

KEGG FOR MEDICAL AND PHARMACEUTICAL APPLICATIONS

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KEGG (<http://www.genome.jp/kegg/>) is a suite of databases that integrates genomic, chemical, and systemic functional aspects of the biological systems. KEGG provides a reference knowledge base for linking genomes to life through the process of PATHWAY mapping, which is to map, for example, a genomic or transcriptomic content of genes to KEGG reference pathways to infer systemic behaviors of the cell or the organism. In addition, KEGG provides a reference knowledge base for linking genomes to the environment, such as for the analysis of drug-target relationships, through the process of BRITE mapping. KEGG BRITE is an ontology database representing functional hierarchies of various biological objects, including molecules, cells, organisms, diseases, and drugs, as well as relationships among them. The KEGG resource is being expanded to suit the needs for practical applications. KEGG PATHWAY now contains 26 pathway maps for human diseases in four subcategories: neurodegenerative disorders, infectious diseases, metabolic disorders, and cancers. Although such maps will continue to be added, they will never be sufficient to represent our knowledge of molecular mechanisms of diseases because in many cases it is too fragmentary to represent as pathways. KEGG DISEASE is a new addition to the KEGG suite accumulating molecular-level knowledge on diseases represented as lists of genes, drugs, biomarkers, etc. KEGG DRUG now covers all approved drugs in the U.S. and Japan. KEGG DRUG is a structure-based database. Each entry is a unique chemical structure that is linked to standard generic names, and is associated with efficacy and target information as well as drug classifications. Target information is presented in the context of KEGG pathways and drug classifications are part of KEGG BRITE. The generic names are linked to trade names and subsequently to outside resources of package insert information whenever available. This reflects our effort to make KEGG more useful to the general public.