

生物信息学在基因芯片中的应用

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押生物信息学和基因芯片是生命科学研究领域中的两种新方法和新技术,生物信息学与基因芯片密切相关,生物信息学促进了基因芯片的研究与应用,而基因芯片则丰富了生物信息学的研究内容。本论文探讨生物信息学在基因芯片中的应用,将生物信息学方法运用到高密度基因芯片设计和芯片实验数据管理及分析。从信息学的角度提出基因芯片设计准则,提出寡核苷酸探针的优化设计方法,将该方法运用于再测序型芯片和基因表达型芯片的设计,在此基础上研制出高密度基因芯片设计软件系统和实验结果分析系统。

APPLICATION OF BIOINFORMATICS TO GENE CHIP

Bioinformatics and gene chip are two new technologies in the field of Life Science. Bioinformatics is very important to the research and the application of gene chip. It plays a key role in gene chip design, experiment data analysis and data management. The applications of Bioinformatics to gene chip are discussed in this paper in great detail. Some rules for designing gene chip are proposed. A new approach for gene chip design, by which an optimal set of oligonucleotide probes can be generated using dynamic programming, is also proposed. The probes have nearly the same melting temperature T_m , and are of variable length and variable overlap. The method is applied to designing gene chips for DNA resequencing, mutational analysis and gene expression analysis. Two software systems, one for gene chip design and one for data analysis have been developed.

关键词

生物信息学(Bioinformatics); 基因芯片(Gene chip); DNA阵列(DNA array); 探针设计(Probe design)