformatics, protein structural biology and proteomics cores, have been installed, mostly on the campus of the Academia Sinica, to support the genomic/proteomic research programs. The central theme of the Genomic Medicine program in the Institute of Biomedical Sciences is to search for the novel genes/targets associated with human diseases, including cancer and adverse drug reactions. Young hypertension and early onset breast cancer are two examples of diseases with significant genetic components in Taiwan and in the latter, risk genes have been identified (Cancer Research 63: 2440, 2003). Several monogenic diseases, including familial psoriasis, familial cardiac arrhythmia have been mapped and genes identified. Genetic markers associated with drug-induced Stevens-Johnson syndrome have been identified (Nature 428:486, 2004; PNAS 102:4134, 2005). A novel SNP associated with inter-individual and inter-ethnic differences in warfarin sensitivity has also been identified (Hum Mol Genet 14:1745, 2005). A systematic, genome-wide, phenotype-driven mutagenesis program for gene function studies in the mouse have resulted in the identification of several interesting animal models of human diseases, including aortic stenosis, hydrocephalus, necrotizing encephalopathy, a mouse model resembling human maple syrup urine disease (J. Clin Invest 113: 434, 2004), and a mouse model of long-chain 3-hydroxyacyl CoA dehydrogenase deficiency. Research along these lines have identified novel disease genes/ targets and increased our understanding of the diseases. It is hoped this will lead to the development of a better treatment for human diseases.