UV-C Decontamination tests: recent published results

6 Aug 2020

- A recent paper has been published showing that “ UV-C irradiation is highly effective in inactivating and inhibiting SARS-CoV-2 replication”

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doi: https://doi.org/10.1101/2020.06.05.20123463.t

Experimental set-up

- Experiments were conducted using a custom-designed low-pressure mercury lamp system which has been spectral-calibrated providing a monochromatic UV-C (254 nm) light and an average intensity of **1.082 mW/cm2** over the illumination area.

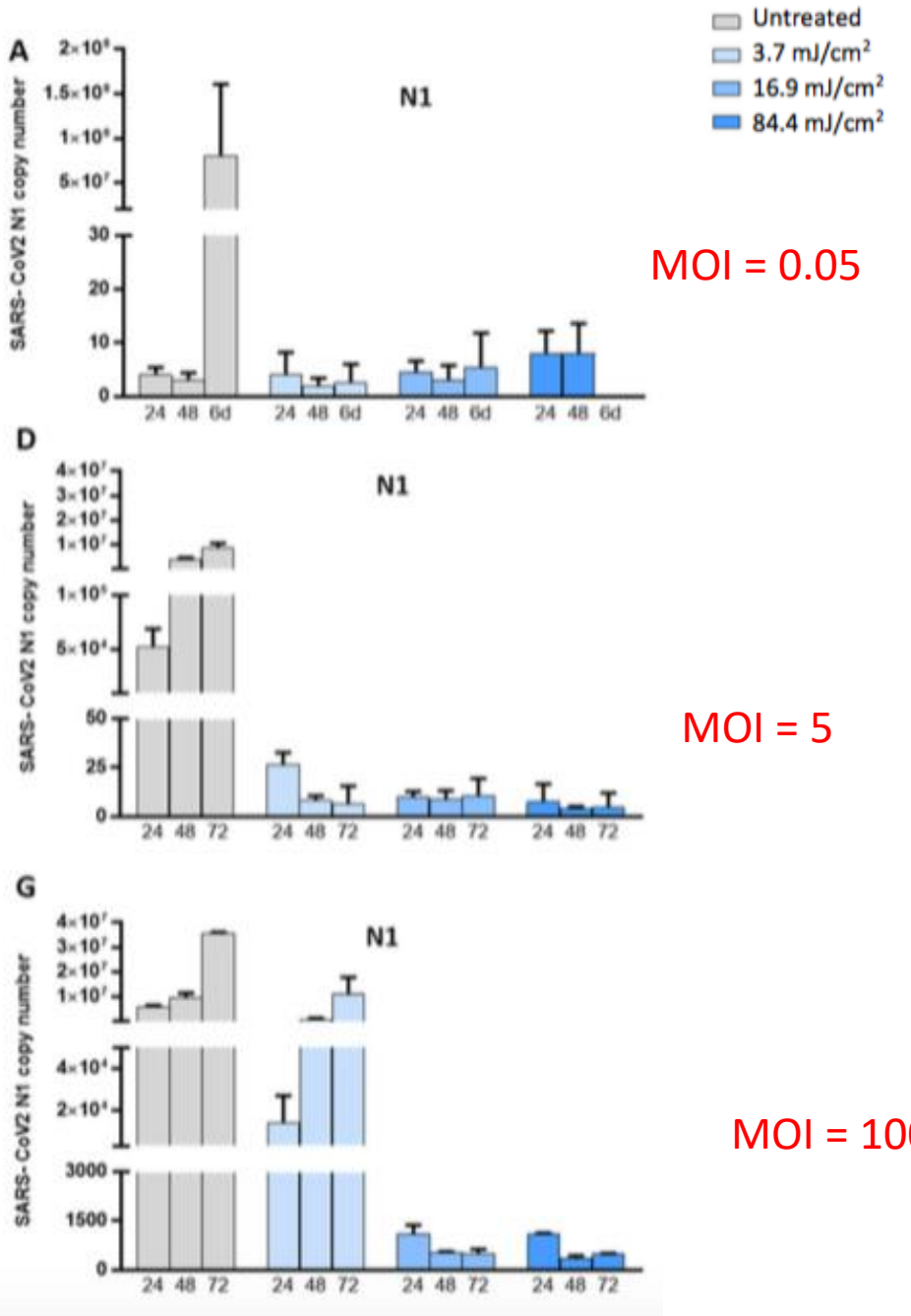
- Three different illumination exposure times, corresponding to a dose of 3.7, 16.9 and 84.4 mJ/cm2 were studied.

