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BIOCHEMICAL METHODS OF INVESTIGATIONS IN DIAGNOSTICS

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Abstract
Biochemical methods of research in diagnostics - methods of research of chemical components of biological fluids, cells and tissues, as well as processes of transformation of substances and energy occurring in the human body in norm and pathology [20,21].

Keywords: Biochemical research, body tissues, energy, chemistry, cells, hormones.

Introduction

For the purposes of clinical diagnostics the following is of interest: chemical composition of biological fluids and tissues of the organism (pathology may be manifested by a change in concentration, or by the absence of one of the usual components, or by the appearance of an unusual component), distribution of fluid and chemical components between different 'structures' of the organism and a single cell, processes of transformation of chemical components in the whole organism or its various organs and their regulation by mediators, hormones, tissue hormones, enzymes; processes of metabolism of organs and tissues of the organism; metabolic processes of the organism and its organs Inorganic and organic substances and macromolecules (proteins, nucleic acids) that are part of living organisms are examined. The study can be carried out in vitro in samples of biological fluids (blood, urine, cerebrospinal fluid, note, digestive juices, etc.), pathological fluids (oedema, ascitic, pleural, pericardial, intra-articular, etc.) or tissue, as well as exhaled air, in vivo using sensors (ion-selective electrodes) introduced into the body [2,3,4].
Biochemical methods of investigation of individual chemical components, their compounds and ratios between them in samples of biological fluids are most widely used in diagnostic practice. Depending on the nature of the study, biochemical methods of research can be divided into qualitative (detection of the desired substance in a sample of biol, liquid or tissue) and quantitative (determination or measurement of its content) [5,6,7,8,9].

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Qualitative methods are mostly based on the use of a characteristic property of the substance under study, manifested under certain chemical-physical influences (addition of an appropriate reagent, heating, etc.). The same principle underlies direct quantitative methods of research. However, since the composition of biological fluids is rather complex, when quantifying a chemical component, the first stage of the study is usually to isolate the desired substance (or a group of similar substances) from biological fluids, and then identify it (by one or another characteristic property) and measure its content (concentration) [10,11,12,16].

In some cases, the separation of substances, identification and concentration measurement can be carried out simultaneously, e.g. in the examination of bioliquids by gas chromatography [13,14,15].

In the study of enzymes, the result of their catalytic activity (decrease in the content of substrate or increase in the content of the product of the reaction catalysed by the enzyme) is mostly measured rather than their concentration. A number of substances with high biological activity, but contained in the body in small amounts (hormones, mediators), are isolated in one or another chemical way, and the measurement of content (concentration) is made with the help of biological test objects (isolated organs or whole organisms of experimental animals), which increases the sensitivity and specificity of the study. Recently, these biological methods have been replaced by radioimmunological methods [17,18,19].

Improvement of biochemical research is aimed at obtaining the most accurate information about the state of metabolic processes in the whole organism, in a particular organ, in a single cell, in subcellular structures. Biochemical methods are combined with methods of immunology, histology, cytology and others. Such methods are usually complex, labour-intensive and require special equipment [20,25].

Another direction of development of biochemical methods of research, not called by the demands of clinical diagnostics, is the development and application of the most simplified in terms of technique of performance and fast methods, allowing within a few minutes or even seconds to obtain an approximate (approximate) assessment of a certain biochemical indicator of this research can be carried out with the help of partially or fully mechanised systems, automatic measuring devices, autoanalysers [20,21,22].

Both the isolation of a substance from a biological fluid and the measurement of its concentration can be carried out in a variety of ways. Combinations of these methods, which represent specific methods of investigation, are quite numerous. For some substances (cholesterol, cholinesterase), up to 100-150 variants of research methods have been described. The known specificity of the research method may be due to the nature of the biological fluid under study, depending on the concentration of protein, pigments, etc. Along with a single study in diagnosis is of interest to study a particular indicator in dynamics - during the day (assessment of the normal daily rhythm), under the influence of a certain functional load (detection of hidden defects of metabolism), in the process of disease development, under the influence of treatment. Due to the variety of biochemical processes simultaneously occurring in the process of vital activity of the organism, in practice, combinations of diagnostic tests reflecting one or another form of pathology, lesion of a particular organ, depth or stage of the pathological process are increasingly used [23,24,25].

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method that optimally corresponds to the tasks and conditions of scientific research. In the practical The variety of biochemical research methods provides an opportunity to choose a activity of clinical diagnostic laboratories it is more expedient to use carefully selected unified methods, unified for all medical and preventive institutions of the country, which allows comparing the results of analyses performed on the same patient in different institutions, and facilitates the material and technical supply of laboratories [10,11].

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