Introduction To Bacteriophage Genomics

8:45 AM - 10:15 AM: Session 1: Basics of Bacteriophage Biology

Overview of bacteriophages and their role in microbiology.
Introduction to bacteriophage life cycles and types.

10:15 AM - 10:30 AM: Coffee / Tea / Snacks Break

Networking and refreshments.

10:30 AM - 12:00 PM: Session 2: Isolation and Characterization of Bacteriophages

Hands-on training on isolating bacteriophages from various sources (Practical: We perform on either Sewage or Soil, Candidates can procure sources from list mentioned below).

Various Sources of Bacteriophages

1. **Sewage and Waste water:** Sewage plants and wastewater systems are rich in bacteria and are a common source of bacteriophages.
2. **Soil:** Soil, especially agricultural or rhizospheric soil, contains a high concentration of bacteria and bacteriophages.
3. **Aquatic Environments:** Oceans, rivers, lakes, and ponds contain abundant bacteriophages, particularly in areas rich in microbial activity.
4. **Marine Sediments:** Sediments in ocean floors or coastal areas are known to harbor a high concentration of bacteriophages.
5. **Animal Gut Microbiome:** The gastrointestinal tracts of animals (including humans) are rich in bacteriophages, particularly in the intestines.
6. **Fermented Foods:** Fermented products such as yogurt, kimchi, and sauerkraut can contain bacteriophages due to the presence of bacteria involved in fermentation.

7. **Human and Animal Wounds:** Wounds or abscesses can be sources of bacteriophages as bacteria proliferate in these areas, attracting their viral predators.
8. **Manure and Compost:** These decomposing organic materials, often full of bacterial communities, are rich in bacteriophages.
9. **Hot Springs:** Thermophilic environments such as hot springs also contain bacteriophages that infect heat-loving bacteria.
10. **Plant Surfaces (Phyllosphere):** Leaves, stems, and roots of plants can harbor bacteriophages due to the presence of surface bacteria.
11. **Freshwater Biofilms:** Biofilms formed in freshwater systems (on rocks, plants, or pipes) are good sources of bacteriophages.
12. **Raw Milk:** Unpasteurized or raw milk from cows, goats, and sheep can contain bacteriophages associated with lactic acid bacteria.
13. **Hospital Environments:** Surfaces in hospital settings, including medical equipment and patient rooms, may harbor bacteriophages due to the presence of antibiotic-resistant bacteria.

Practical session on characterizing bacteriophages using microscopy (Practical) and plaque assays (Practical).

12:00 PM - 1:00 PM: Lunch Break

Catered lunch and networking opportunity.

1:00 PM - 2:30 PM: Session 3: Bacteriophage Genomics Techniques

Overview of genomic techniques for studying bacteriophages.
Practical exercises on DNA extraction (Practical), PCR (Practical), and sequencing (Theory) of bacteriophage genomes.

2:30 PM - 2:45 PM: Short Break

Time for a stretch and informal discussions.

2:45 PM - 4:15 PM: Session 4: Case Studies in Bacteriophage Genomics

Discussion on real-world case studies involving bacteriophage genomics.

Analysis of bacteriophage applications in medicine, agriculture, and biotechnology.

4:15 PM - 4:30 PM: Coffee / Tea / Snacks Break

Last networking opportunity with snacks.

4:30 PM - 5:30 PM: Closing Session: Implementing Changes and Technology Adoption

Group discussions on implementing new techniques learned today.
Dialogue on overcoming challenges in adopting new technologies in similar sectors.
Feedback session and closing remarks.
Certificate Issue

5:30 PM: Workshop Concludes