

Abstract Submitted
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Viral video: Live imaging of virus-host encounters KWANGMIN SON, MIT, JEFFREY S. GUASTO, Tufts university, ANDRES CUBILLOS-RUIZ, SALLIE W. CHISHOLM, MIT, MATTHEW B. SULLIVAN, University of Arizona, ROMAN STOCKER, MIT — Viruses are non-motile infectious agents that rely on Brownian motion to encounter and subsequently adsorb to their hosts. Paradoxically, the viral adsorption rate is often reported to be larger than the theoretical limit imposed by the virus-host encounter rate, highlighting a major gap in the experimental quantification of virus-host interactions. Here we present the first direct quantification of the viral adsorption rate, obtained using live imaging of individual host cells and viruses for thousands of encounter events. The host-virus pair consisted of *Prochlorococcus* MED4, a 800 nm small non-motile bacterium that dominates photosynthesis in the oceans, and its virus PHM-2, a myovirus that has a 80 nm icosahedral capsid and a 200 nm long rigid tail. We simultaneously imaged hosts and viruses moving by Brownian motion using two-channel epifluorescent microscopy in a microfluidic device. This detailed quantification of viral transport yielded a 20-fold smaller adsorption efficiency than previously reported, indicating the need for a major revision in infection models for marine and likely other ecosystems.

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