Tranductomics: Tracking horizontal gene transfer in real time

Manuel Kleiner
Brian Bushnell
Kenneth E. Sanderson
Lora V. Hooper
Breck A. Duerkop

Video Byte

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Abstract

The transfer of genetic material between microbes, or horizontal gene transfer, plays a critical role in microbial evolution. It's the process that enables bacteria to quickly acquire resistance to antibiotics. Unfortunately, current tracking methods can only infer what genes were swapped well after a transfer event has occurred. To address this gap, researchers have developed a real-time approach called "transductomics." The technique sequences both the complete microbial community in a sample as well as virus-like particles (VLPs) that serve as the vehicles for horizontal gene transfer. Comparing the sequencing reads between the two reveals patterns that can be linked to DNA transfer. The team tested their approach on a fecal sample obtained from a single mouse. Results showed indications of specialized transduction by different prophages as well as patterns of potential generalized transduction or gene transfer agents. Interestingly, nearly a quarter of the transduction patterns were unknown. Further studies could help identify the forms of transduction associated with these patterns and identify the viruses that carry specific genes taken from bacteria.