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POLICY PAPER



## Veterinary Laboratory Diagnosis: An overview

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### Introduction

#### OVERVIEW

Veterinary laboratory Diagnosis deals with the various laboratory procedures such as clinical biochemistry, microscopic, microbiologic, immunologic and pathologic study that are applied in the identification of disease process in the living / dead animals. Laboratory reports are as important to the Veterinary clinician as that of history and physical examination of the patients. The evaluation of the patient's condition depends upon the knowledge on blending of results of laboratory examination with physical examination of the patient and history of condition. It is necessary to the veterinarian to carry out various laboratory tests that can be used in the problem oriented approach to diagnosis. It develops an understanding of relationship between physiology, pathology and laboratory results. The normal and abnormal laboratory finding provide information in the process of differential diagnosis, follow up of rational treatment. The abnormal finding are defined clinically as those values that lie outside the limits of reference range.

The various laboratory methods which are employed include

- Examination of blood (Haematology)
- Examination of exudates, transudates, pus and discharges (Cytology)
- Biochemical profiling of serum
- Examination of faeces, skin scraping and ectoparasites
- Urinalysis
- Culture, Isolation and identification of bacteria and fungi
- Antibiogram
- Serology
- Toxicological analysis of samples.

The course focus on the various laboratory procedures to evaluate the physiologic responses to disease and the effects of disease on measurable substances produced by the body. The collection, storage and handling of laboratory specimens and performance of analytic procedures commonly used in Veterinary medicine. It includes Methods for evaluation of Biochemical profiling of serum, Urine and Cerebrospinal fluid and Interpretation.

- To learn and practice appropriate laboratory procedures for Urinalysis of different domestic animals and its Interpretation.
- To learn and practice appropriate laboratory procedures for complete haemogram of different domestic animals and its Interpretation of values in diagnosis of diseases.
- To learn and practice various clinical parasitological laboratory techniques for diagnosis of Parasitic diseases.

### **Diagnostic Methods**

#### Diagnosis

- Diagnosis is an art of determination of the nature of disease i.e. etiology, lesions, symptoms etc. (Dia-through; gnosis-knowledge)

#### Classification

- Diagnosis can be classified into three types based on the method of examination.
- Clinical diagnosis: This is based on inspection of animal by observing the clinical symptoms.
- Physical diagnosis: This is based on the examination of animal by physical methods like palpation, percussion, auscultation etc.
- Laboratory diagnosis: This is based on the laboratory findings like examination of clinical samples like blood, faeces, urine etc.

### **TYPES OF CLINICAL LABORATORY**

- Basic clinical laboratory
- Complete clinical laboratory

#### Basic clinical laboratory

- This is an adjunct to any hospital for routine screening of specimens collected by the clinician. Examination of faecal samples, urine, skin scrapings, nasal washing and screening of wet films are done usually as a routine in all laboratories.

#### Complete clinical laboratory

- It is a full-fledged laboratory having the following sections.
- Clinical pathology section: Deals with examination of body fluids (blood, urine, cerebrospinal fluid, ascitic fluid etc) and also report on biopsy specimens.
- Clinical microbiology section: Deals with entire range of immunological, cultural and antibiotic sensitivity tests.
- Clinical parasitology section: Deals with identification of the parasites, parasitic eggs/oocysts of clinical importance (Both ecto and endoparasites).

- Clinical Biochemistry section: Deals with various biochemical tests like blood urea nitrogen (BUN), creatinine etc. Alterations in biochemical parameters in disease condition are called “Biochemical lesions” and they form the basis of diagnosis of many important ailments. (Examples – Van den Bergh test in jaundice, blood sugar in diabetes mellitus, Aspartate aminotransferase (AST) in myocardial infarction, BUN and creatinine in kidney disorders, Creatinine phosphokinase (CPK) in muscle damage, Alanine aminotransferase (ALT) in liver dysfunction).
- Immunohaematology or blood group studies is gaining importance in veterinary field.

### **CLINICAL BIOCHEMISTRY ANALYZERS**

- Auto Analyzers profoundly changed the character of the chemical testing laboratory by allowing significant increases in the numbers of samples that could be processed.
- The novel design based on separating a continuously flowing stream with air bubbles all but eliminated slow, clumsy, and error prone manual methods of analysis. This instrument single-handedly changed the concept of days per sample to a mindset that hundreds, or even thousands of tests are possible per day.

### **ERRORS AND POINTS TO BE REMEMBERED IN LABORATORY**

Points to be remembered with regard to clinical laboratory examination

- All specimens should be properly collected and labelled.
- A history sheet giving details of the case should always accompany every specimen.viz. owner’s name, address, details of animal (kind of animal, breed, color, age, sex) history, tentative diagnosis, name of the clinician referred and type of sample sent.
- Sample should be as fresh as possible and preserved in a correct manner.
- Repeat samples should be examined wherever possible. It is always better to base the interpretation of data built on 3 or 4 screenings (examination).
- Tests, which are simple and easily performed in a minimum time, should be selected. Complicated tests are resorted only when they are absolutely essential for establishing a diagnosis.
- Promptness in sending the results of tests is of paramount importance for early diagnosis and treatment.
- Specimens register should be properly and neatly maintained giving all the relevant particulars of the case.

### **Errors in clinical laboratory**

- Errors in sample collection
- Laboratory bench error
- Errors in reporting or clerical errors.
- All errors should be carefully avoided to enhance the reliability of the laboratory results. ‘Reliability’ is a comprehensive term to include accuracy, sensitivity and reproducibility.

- In order to enhance reliability, comprehensive quality control programme should be introduced. Periodical cross checking with a standard laboratory, test checking with a different staff and introduction of dummy samples in a batch are some of the useful methods that may help to maintain the quality of work.

### **Conclusion**

Diagnostic laboratories are an essential component of animal disease surveillance systems. To understand the occurrence of disease in populations, surveillance systems rely on random or targeted surveys using three approaches: clinical, serological and virological surveillance. Clinical surveillance is the basis for early detection of disease and is usually centered on the detection of syndromes and clinical findings requiring confirmation by diagnostic laboratories. Although most of the tests applied usually perform to an acceptable standard, several have not been properly validated in terms of their diagnostic sensitivity and specificity. Sensitivity and specificity estimates can vary according to local conditions and, ideally, should be determined by national laboratories where the tests are to be applied. The importance of sensitivity and specificity estimates in the design and interpretation of statistically based surveys and risk analysis is fundamental to establish appropriate disease control and prevention strategies.