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The role of Vascular Endothelium in resilience to HCoV-229E and HRV-16 infections

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Introduction

Clinical observations during COVID-19 pandemic suggest that there may exist at least several possible manners of individual responses to coronaviruses. We proved that the human lung microvascular endothelium (HMVEC-L) expresses surface entry receptors for HCoVs and possesses a wide range of effective innate mechanisms to limit viral replication.

Aim

To compare two different models of response of endothelium to HCoV-229E infection.

Material and methods

HMVEC-L from 2 healthy patients (Patient 1 and Patient 2) were incubated with HCoV-229E and HRV-16 for 3h, washed out and cultured for 120h. In relevant time points mRNA expression of anti-viral and inflammatory genes were assessed. HCoV-229E copies and AP-N (entry receptor) presence in flow cytometry were also assessed.

Results

In HMVEC-L from both Patients viral copies were present right after 3 hour exposition to HCoV-229E. (2000 and 4000 copies/µl in 0 hpi, respectively). However, in cells from Patient 2, neither replication (2100 copies/µl), nor proinflammatory (RANTES 2,4 , IL-6 1,2-fold) and antiviral (IFN-β 0,6-fold) response at 72hpi were observed. No cytopathic effect was shown. By contrast, in HMVEC-L of Patient 1 extensive virus replication was noted, which was accompanied by the high inflammatory (RANTES 1200-, IL-6 76-), antiviral response (IFN-β 47-fold) ($1{,}057 \times 10^6$viral copies/µl) and cytopathic effect. In the case of HRV-16 infection, there was no significant differences in response between patients.

Conclusions

HCoV-229E may infect HMVEC-L from both patients. However, HMVEC-L from certain human individuals may present the constitutive resilience to HCoV-229E, but not HRV-16 infection. Thus, the lung vascular endothelium may play an important role in susceptibility to virus, especially coronaviral infections.

Stwierdzam brak konfliktu interesów.

Praca nie była wcześniej prezentowana na Międzynarodowym Kongresie PTA.