

Virus-like Particles from Antarctic Dry Valley Soil

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In this preliminary study, we have investigated and characterized viruses from dry valley soil. We have isolated virus-like particles from soils collected in the Garwood Valley, Ross Dependency, Antarctica.

Introduction

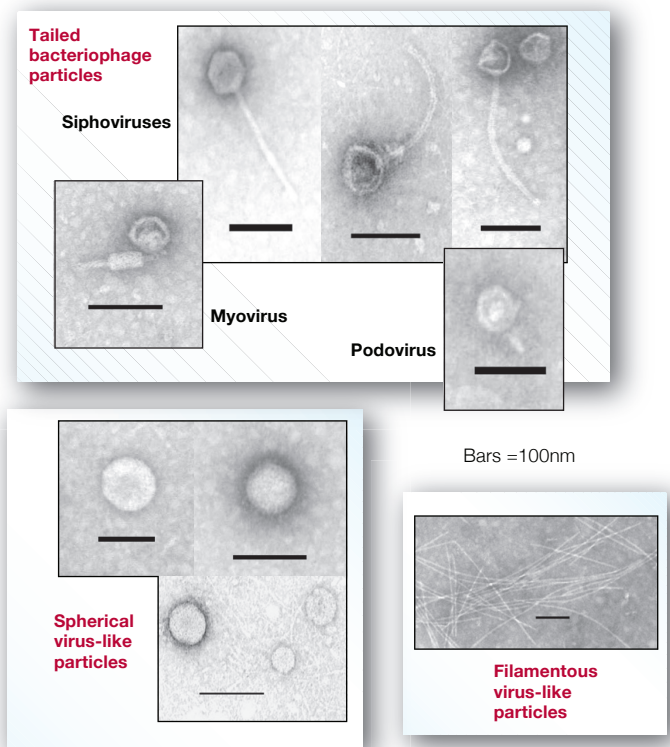
Understanding of the microbial communities in soils of the Antarctic polar desert in the dry valleys is not very advanced. It is known that there are active bacteria and fungi in the soils, and that these organisms contribute to biogeochemical processes such as nutrient cycling. However, there is virtually no information about the factors that regulate microbial populations and the interactions between organisms.

Particles from Antarctic soil

Sieved soil (<2mm) was homogenized with phosphate buffer, given a low-speed centrifugation and the supernatant was filtered through a 0.45µm filter. Virus-like particles in the filtrate were concentrated by ultracentrifugation and examined using a transmission electron microscope.

Results

The soils contained a wide range of virus morphotypes including tailed, spherical, and filamentous particles



Particles from Antarctic soil bacteria

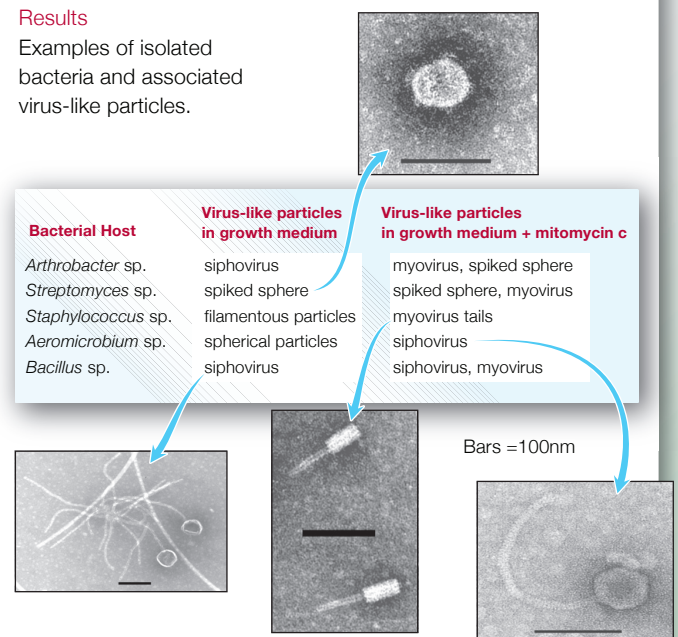
Bacteria were cultured from Antarctic soils, sub-cultured three times and then grown up in liquid medium. After a week's growth at room temperature, the bacterial cells were spun down and the supernatant was filtered through a 0.45µm filter. Virus particles were concentrated by ultracentrifugation.

The bacteria in the supernatant were then resuspended in fresh medium and grown for 24h in the presence of mitomycin C, to induce prophages from lysogenic bacteria. Virus particles were isolated from the medium as before.

The bacterial hosts were partially identified by 16S rRNA sequencing.

Results

Examples of isolated bacteria and associated virus-like particles.



Conclusions

- Virus-like particles with various morphologies could be isolated from Antarctic Dry Valley soils.
- Culturable bacteria from different genera were isolated and virus-like particles were found in several isolates both before and after the addition of mitomycin c to induce prophages.