Classification of Diseases

Disease

Any condition that causes the systems of a plant or animal to not function properly.

How diseases occur

- Sporadic: isolated incident in a single animal
- Enzootic: disease occurs repeatedly in a particular locality (within 30-mile radius)
- Epizootic: disease that effects a large number of animals in a short period of time in a particular area (larger area than enzootic) Example = entire state
- Panzootic: disease that spreads rapidly over a very large area and effects many animals in a short period of time (foot & mouth disease)

Noninfectious Diseases

- Injuries
- Poisons/chemicals
- Poor nutrition
- Birth defects
- Other things not caused by an organism living within the animal

Infectious diseases

- Caused by other living microorganisms (called pathogens) that invade the animal's body
- Usually contagious diseases that the animal can pass to another animal

3 Types of infectious pathogens

- Bacteria
- Viruses
- Protozoa

Bacteria

- Live in a wide range of conditions
- Live on and in the bodies of all animals
- Many can be harmful
- Invade the cells of an animal’s body

Parasitic bacteria

- May harm the animal by feeding off the body cells or secreting a material known as a toxin

Toxin

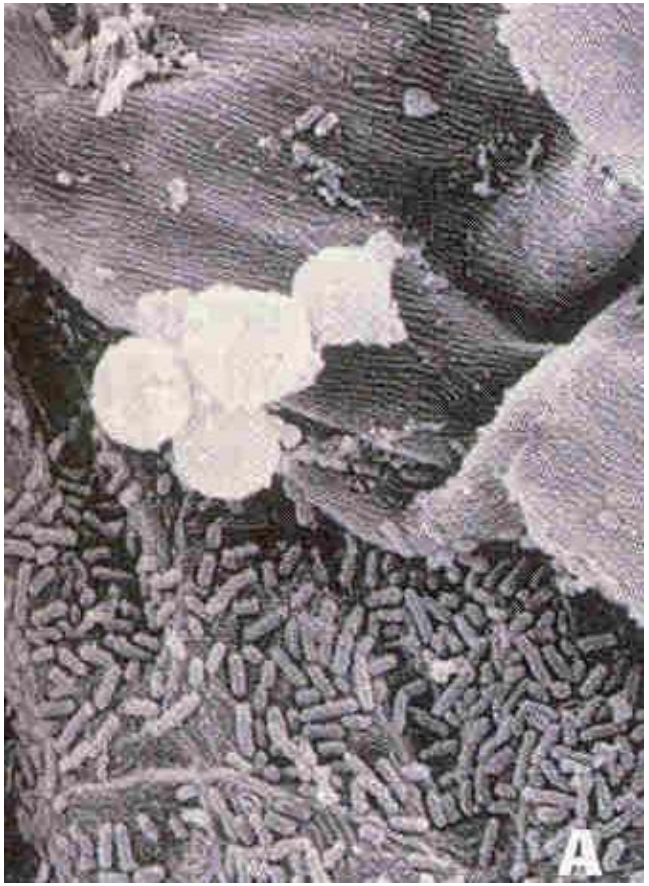
- A poison that destroys the cells

Harmful bacteria

- When large numbers invade, the animal becomes ill
- Type and form of the illness depends on the type of bacteria that invades the animal

Cocci

- Round spherical shaped bacteria



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Cocci

- Staphylococci: cocci bunched together like grapes
  - Cause diseases like mastitis in cattle
- Steptococci: cocci are strung together like a chain
  - Causes disease like distemper and meningitis

Bacilli

- Rod shaped
- Single, pairs, or arranged in chains
- Move by small whip-like projections called flagella

Bacilli

- Cause some of the most dreaded livestock diseases:
  - Anthrax
  - Blackleg
  - Tuberculosis

Spiral Bacteria

- Shaped like spirals or corkscrews
- Very motile
- Require moist atmosphere to live

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Spirilla

- Live very well in the reproductive tracts of animals
- Leptospirosis
- Vibrosis and spirochetosis

Viruses

- Have characteristics of both living and nonliving material
- Are on the borderline between living and non living

Viruses

- Made up of some of the material found in cells but are not cells because they do not have a nucleus or other cell parts.

Viruses

- Do not grow and cannot reproduce outside a living cell
- Once inside a living cell, virus reproduces using energy and materials in the invaded cell

Viruses

- Harm cells by causing them to burst during reproduction
- And by using material that the cell needs to function properly

Virus

- Viral diseases cause the animal to be sick by preventing certain cells in the body from functioning properly

Virus

- More difficult to treat than bacterial diseases
- Antibiotics are not effective against viral infections

Viral diseases

- Foot and mouth disease
- Influenza
- Hog cholera
- Pseudorabies

Viral diseases

- Best means of dealing with them is prevention

Protozoa

- Microorganism that cause disease
- Single-celled organisms that are often parasitic
- Trichomoniasis
- Coccidiosis

Antibiotics

- Useful in controlling bacteria – not viruses
- Are drugs that originate from living sources
- Usually those living sources are molds and fungi

Penicillin

- First founded in 1928
- Many forms are now produced
- Very effective against bacterial infection

The immune system

- Several lines of defense in fighting disease
- Physical barriers that keep pathogens out

The immune system

- Mucous membranes secrete viscous water substance that trap and destroy bacteria and viruses

The immune system

- Nostrils are lined with hairs that attract particles that harbor germs before they can enter the body

The immune system

- Digestive and respiratory systems – greatest avenue for entry
- Some disease germs can live in the soil for many years –Anthrax 20 years

2nd line of defense

- Blood cells
- White and Red
- Red – carry oxygen and other nutrients to other body cells- fuel truck

White Blood Cells

- Are produced in the bone marrow
- Circulate throughout the body to get rid of dead and worn-out cells—trash truck

Phagocytes

- White blood cells that intercept and destroy pathogens- soldiers
- Also migrate to certain organs and remain there to intercept pathogens

Phagocytes

- Release chemicals that can induce the production of more white blood cells to help fight disease

Phagocytes

- An elevated WBC count indicates that there are disease organisms present in the animal's body and a large number of phagocytes have been produced to combat them

Lymphocytes

- Lymph glands that produce certain WBCs
- These cells react to foreign substances by releasing chemicals that kill the pathogen or inactivate the foreign substance

Antigens

- Substances that cause the release of chemicals
- May be viruses, bacteria, toxins, or other substances

Antibodies

- The chemicals released by the lymphocytes

2nd Immune Response

- Lymphocytes become memory cell and are ready to release the antibody if the antigen enters the body at a later time

2nd Immune Response

- Response occurs much more quickly
- Lasts longer than primary response

Immunity

- Means that an animal is protected from catching a certain disease
- Animal's body is capable of producing enough antibodies fast enough to neutralize the disease

Immunity

- Animals are born with some immunity
- Colostrum is rich in antibodies
- Serve the new animal until its own immune system can take over

Immunity

- Active or passive
- Active–animal is more or less permanently immune
- Passive–animal is only temporarily immune

Immunity

- As the animal is exposed to more antigens, antibodies build up within the animal.
- Naturally acquired active immunity results from the animal actually contracting the disease and recovering

Artificial Active

- Induced by injecting antigens into the animal
- Causes phagocytes to react without making the animal seriously ill

Edward Jenner

- Late 1700s
- Began vaccination process
- Smallpox and cowpox
- Collected material from sores of people with cowpox

Edward Jenner

- Injected healthy people with material
- Became mildly ill with cowpox
- Then were immune

Louis Pasteur

- Developed several vaccines following Jenner's lead

Vaccines

- Live
- Killed or weakened strain
- Both stimulate production of antibodies
- Killed–less dangerous than live vaccine