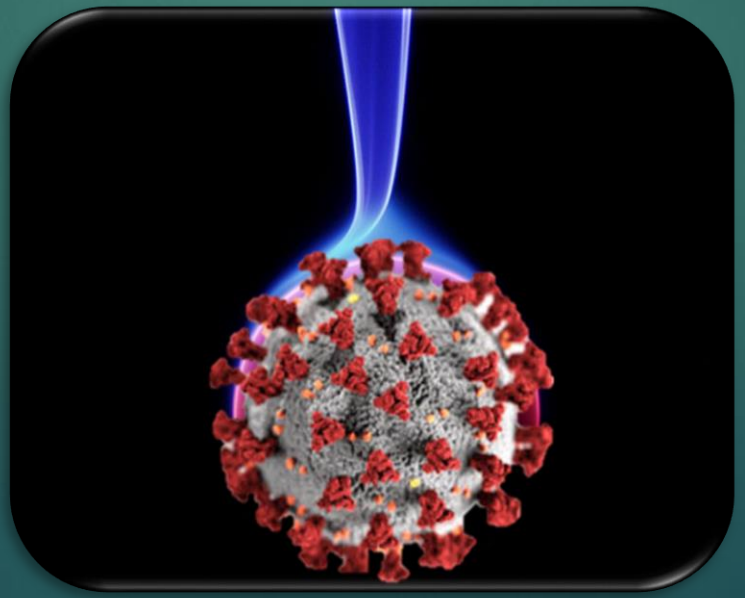
IDEA² Kickoff Workshop

June 24th & 25th.

Ion vs SARS-CoV-2:

ion generation for closed environments



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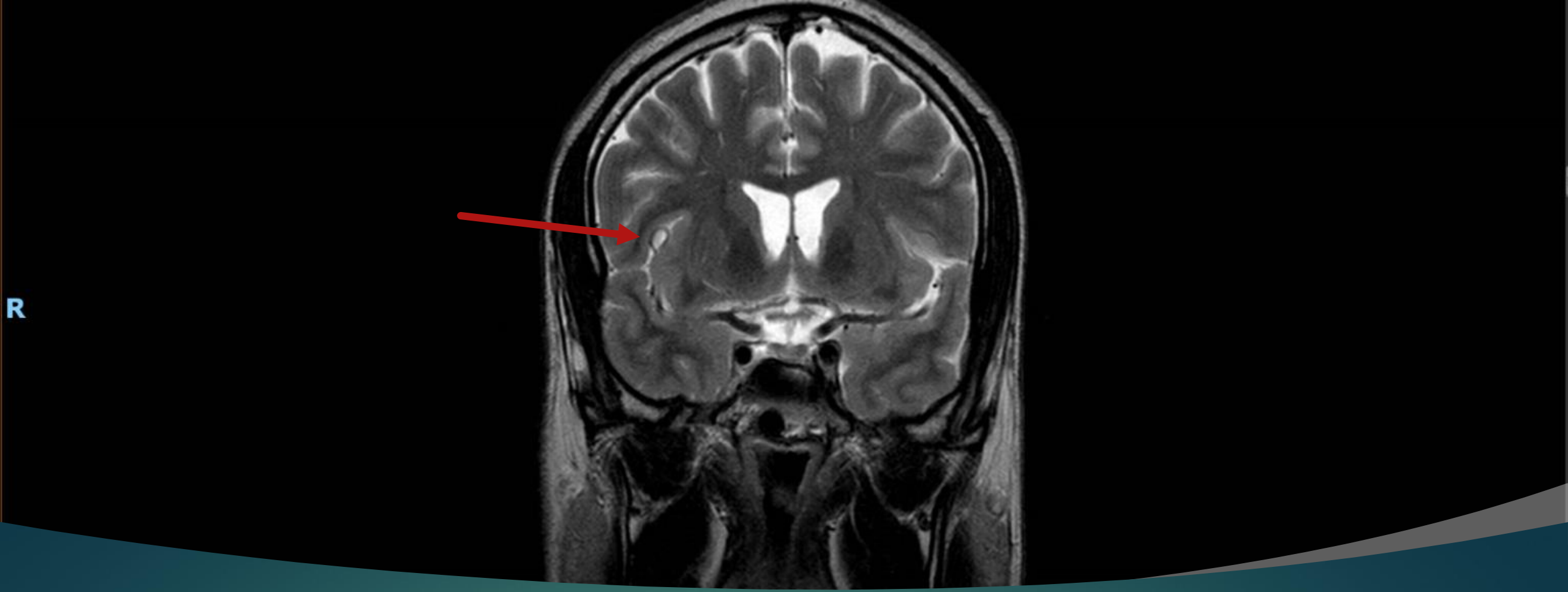
Emilio Morenatti
2021 Pulitzer Award

