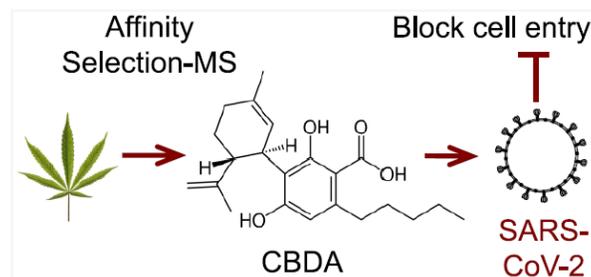


A Review of: Cannabinoids Block Cellular Entry of SARS-COV-2 and the Emerging Variants

A recent peer-reviewed paper entitled “Cannabinoids Block Cellular Entry of SARS-COV-2 and the Emerging Variants” published in the Journal of Natural Products, by R. van Breemen et al. sheds light on yet another potential application of the 170+ different cannabinoids produced in hemp. Here we summarize the article and provide insights.



### Key take-aways

1: the cannabinoid molecules that were the most effective at blocking SARS-CoV-2 entry were of the acidic form of CBD and CBG (don't worry these acid forms won't burn you), known as **CBDA and CBGA**.

2: One can't smoke cannabis and expect to achieve the effects described in the paper because heat “decarboxylates” or drops the acid form down to CBD and CBG which had little to no function in blocking entry of coronavirus.

3: The group looked at the ability of hemp extracts to bind to the coronavirus “spike” protein, which is the same target for the vaccines. The spike binds the human ACE2 receptor to initiate infection. ACE2 receptors are abundant in the lungs, heart, arteries, kidney and intestines.



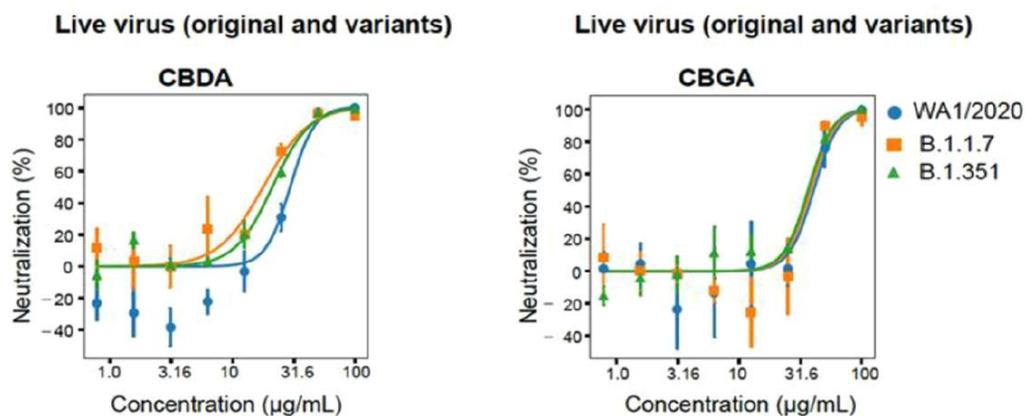
SARS-CoR-2

4: First hemp plant extracts with the highest ability to bind the spike protein were identified. The primary cannabinoid from these extracts was CBDA and CBGA.

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5: CBDA and CBGA were introduced along with SARS-CoV-2 in cells and the ability of CBDA and CBGA to block viral entry was discovered.

The capacity of SARS-COV-2 (the novel coronavirus that causes COVID19) to mutate rapidly results in new “variants of concern” such as the Delta and Omicron. Some of these variants have demonstrated the ability to escape immunity from vaccines, so called “breakthrough infections”. From the article it appears that CBDA and CBGA may serve as an alternative approach for stopping COVID19 by blocking its entry into human cells.



Above: Figure 3D & E from the paper. The Y-axis Neutralization % is the percent of virus blocked from entering cells. Concentration X-axis is the amount of CBDA or CBGA needed for blocking entry. Three coronavirus variants were used WA1/2020 (authentic SARS-CoV-2), B.1.1.7 and B.1.351 are variants of concern.

The paper does a convincing job demonstrating the ability of CBDA and CBGA to block the entry of coronavirus and variants into the cells. We must note that these are only cell lines and not human clinical trials. The data are convincing enough that we are first introducing a Pure CBGA oil to promote healthy lung and cellular function and to boost immunity. Next, we aim to introduce a high purity CBDA hemp extract oil.