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Editorial

Lentil Lectin, A Molecularly Engineered from *Lens culinaris*: A Broad-Spectrum Activities Against SARS-CoV-2 (COVID-19)

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Recently, a study demonstrated an engineered banana lectin (BanLec, *Lens culinaris*) that importantly decreased mitogenicity by replacing histidine 84 with a threonine (H84T-BanLec) and introduction of a single amino acid substitution [1]. H84T-Banlec demonstrated potent broad-spectrum against viruses high-mannose N-glycans (particularly oligomannose-type glycans and GlcNAC at the non-reducing end terminus and artificial mutants at N-/O-linked glycosylation with most potent and broad antiviral activity against the epidemic variants B.1.1.7, B.1.351, and P.1 [2]), such as severe-acute-respiratory-syndrome coronavirus (SARS-CoV-2 (COVID-19)) and middle-east-respiratory-syndrome coronavirus (MERS-CoV) *in vitro and in vivo*, in addition to Ebola virus, human immunodeficiency viruses 1 and 2, hepatitis C virus, and influenza viruses A and B, via highly-glycosylated-viral proteins for blocking the cell attachment, cell entry, fusion of membrane, and coronavirus replication [1,3-5]. At 1 mg/mL, lentil lectin revealed no cytotoxic activity and weak hemagglutination [2]. In mouse model, with single injection, no weight loss was identified [2]. Lentil lectin could block inhibit the binding of the human anti-converting-enzyme-2 (ACE 2) receptors to SARS-CoV-2 (COVID-19)-S-trimer protein [2,6] (Figure 1).

In conclusion, lentil lectin demonstrated strong evidence of blocking SARS-CoV-2 (COVID-19) variant infection for development of worthy future strategies of SARS-CoV-2 (COVID-19) variant management.

Figure 1: Demonstrating the mechanism of H84T-BanLec in blocking viral entry with protection against SARS-CoV-2 (COVID-19) and MERS-CoV infections *in vivo*.

(Source: Zhu R, Hain L, Seferovic H, Tampe′ R, Kai-Wang To K., *et al*. A molecularly engineered, broad-spectrum anti-coronavirus lectin inhibits SARS-Co-2 and MERS-CoV infection in vivo. Cell Reports Medicine 2022; 3: 100774. DOI: https://doi.org/10.1016/j.xcrm.2022.100774)

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