



Lecture title: Clinical laboratory diagnosis

Lecturer Affiliation: Lecturer Eva A Ajaj/ Department of Internal and Preventive Medicine
College of Veterinary Medicine, University of Mosul, Mosul, Iraq

Summary:

It deals with the use of laboratory methods to diagnosis and treatment of diseases.

The Vet. Diagnostic Laboratory offers diagnostic services to veterinarians and owners of livestock, zoo animals, and companion animals in the form of postmortem examinations: clinical pathology, surgical biopsy interpretations, bacteriology, endocrinology, nutrition, parasitology, immunodiagnostics, toxicology, and virology.

Veterinary clinical diagnosis relies on knowledge of Anatomy, Physiology, Pathology and Animal behavior, skills in the methods and techniques of clinical examination, clinical sign and pathogenesis of the diseases which are the basic requirements for clinician in his/her good diagnostic approach.

Clinical laboratory diagnosis evaluates disease in animals using laboratory data collected during analysis of blood, urine, body fluids, and tissue aspirates.

Laboratory data sets collected in sick animals typically include hematology data, serum or plasma chemistry concentrations, urinalysis results, and cytology interpretations. In Clinical laboratory diagnosis the equipment used to collect



accurate laboratory data for a variety of species, including dogs, cats, horses, cows, pigs, poultry, camelids, rodents, non-human primates, reptiles, and fish.

Clinical laboratory diagnosis covers many labs This may include the following:

- 1- Hematology. (Immunology and serology)
- 2- Parasitology.
- 3- Microbiology
- 4- Clinical chemistry and biology
- 5- pharmacology.
- 6- Blood bank.
- 7- Histopathology and cytopathology
- 8- Molecular biology
- 9- Public health: providing tests such as water analysis and testing for environmental toxins.

What does a Clinical laboratory Technician do?

laboratory Technician look at blood, urine, and other body fluid samples under a microscope, or with other diagnostic tools. They watch levels of certain chemicals or other substances in the body. A diagnosis or decision to do further study is then made based on the test results.

Types of specimens used in Clinical laboratory diagnosis:

- 1-Blood
- 2-Urine



3-Nasal discharge

4-feces

5-Other body fluids (Spinal fluid, Pleural fluids (pleural cavity), ruminal fluid, Joint fluids).

6-Bone marrow.

7-Skin lesions.

Techniques used in Clinical laboratory diagnosis and guides in diseases diagnosis:

- ☐ Light microscope technique: also known as an optical microscope, is a scientific instrument that uses visible light and a series of lenses to magnify and observe small objects or organisms that are otherwise invisible to the naked eye. It is one of the most commonly used tools in biology and other scientific fields
- ☐ Electron microscope technique: used for obtaining high resolution images of biological and non-biological specimens. It is used in biomedical research to investigate the detailed structure of tissues, cells, organelles and macromolecular complexes.
- ☐ Histochemistry Techniques: methods provide powerful tools for analyzing the location and distribution of molecules in cells and tissues.
- ☐ Immunohistochemistry Techniques: depend on Ag –Ab reaction to detect autoimmune diseases, enzymes or fluorescent dye used for this reaction and



diagnosed by florescent microscope.

- Biochemical Technique: refer to a set of methods, assays, and procedures that enable scientists to analyze the substances (enzymes, hormones, metabolites, ions in body fluids) found in living organisms and the chemical reactions underlying life processes. Various technique such as centrifugation, electrophoresis, chromatography, spectroscopy etc.
- Cell culture: is the process wherein cells in vivo are grown outside the body in controlled conditions, used for studying basic cell biology, interactions of drugs and other chemicals with cells, production of vaccines and proteins, etc.
- Microbial culture: used for isolation the pathogens (bacteria, fungi) from different animals' samples (urine, feces, blood, etc.). Also, sensitivity testing is carried out to determine whether the pathogen is sensitive or resistant to a suggested medicine.
- Molecular Technique: used for study the DNA and RNA of body cells and microbes which depend on proliferation copies of genetic material by polymerase chain reaction technique (PCR)for detection many diseases.

Some considerations should be flow before collection Samples:

1-Samples collected must be reflected the condition being investigated and the lesions that noticed, and should collected enough quantity of material must be provided to permit a complete examination.



2-If samples are taken from live animals, care should be taken to avoid injury or make little pain or even distress to the animal or danger to the practical Vet. and assistants, therefore it might be necessary to use mechanical restraint, tranquilizations or even general anesthesia.

3-For bacteriological isolation, sample should be collected before the administration of any form of treatment specially antibiotics.

4- should kept in mind the risk of zoonotic disease therefore precautions should strongly take to avoid human infection.

5-Care should be taken to avoid environmental contamination, or risk of spread of disease through insects or fomites.

6-Animals in advance stages of the disease must always be selected for sampling.

7-When there are a herd problem, different samples and specimens should be selected and obtained from different diseased animals at different disease stages and also from one or two animals that have died recently.

8-Identification of samples should be added and submitted with each sample including:

- 1- Owner name and address
- 2- Animal Description: species, age and sex.
- 3-Duration of the condition or outbreak.
- 4- Morbidity and mortality rates.

University of Mosul
Lecture No.: 1
College of Veterinary Medicine
Date: September 2024
Unit of Scientific Affairs
Website:



<https://orcid.org/0000-0002-6478-6728>
<https://www.researchgate.net/profile/Eva-Ajai>

-
- 5-Type of feeding: Indoor, out door, any change of feed that has occurred.
 - 6- Symptoms observed.
 - 7- Necropsy findings.
 - 8- History of previous treatment or vaccination.
 - 9-Primary or tentative clinical diagnosis.
 - 10- The Vet. name, address and phone
 - 11- The nature of submitted sample/s.
 - 12-Type of preservative material used on specimen.