Exogenous vimentin supplementation transiently affects early steps during HPV16 pseudovirus infection

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Understanding and modulating early steps in oncogenic Human Papillomavirus (HPV) infection has great cancer-preventative potential. We have previously identified cell-surface expressed vimentin as a novel HPV16 pseudovirus (HPV16-PsVs)-binding molecule modulating its infectious potential [1]. To further explore its mode of inhibiting HPV16-PsVs internalisation, artificial supplementation with exogenous recombinant human vimentin (rhVim) revealed that only the globular form of the molecule (as opposed to the filamentous form) inhibited HPV16-PsVs internalisation *in vitro*. Further, this inhibitory effect was transient and not sustained over prolonged incubation times as demonstrated *in vitro* and *in vivo*, possibly due to full entry molecule engagement by the virions once saturation levels have been reached. The rhVim -mediated delay of HPV16-PsVs internalisation involved multiple steps during the virus' interaction with the host cell and was found to affect both heparan sulfate proteoglycan (HSPG) binding as well as subsequent entry receptor complex engagement. Interestingly, decreased pseudovirus internalisation (but not infection) in the presence of rhVim was also observed for the oncogenic HPV types 18, 31 and 45.
Together, these data demonstrate the potential of rhVim as a modulator of HPV infection but need further refinement with regard to stabilisation and formulation before development as an alternative prophylactic means.

[1] G. Schäfer et al., Journal of Virology 91, 16 (2017)