

# Observed Kinetics of Enterovirus Inactivation by Disinfectants Differ among the Host Cells Used for Enumeration

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## Introduction

The virus inactivation efficacy of disinfectants is typically assessed by infectivity assay utilizing a single type of host cell. Enteroviruses infect multiple host cells via different entry routes, and each entry route may be impaired differently by a given disinfectant. However, it is poorly known how the choice of host cells affects the observed inactivation kinetics. Here, we evaluated the inactivation kinetics of echovirus 11 (E11) by free chlorine, ultraviolet (UV) irradiation, and heat, using three different host cells (BGMK, RD, and A549).

## Results and discussion

E11 inactivation by free chlorine occurred two-fold faster when enumerated on BGMK cells compared with RD and A549 cells. Conversely, a comparable inactivation rate was observed for UV and heat inactivation, independent of the host cell used for enumeration. Host cell-dependent inactivation kinetics by free chlorine were also observed for echovirus 7, 9, and 13, and coxsackievirus A9, confirming that this phenomenon is not serotype-specific. E11 inactivation by free chlorine was partly caused by a loss in host cell attachment, which was most pronounced for BGMK cells. BGMK cells lack an attachment receptor, CD55, and a key subunit of the uncoating receptor,  $\beta$ 2M, which may contribute to the differential inactivation kinetic for this cell type.

## Conclusions

Inactivation kinetics of enteroviruses should be assessed using host cells with different receptor profiles. This will yield a more complete understanding of the virucidal efficacy of disinfectants targeting the viral attachment and/or uncoating.

**Keywords:** Virus; Disinfection; Host cells