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| Nota di contenuto | 1. Genominomics and prospects -- Chapter objectives -- Human genome project completed -- Biochips -- Next-generation sequencing -- Applications of biochips -- Consanguinous marriages -- Ashkenazi Jews -- Cystic fibrosis -- Tuberculosis -- Cancer -- Sickle-cell anemia -- Small pox -- Paleo genomes -- Colony collapse disorder -- Schizophrenia -- Prenatal testing -- DNA for forensic investigation -- Genomic surveillance -- Bio-corrosion -- Human immunodeficiency syndrome -- Microarray analysis -- Pioneers in double-helix structure of DNA -- Genominomics, economics of sequencing, $1,000 -- Genome is within reach -- Genetically modified crops -- Glossary -- Summary --<br>2. Microarray analysis -- Chapter objectives -- Molecular basis for disease -- Microarray technology development -- Specifications -- Nanoprint microarrayer -- Ten tips for five-step process -- Step 1 formulation of a biologic question -- Step 2 sample preparation -- Step 3 biochemical reaction -- Step 4 microarray detection -- Step 5 microarray data analysis and modeling -- Microarray fluorescence detection -- Confocal scanning microscope -- Quality of substrate surface -- Phosphoramadite synthesis -- Summary --<br>3. Sequencing technology advances -- Chapter objectives -- Genomes completed -- Next-generation sequencers -- Gene mapping -- Electrophoretic methods -- Microfluidic separations -- Polymer liquids -- Transport parameters -- Transient concentration profile predicted using the a capite ad calcem concentration non-Fick diffusion equation |

in a semi-infinite medium -- Convection and diffusion -- Summary --
4. Applications -- Chapter objectives -- Cancer -- Kinetic model for progression of cancer -- Proteomics and Michaelis and Menten kinetics -- Immune action mechanism -- DNA hybridization kinetics-diffusion effects -- Gene modifications -- DNA-melting temperature -- Genetic disorders and microarray analysis -- Tissue microarrays and cell microarrays -- Bio-based polymers -- Gene silencing -- Metabolomics -- Recombinant DNA technology and genetically -- Modified crops -- Biodiesel -- Consecutive-competitive reactions -- Centrifugal separation of fame and glycerol: torque requirements -- Shear flow theory -- Results -- Gene therapy -- Gene activity in songbirds similar to humans -- Glossary -- Summary --
5. Next-generation sequencing -- Chapter objectives -- Blotting techniques -- Sanger sequencing -- Sequencing by synthesis -- Sequencing by ligation -- Pyrosequencing -- Single-molecule sequencing -- DNA sequencing through nanopore -- Glossary -- Summary --
6. Biochip manufacturing -- Chapter objectives -- Three approaches -- Ex situ manufacturing -- Commercial instruments -- Time to print -- Summary --
7. Statistical characterization and normalization -- Chapter objectives -- Housekeeping genes and normalization -- Clustering -- Supervised -- Variation filter -- Unsupervised -- Pearson's correlation coefficient -- Principal component analysis -- Cluster determination -- Nearest neighbor clustering -- Unsupervised classification -- Silhouette method -- Dunn's validation index -- Davies-Bouldin index -- C-index -- Self-organizing maps -- K-means clustering -- Agglomerative clustering -- Dendrograms -- Two-dimensional dendrograms -- Division or partition clustering -- Bayesian clustering -- Boolean networks -- Bayesian networks -- Relevance networks -- Glossary -- Summary --
References -- About the author -- Index.

Sommario/riassunto

Microarray Analysis is a natural outgrowth of the author's teaching and research into the field of microarray processing, a fast growing and developing field. The book highlights the development of various microarray analysis tools and the applications of the technology towards disease prevention and eradication. The goal is to illustrate the many sequencing methods in place, and to show the various applications of these methods. This book will show how the biochemical reactions involved in the different steps of the cure process can be studied using microarray methods. Examples will be provided throughout the text of various disease states, including the spread of cystic fibrosis in children consanguineous marriages in Saudi Arabia, genetic disorders, and autoimmune disorders. The protocols from sample preparation to confocal scanning microscopy and detectors using photo multiplier tubes, biochip manufacturing methods, advances in sequencing methods, microfluids, electrophoretic methods are discussed in detail. The Polymerase chain reaction, a technique used to amplify and simultaneously quantify a targeted DNA molecule is explored. The criteria for choosing the best surface to use for microarray analysis is elloborated. Additionally, Microarray Analysis: Biochips and Eradication of Disease will feature the statistical methods needed for analysis of DNA data from microarray analysis, including shotgun and next generation sequencing.