

BIOCHEMICAL BASES OF THERAPY IN VETERINARY MEDICINE

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Abstract. The biochemical bases of therapy in veterinary medicine are critical for understanding how to effectively diagnose, treat, and manage diseases in animals. Here are some key aspects of how biochemistry informs therapeutic approaches: Pharmacokinetics examines how drugs are absorbed, distributed, metabolized, and excreted in the body. This knowledge helps veterinarians determine appropriate dosing regimens and routes of administration. Pharmacodynamics involves how drugs exert their effects on the body, including mechanisms of action, therapeutic effects, and potential side effects. Biochemical analyses reveal critical information about an animal's health status, allowing for the identification of disease processes and assessment of treatment responses through various biomarkers. These can include enzyme levels, electrolyte imbalances, and metabolic byproducts. Drug Composition and Mechanism of Action: Understanding the biochemical composition of therapeutic agents—including active ingredients and their mechanisms—enables veterinarians to select appropriate treatments for specific conditions. For instance, anti-inflammatory medications and antibiotics work by targeting specific biochemical pathways or infectious agents. Nutritional Biochemistry: Nutrition plays a vital role in therapy, as specific nutrients can influence healing and overall health. For example, employing specialized diets or supplements that contain antioxidants can support liver function or immune response during treatment. Personalized Medicine: Recognizing individual variability in animal patients, such as age, breed, genetic predispositions, and underlying health conditions, allows veterinarians to tailor treatments more effectively. Biochemical profiles can guide adjustments in therapy based on a patient's unique needs. Routine biochemical testing during therapy helps monitor the effects of medications on organ function and systemic health, allowing for swift adjustments and minimizing adverse effects. This is especially crucial in long-term or complex treatments. Understanding biochemical interactions between different drugs, as well as between drugs and food, helps to anticipate and manage potential side effects and interactions, ensuring safer treatment protocols. In summary, the biochemical bases of therapy in veterinary medicine are fundamental for developing effective treatment strategies, enhancing the precision of care, and improving

outcomes for animals. This approach allows veterinarians to integrate a comprehensive understanding of biochemistry into everyday clinical practice.

Keywords: Personalized Medicine, Drug Composition, Nutritional Biochemistry, Mechanism of Action

Introduction. The relevance of biochemical data in veterinary therapy cannot be overstated, as it plays a pivotal role in diagnosing, treating, and managing diseases in animals. Here are several key points highlighting its importance: Biochemical data can reveal abnormalities in organ function and metabolism before clinical signs appear. This allows for early intervention, which can significantly improve prognosis and treatment outcomes. Biochemical tests provide specific information about various diseases. For example, elevated liver enzymes can indicate hepatic issues, while abnormal electrolyte levels may point to renal dysfunction. This helps veterinarians differentiate between similar conditions and make accurate diagnoses. Regular biochemical assessments enable veterinarians to monitor how well a patient responds to treatment. For example, changes in blood glucose levels can indicate the effectiveness of insulin therapy in diabetic animals. Biochemical data allows for the tailoring of treatment plans. If an animal shows adverse reactions to a medication based on biochemical feedback, veterinarians can adjust dosages or switch to alternative therapies. Evaluating levels of specific enzymes, electrolytes, and other biochemical markers helps assess the function of vital organs such as the liver, kidneys, and pancreas. Understanding these functions is crucial for managing conditions like liver disease, renal failure, and metabolic disorders.

Biochemical data can guide dietary recommendations, especially in cases of metabolic disorders or specific health conditions. For example, biochemical analysis can help determine the need for supplemented vitamins and minerals, or influence the formulation of special diets. Analyzing biochemical parameters provides insights into the underlying mechanisms of diseases, aiding researchers and practitioners in developing new therapeutic strategies or improving existing ones. Individual variations in metabolism and response to treatment can be identified through biochemical analysis, allowing for personalized treatment plans tailored to the specific needs of each animal. Regular biochemical testing can be part of wellness checks, helping to predict potential health issues before they become serious, thus allowing for preventive measures to be taken. Biochemical data contribute to the development of new therapies and veterinary pharmaceuticals, helping to advance the field of veterinary medicine with evidence-based practices.

In summary, biochemical data is integral to veterinary therapy as it enhances diagnostic accuracy, treatment efficacy, and overall animal health management. By

leveraging biochemical insights, veterinarians can ensure a more informed, proactive, and personalized approach to veterinary care.

Aim of the Study to determine the optimal aspects of the biochemical basis of therapy in veterinary medicine.

Materials and methods. Data sources from databases of highly rated journals (articles), monographs and dissertations over the past 5 years and processing by meta-analysis.

Discussion. Early detection of abnormalities through biochemical data is a crucial aspect of veterinary medicine. Here's how this proactive approach benefits animal health:

Subclinical Disease Detection: Many diseases progress silently without visible symptoms until they reach an advanced stage. Biochemical tests can identify changes in organ function, such as elevated liver enzymes or altered kidney values, before the animal shows any clinical signs. This allows for timely diagnosis and treatment.

