

1159. BanLec, a banana lectin, is a potent inhibitor of Middle East respiratory syndrome coronavirus in *in vitro* assays

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Background. Middle East respiratory syndrome coronavirus (MERS-CoV) continues to cause human infections with multiple clusters two years after the onset of the epidemic. Though mild cases have been recognized, the infection is severe in those with comorbidities and >30% of patients die from the infection. Our recent structure-based development of a fusion inhibitor is one of the few treatment options for MERS and it led us to hypothesize that other existing antivirals that block cellular entry may also be active against MERS-CoV. BanLec is a jacalin-related banana lectin that has potent anti-HIV activity through binding to glycosylated viral envelope proteins and blocking cellular entry. We assessed the anti-MERS-CoV activity of BanLec in cell culture assays.

Inhibitory effect of BanLec on MERS-CoV replication

Cell line ^a	EC ₅₀	EC ₉₀	EC ₉₉	CC ₅₀ ^b	SI ^c
Vero	3.99±0.22	7.95±0.21	8.84±0.20	>10	>2.51
Calu-3	4.82±0.48	8.95±0.40	9.88 ± 0.39	>10	>2.07
HK2	4.58±0.005	8.74 ± 0.17	9.67 ± 0.21	NA	NA

^aEC₅₀ was determined by CPE inhibition assay in Vero and Calu-3 cells, and by PRA in the HK2 cells

^bNA, not available

^cSelectivity index = CC₅₀/EC₅₀

Methods. The anti-MERS-CoV activity of BanLec was assessed by cytopathic effect (CPE) inhibition, viral yield reduction, and plaque reduction (PRA) assays in Vero, Calu-3, and/or HK2 cells. The cytotoxicity of BanLec was also assessed.

Results. The CC₅₀ of BanLec was >10 nM in Vero and Calu-3 cells. CPE was completely absent in Vero and HK2 cells infected with MERS-CoV on 3 dpi with 30.00 nM of BanLec. In Calu-3 cells, CPE was completely absent at 90.00 nM of the drug. The EC₅₀ of BanLec ranged from 3.99–4.82 nM (table). The mean viral loads reduced by 7.13, 3.40, and 3.63 log₁₀ copies/ml in Vero, Calu-3, and HK2 cells respectively (Figures 1A, 1B and 1C). The highest percentage of plaque reduction at a concentration of >10 nM of BanLec were 100% and 59.5% in Vero cells and HK2 cells respectively (Figures 2A and 2B).

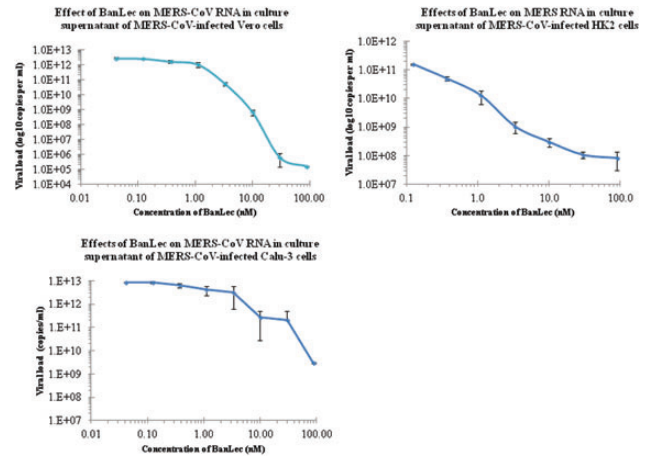


Fig. 2A Inhibitory effect of BanLec on MERS-CoV in MERS-CoV-infected Vero cells by plaque reduction assay

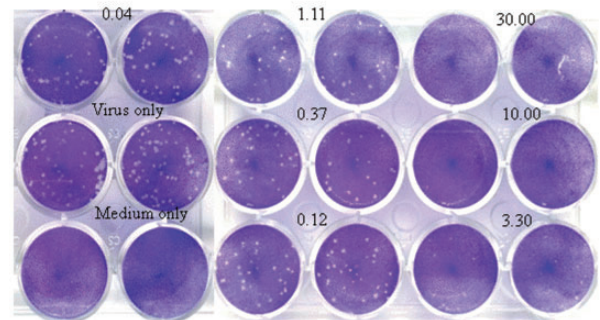
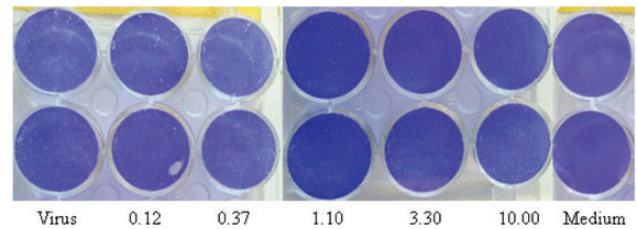


Fig. 2B Inhibitory effect of BanLec on MERS-CoV in MERS-CoV-infected HK2 cells by plaque reduction assay



Conclusion. BanLec exhibits potent *in vitro* anti-MERS-CoV activity. The detailed mechanism and *in vivo* correlation of its antiviral activity should be further tested in animal models. The potential advantages of using BanLec for MERS include its high stability and the prospect of using it as a topical treatment or prophylaxis for exposed patients.

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