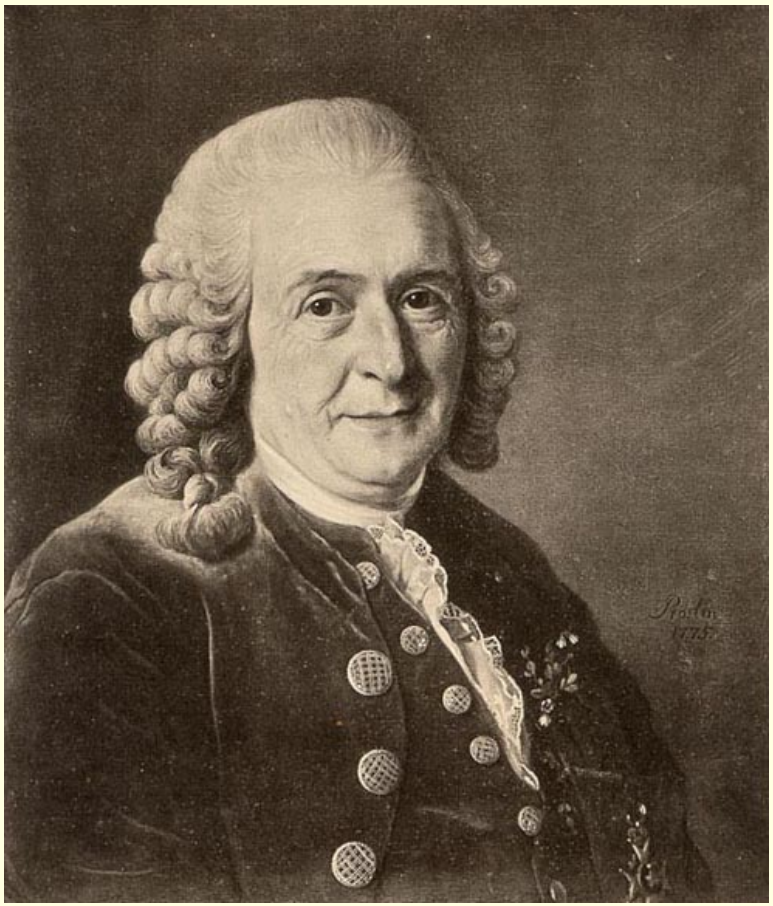
Microbiology History

Chapter One

Microorganisms

- Beneficial
  - Environment
    - Decomposition
    - Digestion
    - Photosynthesis
  - Industry
    - Food processes
    - Genetic Engineering
- Pathogenic
  - Food
  - Health

Classification of Organisms



Carolus Linnaeus

- 3 Domains
- 5 Kingdoms
  - Prokaryotic
    - Monera (bacteria)
  - Eukaryotic
    - Protista
    - Fungi
    - Plantae
    - Animaliae
- Binomial nomenclature
  - *Genus*
  - *species*

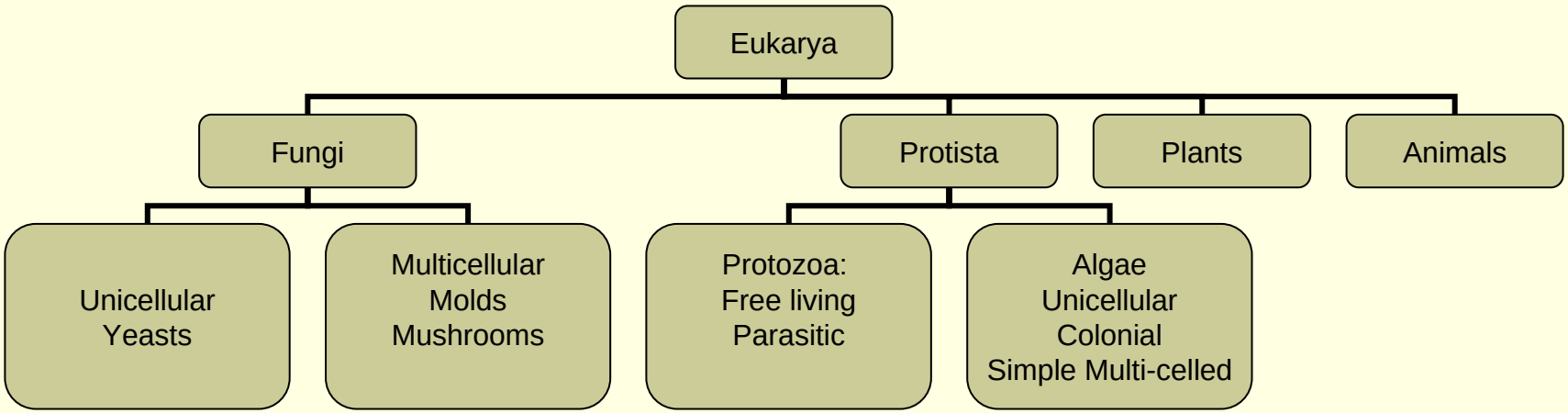
Domain Archaea

- No known human pathogens
- Cell walls lack peptidoglycan
- Extreme Environmental Habitats
  - Methanogens
  - Halophiles
  - Thermophiles