Improved Treatment Options: Early intervention often leads to a wider range of treatment options. For example, if a liver issue is detected before significant damage occurs, veterinarians can implement dietary changes or medications that might completely resolve the issue rather than managing advanced disease.

Better Prognosis: Animals treated in the early stages of a disease generally have better outcomes. For instance, early detection and management of diabetes can prevent complications like diabetic ketoacidosis, improving long-term health and quality of life.

Preventive Care: Routine biochemical screenings as part of wellness exams can help identify potential health issues early, allowing for preventive measures to be taken. This proactive approach not only helps in individual cases but can also contribute to overall herd or population health management.

Customization of Treatment Plans: Early detection affords veterinarians the opportunity to personalize treatment plans based on specific biochemical markers, ensuring that the therapy is tailored to the individual animal's needs and conditions.

Reduced Treatment Costs: By catching diseases early, the overall cost of treatment can often be reduced. Advanced-stage diseases typically require more intensive—and therefore more expensive—treatment regimens compared to those that can be managed at an earlier stage.

Biochemical tests are invaluable in veterinary medicine because they offer precise insights into the health status of animals and can highlight specific disease processes. Let's delve a bit deeper into how these tests provide critical information:

Liver Function Tests:

Elevated Liver Enzymes: Tests such as alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP) help assess liver health. High levels can indicate liver damage, inflammation, or cholestasis (bile flow obstruction).

Bilirubin Levels: Elevated bilirubin can indicate liver dysfunction or hemolysis, giving clues about potential jaundice and other hepatic issues.

Kidney Function Tests:

Blood Urea Nitrogen (BUN) and Creatinine: Elevated levels of these metabolites can signal renal dysfunction. Creatinine in particular is a reliable indicator of kidney clearance ability.

Electrolytes: Abnormal levels of electrolytes (such as potassium and phosphorus) can also indicate kidney disease, dehydration, or endocrine disorders, particularly in chronic kidney disease.

Pancreatic Function Tests:

Amylase and Lipase: Elevated levels may suggest pancreatitis or pancreatic injury, helping to differentiate between gastrointestinal and pancreatic disease.

Specific Tests for Canine Pancreatic Lipase Immunoreactivity can provide more accurate insights into pancreatic health.

Electrolyte Imbalances:

Electrolytes like sodium, potassium, calcium, and chloride are crucial for many physiological processes. Abnormal levels can signify issues such as dehydration, kidney disease, hormonal dysregulation (e.g., Addison's disease), or metabolic disorders.

Endocrine Disorders:

Biochemical tests help diagnose conditions such as diabetes mellitus (elevated blood glucose and fructosamine levels), hyperthyroidism (increased thyroid hormones in cats), or hypothyroidism (decreased thyroid hormones in dogs).

Infection and Inflammation:

Certain biochemical markers can indicate inflammation or infection. For example, increased acute-phase proteins and changes in white blood cell counts can suggest inflammatory processes or infections.

Equine and Specialty Tests:

Specific biochemical profiles are also available for unique species and conditions, such as tests for equine metabolic syndrome or performance-related disorders in horses.

Conclusions

By correlating biochemical test results with clinical findings and history, veterinarians can accurately diagnose and effectively manage numerous health issues. This synergy between biochemical testing and clinical assessment is fundamental in ensuring that animals receive precise and timely treatment.

In summary, the ability to detect abnormalities in organ function and metabolism through biochemical data is invaluable in veterinary practice. It emphasizes the

importance of regular health screenings and helps veterinarians provide timely and effective care, ultimately leading to healthier outcomes for animals.

