



Molecular methods in Public Health - Metodi Molecolari in Sanità Pubblica

Public Health (PH) practitioners are becoming increasingly interested in biomolecular techniques, this stands as testimony to the number of courses and dedicated sessions in national conferences that have occurred since 1990 which have involved several colleagues. On behalf of the past-president of Italian Society of PH (SItD), Prof. G. Renga, the volume *Molecular methods in Public Health - Metodi Molecolari in Sanità Pubblica* represents the first attempt to rigorously collect different contributions from Italian researchers working in the field of molecular biology as applied to PH. The volume, edited by Prof. G. Giammanco and Prof. S. De Flora and published by Centro Scientifico Editore 2004, addresses all of the traditional aspects of molecular biology in PH. It is divided into six sections, focusing on the areas of epidemiology and prevention of infectious diseases in community and nosocomial settings, the epidemiology of chronic-degenerative diseases, hygiene in the working and living environment, food and water hygiene, and genetically modified organisms (GMOs). As far as the prevention of infectious diseases is concerned, the molecular approach has shown that genotyping aetiological agents permits the comparison of different isolates collected during epidemic events, thus providing the timely reconstruction of the chain of transmission of the disease. In this context all of the recent molecular techniques used for bacteria and viral genotyping are discussed, for example, Restriction Fragment Length Polymorphisms (RFLP) of genomic DNA, Southern blotting analysis, Pulsed Field Gel Electrophoresis (PFGE), Amplified Fragment Length Polymorphisms (AFLP), ribotyping, and others based on Polymerase Chain Reaction (RAPD, ERIC-PCR, REP-PCR) and genome sequencing. The application of molecular techniques in the epidemiology of influenza viruses, by studying the antigenic shift and drift, across the epidemiology of polio, rubella and parotitis are recounted in relation to the development of new vaccines. The molecular epidemiology and prevention of enteric viruses and bacteria infections, as well as blood-related viruses infections (HBV, HCV, HIV) and sexual-transmitted diseases are also described, from the genomic structure of the aetiological agents to the nucleic acid mutations identified in relation to virulence factors and host resistance. Molecular techniques applied to *Mycobacterium* spp. infections are emerging as effective tools for the immediate detection of new cases of infection, and for genotyping the isolates involved in community or nosocomial settings in order to implement preventative measures. The molecular epidemiology of nosocomial infections caused from *Candida* spp., *Legionella pneumophila*, *Staphylococcus* spp. and *Pseudomonas* spp. are systematically described, including the approach used to reconstruct the chain of transmission. The third chapter examines the molecular epidemiology of chronic-degenerative diseases from two differing view points. The first describes the study of endogenous risk factors relating to genetic susceptibility and how to use this information in order to inform primary prevention. The second highlights how to use genetic markers for mutagen environmental exposure in order to predict the risk of development and the outcome of a chronic-degenerative disease. Furthermore, all recent applications of DNA and antibody-based microarrays are presented. The bio-monitoring of occupational exposure to mutagens are also discussed, illustrating the genetic tests currently available [comet assay, micronuclei test and hypoxanthine phosphoribosyltransferase (HPRT) test]. The analysis of water and food (GMOs included) by the use of commercially and home-made molecular methods concludes this comprehensive text, which represents a cornerstone in the panorama of PH. Finally, we would like to acknowledge the authors for their logical presentation of the contributions in this new field of PH.

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