Domain Bacteria

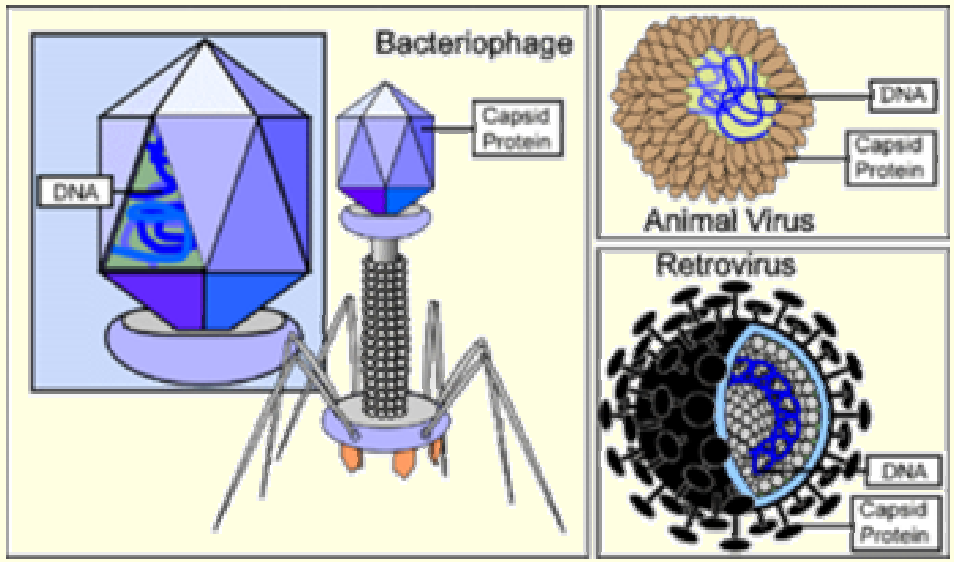
- Unicellular
- Various Shapes
- Cell walls have peptidoglycan
- Binary fission
- Beneficial vs. pathogenic

Domain Eukarya



Viruses

- Acellular
- Nucleic Acid
  - DNA
  - RNA
- Envelope
  - Classification
  - Function
- Inert outside host

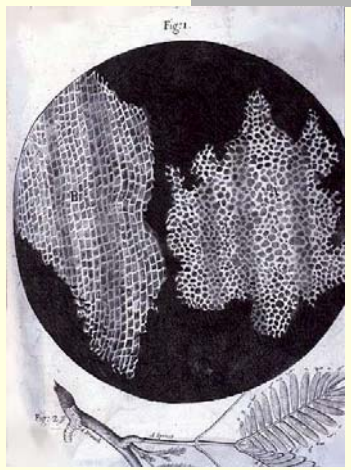


Golden Age of Microbiology

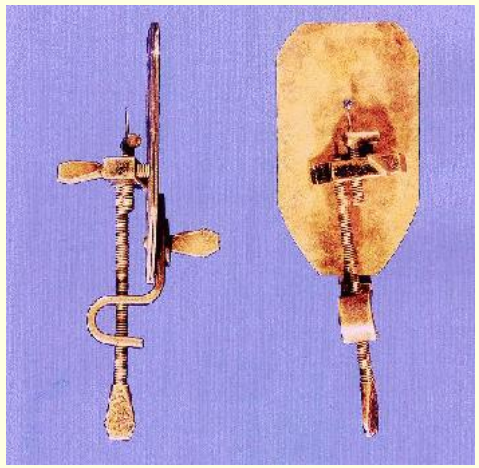
- Late 1800's-early 1900's
- Questions and Theories Developed
  - Microbial Source
  - Microbial Processes
  - Disease source
  - Disease prevention
- Areas of Study
  - Bacteriology
  - Immunology
  - Virology
  - Epidemiology
  - Chemotherapy