Reference

1. Stockham S. L., Scott M. A. (ed.). Fundamentals of veterinary clinical pathology. – John Wiley & Sons, 2024.
2. Janas K. E. A., Tobias K. M., Aisa J. Clinical outcomes for 20 cats with congenital extrahepatic portosystemic shunts treated with ameroid constrictor ring attenuation (2002–2020) //Veterinary Surgery. – 2024. – Т. 53. – №. 2. – С. 243-253.
3. Reeves A. M. et al. HEMATOLOGY AND BIOCHEMICAL REFERENCE INTERVALS FOR FREE-RANGING PRONGHORN (ANTILOCAPRA AMERICANA) IN WEST TEXAS //Journal of Zoo and Wildlife Medicine. – 2024. – Т. 55. – №. 3. – С. 573-584.
4. Толегенов Н. С., Кереев А. К., Абдрахманов Р. Г. ГЕМАТОЛОГИЧЕСКИЕ И БИОХИМИЧЕСКИЕ ПОКАЗАТЕЛИ КРОВИ ПРИ ЦЕНУРОЗЕ //Вестник науки. – 2024. – Т. 4. – №. 10 (79). – С. 1202-1211.
5. Требухов А. В., Ракитин Г. А. Влияние пробиотика на биохимические показатели крови служебных собак //Вестник Алтайского государственного аграрного университета. – 2024. – №. 11 (241). – С. 47-52.
6. Тарасова Е. Ю., Матросова Л. Е. ИЗУЧЕНИЕ БИОХИМИЧЕСКИХ ПОКАЗАТЕЛЕЙ СЫВОРОТКИ КРОВИ КУР-НЕСУШЕК ПРИ СОЧЕТАННОМ МИКОТОКСИКОЗЕ НА ФОНЕ ПРИМЕНЕНИЯ МНОГОКОМПОНЕНТНОГО СРЕДСТВА «ГАЛЛУАСОРБ» 8 //Вестник КрасГАУ. – 2024. – №. 10. – С. 140-146.
7. Байкулов А. К., Убайдуллаева Г. Б., Хайитова Б. А. ЭНДОТЕЛИАЛЬНАЯ ДИСФУНКЦИЯ СОСУДОВ С ЭКСПЕРИМЕНТАЛЬНОЙ ГИПЕРЛИПОПРОТЕИНЕМИЕЙ //O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI. – 2023. – Т. 2. – №. 18. – С. 620-626.
8. Советов К. Т., Байкулов А. К. Динамика ИБС с коррекцией ЛДГ //Modern Scientific Research International Scientific Journal. – 2023. – Т. 1. – №. 9. – С. 47-55.
9. Байкулов А. К. и др. ТОКСИКОДИНАМИКА И ТОКСИКОКИНЕТИКА КОФЕИНА, СТРИХНИНА И РТУТИ //Yangi O'zbekiston taraqqiyotida tadqiqotlarni o'rni va rivojlanish omillari. – 2024. – Т. 12. – №. 1. – С. 92-100.
10. Байкулов А. К. и др. ВАЛИДАЦИЯ ПЕРЕГОНКИ ЛЕТУЧИХ ЯДОВ ВОДЯНЫМ ПАРОМ //Modern education and development. – 2024. – Т. 13. – №. 2. – С. 117-123.
11. Байкулов А. К. и др. ҚАНДЛИ ДИАБЕТА ҚАРШИ ДОРИ ВОСИТАЛАРИНИ ТОКСИКЛИГИ //Yangi O'zbekiston taraqqiyotida tadqiqotlarni o'rni va rivojlanish omillari. – 2024. – Т. 12. – №. 1. – С. 87-91.
12. Bayqulov A. K., Halimova S. A., Eshburieva N. R. Dynamics of the influence of lactate dehydrogenase during experimental myocardial infarction //World of Scientific news in Science. – 2024. – Т. 2. – №. 3. – С. 232-238.

13. Baykulov A. K. et al. EXPERIMENTAL GIPERLIPOPROTEINEMIYANI XITOSAN HOSULALARI BILAN KORREKSIYASI //Zamonaviy fan va ta'lim yangiliklari xalqaro ilmiy jurnal. – 2024. – T. 2. – №. 2. – С. 230-240.
14. Baykulov A. K., Halimova S. A., Murtazayeva N. K. Vascular endothelial dysfunctions with hyperlipoproteinemia //Golden brain. – 2023. – T. 1. – №. 7. – С. 4-11.
15. Karjavov A., Fayzullaev N., Baykulov A. Production of acetone by catalytic hydration of acetylene //E3S Web of Conferences. – EDP Sciences, 2023. – T. 389. – С. 01046.
16. Baykulov A. K., Hurramova S. G., Ubaydullayeva G. B. STUDYING OXIDATIVE STRESS OF LIPIDS DURING EXPERIMENTAL MYOCARDIAL INFARCTION IN RATS //Bulletin news in New Science Society International Scientific Journal. – 2024. – T. 1. – №. 5. – С. 181-191.
17. Байкулов А. К., Советов К. Т., Халиков К. М. РЕПАРАТИВНАЯ РЕГЕНЕРАЦИЯ КОЖИ ПРИ ЭКСПЕРИМЕНТАЛЬНОМ ТЕРМИЧЕСКОМ ОЖОГЕ С ИСПОЛЬЗОВАНИЕМ ХИТОЗАНА //АКТУАЛЬНЫЕ ПРОБЛЕМЫ БИМЕДИЦИНЫ-2020. – 2020. – С. 291-292.
18. Ашурбоев Ш. Д. и др. ДОРИ ВОСИТАЛАРИНИНГ ЯРОҚЛИЛИК МУДДАТИНИ АНИҚЛАШ //ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ. – 2024. – Т. 57. – №. 10. – С. 147-151.
19. Байкулов А. К., Убайдуллаева Г. Б., Хайитова Б. А. ЭНДОТЕЛИАЛЬНАЯ ДИСФУНКЦИЯ СОСУДОВ С ЭКСПЕРИМЕНТАЛЬНОЙ ГИПЕРЛИПОПРОТЕИНЕМИЕЙ //O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI. – 2023. – T. 2. – №. 18. – С. 620-626.
20. Ermanov R. T., Qarshiev S. M., Baykulov A. K. CHANGES IN THE NITRERGIC SYSTEM DURING EXPERIMENTAL HYPERCHOLESTEROLEMIA //World of Scientific news in Science. – 2024. – T. 2. – №. 4. – С. 326-339.
21. Kenjayevich B. A. Dynamics of the nitroergic system in experimental hypercholesterolemia //Int Res J Med Med Sci. – 2023. – T. 11. – №. 3. – С. 30-34.