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Zh 90 PCR-diagnostics: manual / A.I. Zhussupova. – Almaty: Qazaq university, 2015. – 126 p.
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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, as well as 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».

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FOREWORD

Polymerase chain reaction (PCR) invented in 1983 by an American scientist, Dr. Kary B. Mullis (1993 Nobel Prize winner), is at the present moment one of the most accurate and sensitive methods of molecular diagnostics, so called timely and clinically approved «golden standard» for a number of infectious diseases.

At the heart of the PCR method is its repeated doubling of a specific DNA region. As a result sufficient for visual detection amounts of DNA are obtained. It permits estimating the presence of a pathogen in a sample, even if there are only a few DNA molecules of the pathogen. It also allows you to diagnose the presence of slowly growing pathogens, without resorting to time-consuming microbiological methods, which is especially important in gynecology and urology in the diagnosis of urogenital infections and sexually transmitted diseases.

This method also diagnoses viral infections, such as hepatitis, human immune-deficiency virus, and others. The sensitivity of the method is higher than that of immune chemical and microbiological methods, and the principle of the method allows diagnosing the presence of infections even with significant antigenic variation.

Specificity of PCR diagnostics for a broad range of viral, chlamydia, mycoplasma, ureaplasma, and large number of other bacterial infections reaches 100%. PCR diagnostics allows detection of infectious agents even in cases, where other methods (immunological, bacteriological, and microscopic) cannot do so.

PCR diagnostics is particularly effective for diagnosis of hardly cultured, uncultured and private existing forms of microorganisms, which often are encountered in the latent and chronic infections, permitting to avoid the difficulties associated with the cultivation of microorganisms in the laboratory. Use of PCR diagnostics is also very effective against pathogens with high antigenic variability and intracellular parasites.

By the PCR means detection of pathogens is possible not only in clinical material obtained from the patient, but also in materials derived from the environmental objects (water, soil, etc.): in urological and gynecological practice – for the detection of chlamydia, ureaplasma, gonorrhea, herpes, bacterial vaginosis, mycoplasma infection, human