- Three different SARS-CoV-2 **multiplicity of infection (MOI) of 0.05, 5, 1000 were considered corresponding to:**
  - low-level (MOI = 0.05) contamination observed in closed environments (e.g. hospital rooms);
  - average concentration (MOI=5) found in the sputum of COVID-19 infected patients;
  - very large concentration (MOI=1000), corresponding to that observed in terminally diseased COVID-19 patients19.

Results (1)

Viral replication of UV-irradiated SARS-CoV-2 virus in vitro VeroE6 cells were studied.
Culture supernatants were harvested at different times : 24, 48 72 hours and 6 days.

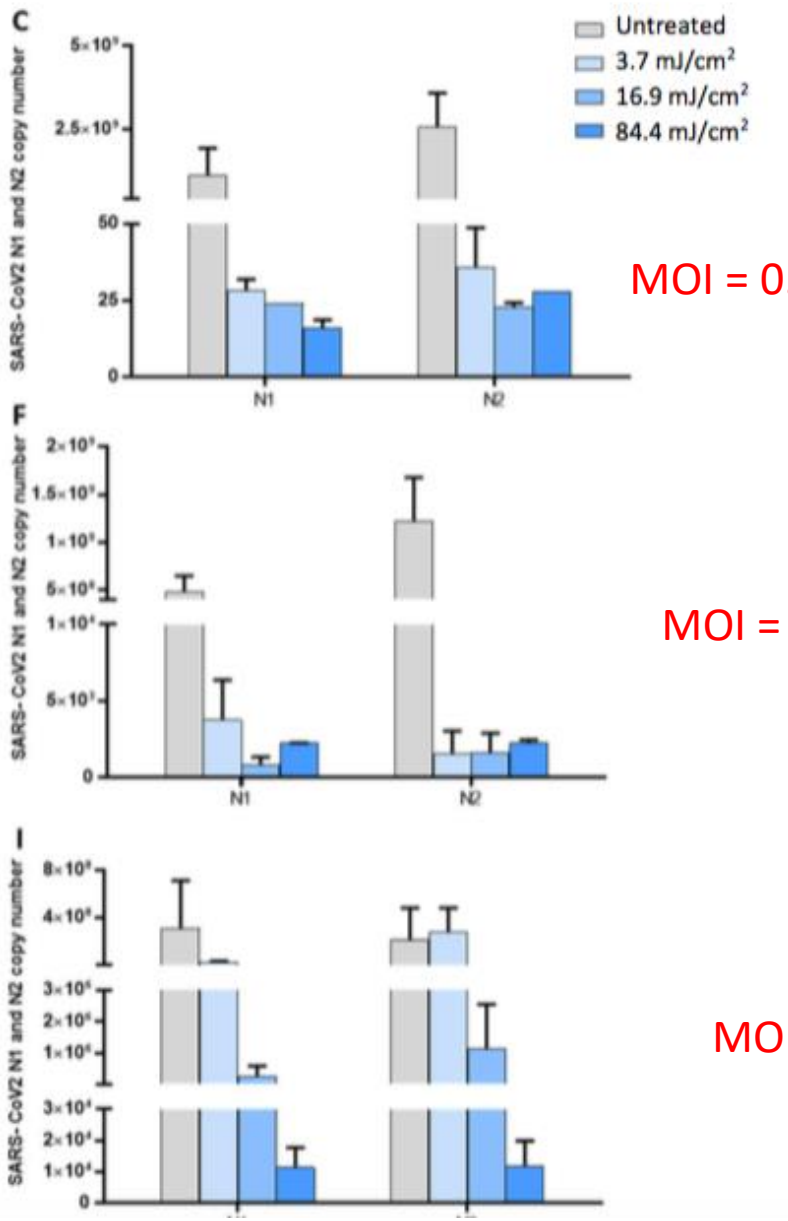
- The effect of the UV-C exposure was extremely evident independently from the MOI employed dose- response and a time-dependent curves were observed.



Results (2)

Viral replication was assessed on cell lysate harvested at the end of cell cultures at 72 hours (5 and 1000 MOI) and 6 days (0,05 MOI) post infection.

- **A dose of 3.7 mJ/cm2** is enough to achieve full inactivation of the virus for MOI 0.05 and 5.
- Viral replication was totally inactivated at a **dose >16.9 mJ/cm2**.



MOI = 0.05

MOI = 5

MOI = 1000

Conclusions:

- UV-C radiation inhibit SARS-CoV-2 and the response depends on both the UV-C dose and the virus concentration.
- For virus concentrations typical of low-level contaminated closed environment and sputum of COVID-19 infected patients, a very small dose **of less than 4 mJ/cm2** was enough to achieve full inactivation of the virus.
- At the highest viral input concentration (1000 MOI), viral replication was totally inactivated at a **dose >16.9 mJ/cm2**.