

• Koch's Postulates:

- Microorganism must be present in every case of the disease but absent from individuals.
- The suspected microorganism must be isolated and grown in pure cultures.
- The disease must result when the isolated microorganism is inoculated into a healthy host.
- The same microorganism must be isolated from the disease host.

• Isolation of Microorganisms:

- During Koch's studies, it became necessary to isolate suspected bacterial pathogens.
- He cultured bacteria on the sterile surfaces of cut, boiled potatoes → Not satisfactory.
- Regular liquid medium solidified by adding gelatin → gelatin melted @ $T > 28^{\circ}\text{C}$.
- Fannie Eilshemius suggested use of agar; 100°C to melt, 50°C to solidify.
- Richard Petri developed petri dish, a container for solid culture media.

• Louis Pasteur (1822 – 1895):

- Developed **vaccines** for Chickenpox, anthrax, rabies
- Demonstrated that all fermentations were due to the activities of specific yeasts and bacteria.

- Developed **Pasteurization** to preserve wine during storage. Important: Foods

- Discovered that **fermentative microorganisms** were **anaerobic** and could grow in absence of oxygen.

• Other Developments...

- **Winogradsky** made many contributions to soil microbiology; discovered bacteria could oxidize Fe, S and ammonia to obtain energy.
- Isolated Anaerobic nitrogen-fixing bacteria; studied the decomposition of
- Together with **Beijerinck**, developed the **enrichment-culture** technique and the use of **selective media**.
- Early 40's, **Microbiology** established closer relationship with **Genetics** and **Biochemistry**; microorganisms are extremely useful experimental subjects.
- e.g. Study of relationship between genes and enzymes; evidence that DNA is the genetic material;
- Recently, **Microbiology** been a major contributor to the rise of **Molecular Biology**.
- Studies on Genetic code; mechanisms of DNA, RNA, and Protein synthesis; regulation of gene expression; control of enzyme activity.
- Development of **Recombinant DNA Technology** and **Genetic Engineering**.

• Composition of the Microbial World:

- **Prokaryotes:** relative simple morphology and lack true membrane delimitation