Early Developments

- Robert Hooke
  - Cell Theory
  - Early microscope

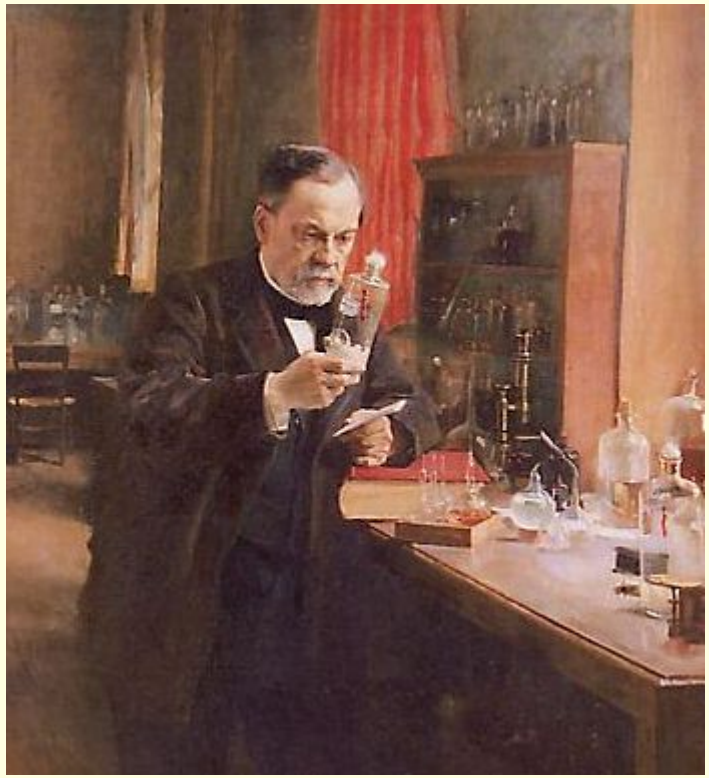


- Antoni Leeuwenhoek
  - Improved microscope
  - Microbes viewed



Louis Pasteur

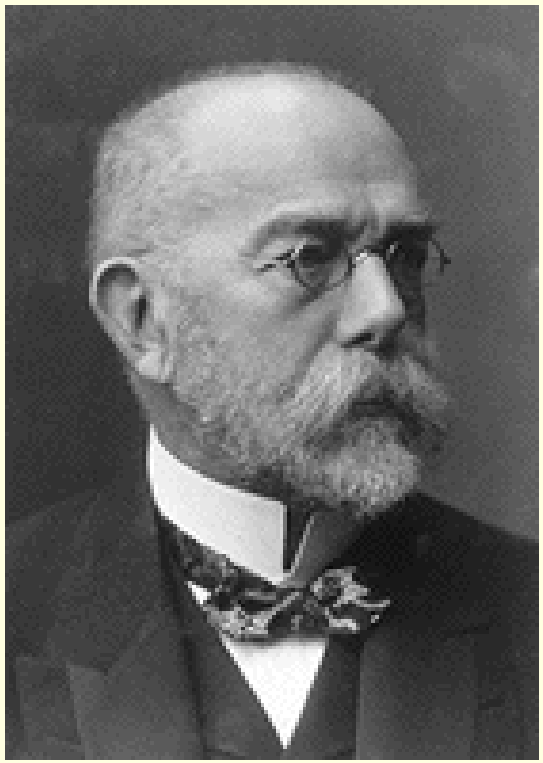
- Germ Theory of Disease
  - Similar disease symptoms
  - Germ = pathogen
- Fermentation
- Pasteurization
- Father of Microbiology



Joseph Lister

- Aseptic Technique
  - Surgical Site prep with phenol
  - Continued Handwashing, as previously demonstrated by Semmelweis

Robert Koch



- Simple Stain technique
- Solid growth Media
- Aseptic lab techniques
- Isolated Bacteria as causative agents for
  - Anthrax
  - TB
  - Cholera
- Koch's Postulates
  - Series of experimental steps to show that specific organism causes a specific disease

Original Koch's Postulates

That the organism could be discoverable in every instance of the disease;

That, extracted from the body, the germ could be produced in a pure culture, maintainable over several microbial generations.

That the disease could be reproduced in experimental animals through a pure culture removed by numerous generations from the organisms initially isolated;

That the organism could he retrieved from the inoculated animal and cultured anew.

Edward Jenner

- Vaccination
  - Cowpox scrapings
  - Smallpox
- Immunology field

John Snow

- Cholera Prevention
- Father of Epidemiology
- First to use anesthesia (ether) during surgery

Florence Nightingale

- Nursing care
- Hygeine
- Improved nurse training

Christian Gram

- Differential Staining of cell walls using various dyes
  - Gram positive
    - “purple”
  - Gram negative
    - “red”

Paul Ehrlich

- Chemotherapeutic Agents
  - Magic Bullet Treatment
    - Syphilis
    - Trypanosome
- Early Acid Fast staining techniques for TB
- Immunological Studies on antisera
- Tumor transformation research

Alexander Flemming

- Antibiotic penicillin
- Lysosome secretion by tissues
- Developed titration methods for analyzing body fluids

Microbes in Human Diseases

- Normal Flora
  - In or on body
  - Beneficial
  - Normal host defenses protect
- Infectious Diseases
  - Location
  - Virulence factors
  - Microbe life cycle causes pathology
  - Host defenses

Questions?