Re-Inventing the Wheel
Phage Therapy in the West

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Mountain Men of Georgia

- Treated by phage therapy for Staph infections
- Important lesson learned:
  - Relics of the Soviet army: Deadly or Lifesaving
  - Don’t bring strange odd warm objects found in the woods into the tent

Bacteriophages and Their Useful Properties

- Specific to certain bacterial spp
- No harm to plants/animals
- Lytic viruses will successfully kill target microbes

Phage History

- 1896-Hankin
  - Ganges water as a cure for Cholera
- 1915-Twort
  - Ultramicroscopic agent that kills bacteria
- 1916-d’Herelle
  - Coined the name “Bacteriophages” to these things that was found in non-bacteria containing stool samples from dysentery patients
  - 1919-Made a phage preparation that stopped dysentery

d’Herelle and Ethics

- Before administering phages to patients,
  - He gave himself various cultures of bacteriophage
  - His family
  - His coworkers
  - No side effects!

More dates, yeay!

- 1923-Eliava
  - Started an institute under Joseph Stalin
  - This was the major producer of phages during WWII
  - d’Herelle came to work there
  - Problem: he believed one bacteriophage for every bacteria
  - Eliava was executed by KGB
Over There
- Work at Eliava Institute continued
  - 1940's-gangrene phages
  - Soviet military was a huge consumer of the medications
    - Cheaper than antibiotics
    - Carried with them 5 phages for:
      - Staph. aureus
      - E. coli
      - Pseudomonas
      - Strep.
      - Proteus vulgaris

The West
- 1930's-many scientists making phage concoctions
  - Not all were designed to attack the correct bacterial infection
  - The concoctions were not purified and were contaminated with many things including bacterial toxins
  - As a result, phage therapy wasn’t working well for other scientists and penicillin and antibiotics were the rage!

What Phages have been used to treat
- Dysentery
- Cholera
- Bubonic plague
- TB
- Anthrax
- Salmonella Poisoning
- Gangrene
- Open wounds
- Diabetic lesions
- Burn victims
- Ulcers

Antibiotic Resistance and Desperation
- Host immune response?
- Viral genome incorporation with deleterious effects?
- Could the bacteria become resistant to phages?
- The FDA!!
  - Only lytic viruses
  - Don’t care to analyze the work of the Soviets

Other applications
- Agriculture
- Aquaculture
  - Vibrio vulnificus
  - Cultured fish
- Food processing
  - Food spoilage
  - Salmonella
- How do you think all those that were for genetic labeling would handle this one?
What now?

- Research, Research, Research!!
- Methods of phage delivery
- Longevity of virus
- Immune system avoidance
- Find phage for specific bacteria
- Work using lytic agents of virus

References


