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Geoffrey Duyk, M.D., Ph.D., Chief Scientific Officer, was previously Vice President of Genomics at Millennium Pharmaceuticals, Inc. and before that a faculty member of Harvard Medical School in the Department of Genetics as Assistant Professor and Assistant Investigator of the Howard Hughes Medical Institute. Dr. Duyk is a member of the Genome Research Review Committee of the National Human Genome Research Institute and an Scientific Advisory Board member overseeing the National Institutes of Health Pilot Human Genomic Sequencing Project.

**Genetics in a Post-Genomics Era: Lessons
from Model Systems**

The Human Genome Project has reached its midpoint. Its initial goals were to complete genetic and physical maps of the human genome in anticipation of completing the primary nucleotide sequence. The project was initially aimed at providing the infrastructure necessary for the identification of the genetic basis of common disease. This effort spawned sister projects focused on model systems (mouse, rat, zebrafish, *Arabidopsis*, *Drosophila*, *C. elegans*, yeast, multiple bacterial species, etc.) as well as stimulating the growth of our technology base. In addition, genomics efforts are now being actively applied towards the direct study of plant, insect, and animal systems essential for the development of modern agricultural products. An important consequence of this effort has been the application of high-throughput process technologies to discovery phases of research. Specifically, the introduction of automation and informatics into the biology work place. The project has also stimulated a paradigm shift in research as the gathering and presentation of information has become an end itself, resulting in the dissociation of data acquisition from classic hypothesis-based research.

The challenge for life science companies is not only implementation and application of these technologies toward the development of new crop protection, crop improvement, and animal husbandry products, but the demonstration of how these diverse set of tools and vast amounts of information significantly accelerate and improve the identification of robust targets and traits. The goal of this talk will be to review the utility of available genetic systems for target discovery and target validation. Special emphasis will be placed on the traditional invertebrate model systems as they offer the opportunity for systematic genetic screening in the context of a well-established understanding of organismal biology, the availability of high quality genomic/genetic information and tools as well as advanced technology for germline modification. In addition, I will discuss the challenges and opportunities confronting the development of new model systems.

In this era of target based pesticide discovery and increasing interest in identification of high value output traits, the utility of model systems are further enhanced by the remarkable evolutionary conservation of signal transduction pathways, facilitating the application of pathway and gene network information to diverse sets of biochemistry and physiology.