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Manual comprises basic theoretical questions of modern PCR-diagnostics, including its components and stages, its detection and analysis, primer and probes design, and its practical application in the field of molecular biology, genetic engineering and medicine, and in the field of laboratory diagnostics of hereditary and infectious diseases in particular, control questions and sample tests; is well illustrated with schemes and figures.

Manual is aimed at master and doctoral students, specialty «Biology».

Учебное издание содержит аналитический обзор теоретических вопросов современной ДНК-диагностики, включая ее компоненты и стадии, применение для обнаружения и изучения целевого материала, дизайн праймеров и проб, ее практическое применение в области лабораторной диагностики наследственных и инфекционных заболеваний, а также контрольные вопросы и образцы тестов. Пособие также хорошо проиллюстрировано схемами и рисунками.

Учебное издание, в первую очередь, предназначено для магистрантов и докторантов специальности «Биология».

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FOREWORD

With the development of technologies of molecular and genetic researches it became clear that variability of a genome causes not only evolutionary and biological diversity, but also defines development of different forms of pathologies. The beginning of the XXI century was marked by almost full interpretation of human genome. This break in human biology changes diagnostic opportunities of medicine, creates prerequisites for further development of molecular medicine, which considers emergence and pathogenesis of diseases at the molecular level: from prerequisites of developing of an illness and primary products of mutant genes to pathological metabolites. On the basis of knowledge of molecular events in norm and pathogenesis essentially new approaches to diagnostics, personalized treatment and prevention of diseases are developed. Practical potential of molecular diagnostics is most brightly shown in the biomedical researches directed on: identification of the genes responsible for developing of diseases; analysis of genetic polymorphism defining drug resistance; detection of genetic defects at the level of the whole genome; creation of models of various pathologies, etc. Also it is a little known of the difficult diseases, which are not submitting to simple Mendelian laws of inheritance, and relating to group of diseases with hereditary predisposition (cancer, psychiatric diseases, diabetes, asthma, atherosclerosis, hypertension, etc.), dependent on environmental conditions, which is the new direction of human genetics.

Manual comprises the basic theoretical questions of modern molecular diagnostics, including modern concepts on molecular mechanisms of diseases and immune systems of the body; molecular mechanisms of apoptosis; molecular and genetic markers of diseases; classification of hereditary diseases and their characteristics; basic