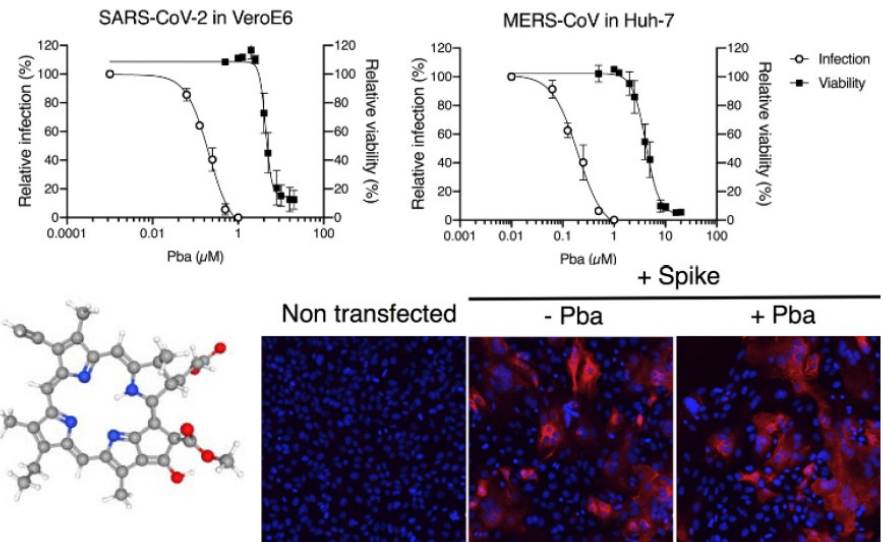


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A Photoactivable Natural Product with Broad Antiviral Activity against Enveloped Viruses, Including Highly Pathogenic Coronaviruses

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) outbreak has highlighted the need for broad-spectrum antivirals against coronaviruses (CoVs). Here, pheophorbide a (Pba) was identified as a highly active antiviral molecule against human CoV-229E after bioguided fractionation of plant extracts. The antiviral activity of Pba was subsequently shown for SARS-CoV-2 and Middle East respiratory syndrome coronavirus (MERS-CoV), and its mechanism of action was further assessed, showing that Pba is an inhibitor of coronavirus entry by directly targeting the viral particle. Interestingly, the antiviral activity of Pba depends on light exposure, and Pba was shown to inhibit virus-cell fusion by stiffening the viral membrane, as demonstrated by cryoelectron microscopy. Moreover, Pba was shown to be broadly active against several other enveloped viruses and reduced SARS-CoV-2 and MERS-CoV replication in primary human bronchial epithelial cells. Pba is the first described natural antiviral against SARS-CoV-2 with direct photosensitive virucidal activity that holds potential for COVID-19 therapy or disinfection of SARS-CoV-2-contaminated surfaces.



Meunier T*, Desmarests L*, Bordage S*, Bamba M, Hervouet K, Rouillé Y, François N, Decossas M, Sencio V, Trottein F, Tra Bi FH, Lambert O, Dubuisson J, Belouzard S, Sahpaz S#, Séron K#