2020-2021: SARS-CoV-2 crisis

4 millions deaths worldwide up to now, but it's been even more

1. 2020 collapse stock markets: ↓10%
2. Health systems saturation: ~100%
3. Mental health: ↑ 200% anxiety, stress,…
4. Domestic violence & child abuse : ↑70%
5. Education: Change to virtual classes
6. Sports & entertainment

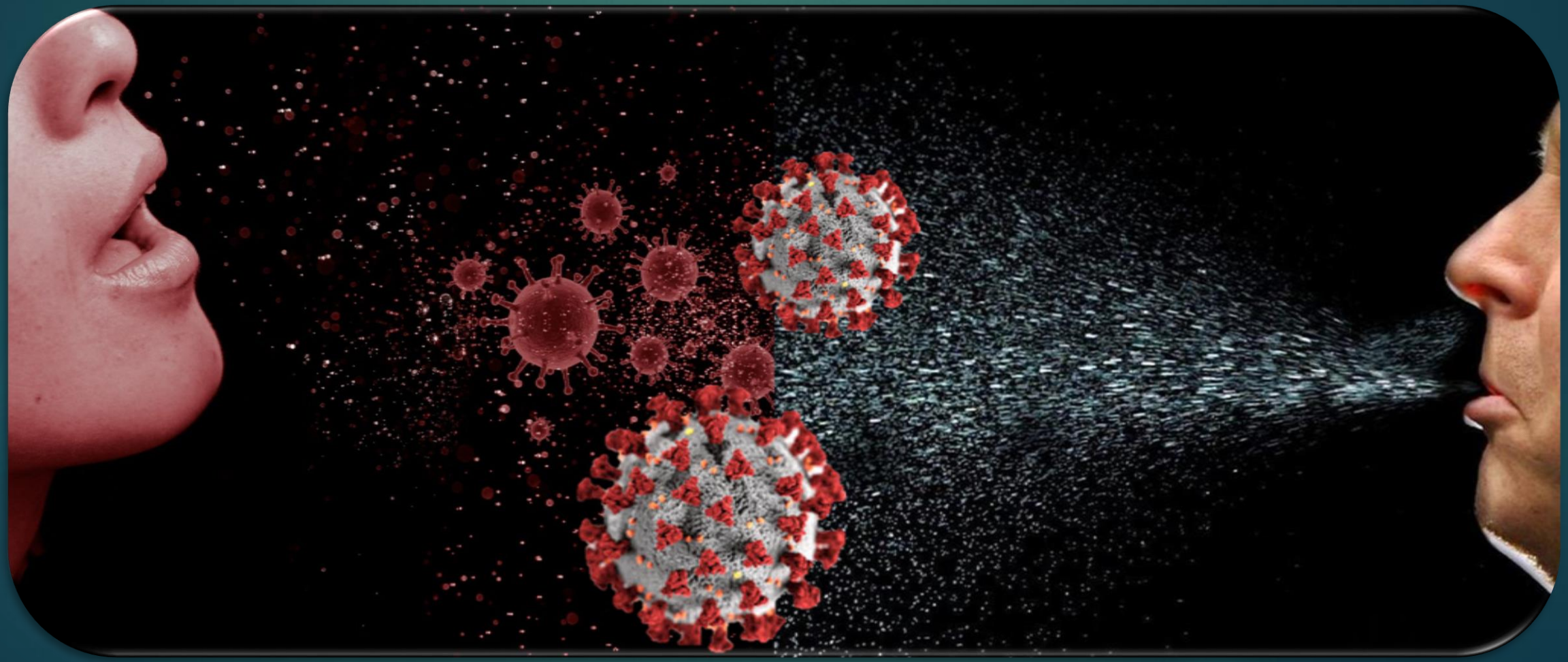
…



3 ischemic strokes in a row

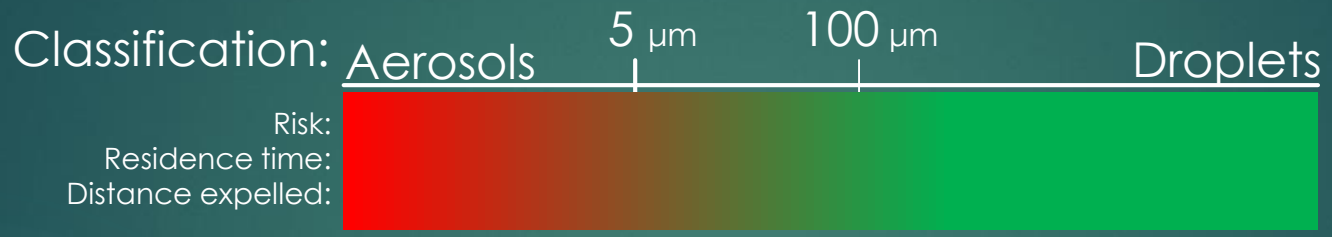
Introduction:

Diseases spread & residence time

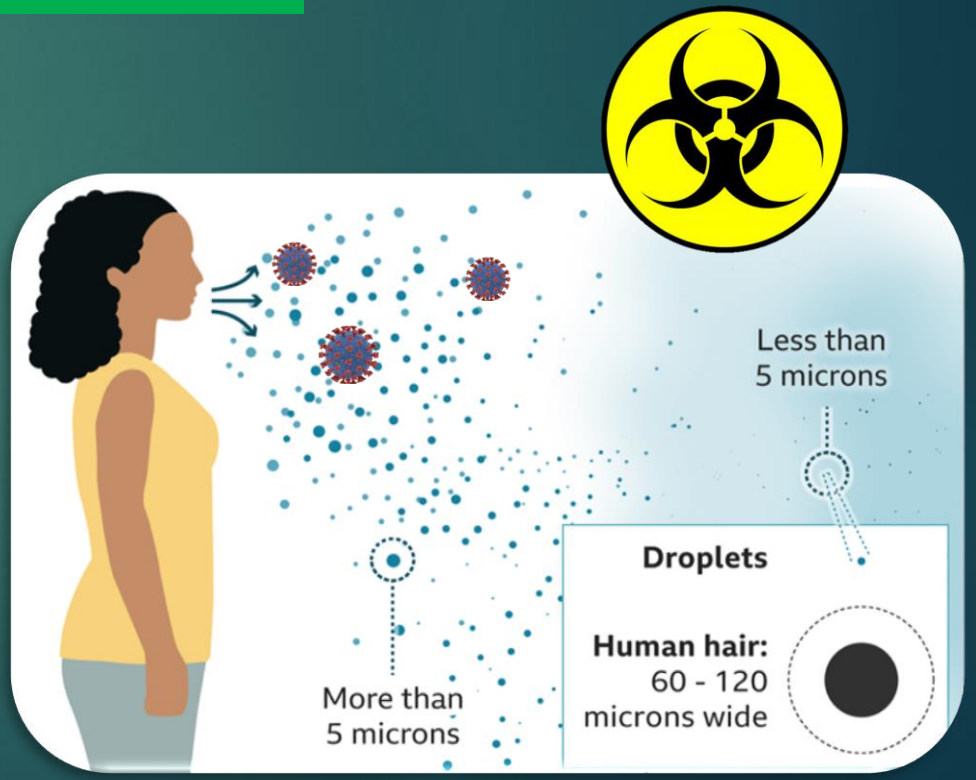


Introduction

Human aerosols & droplets release

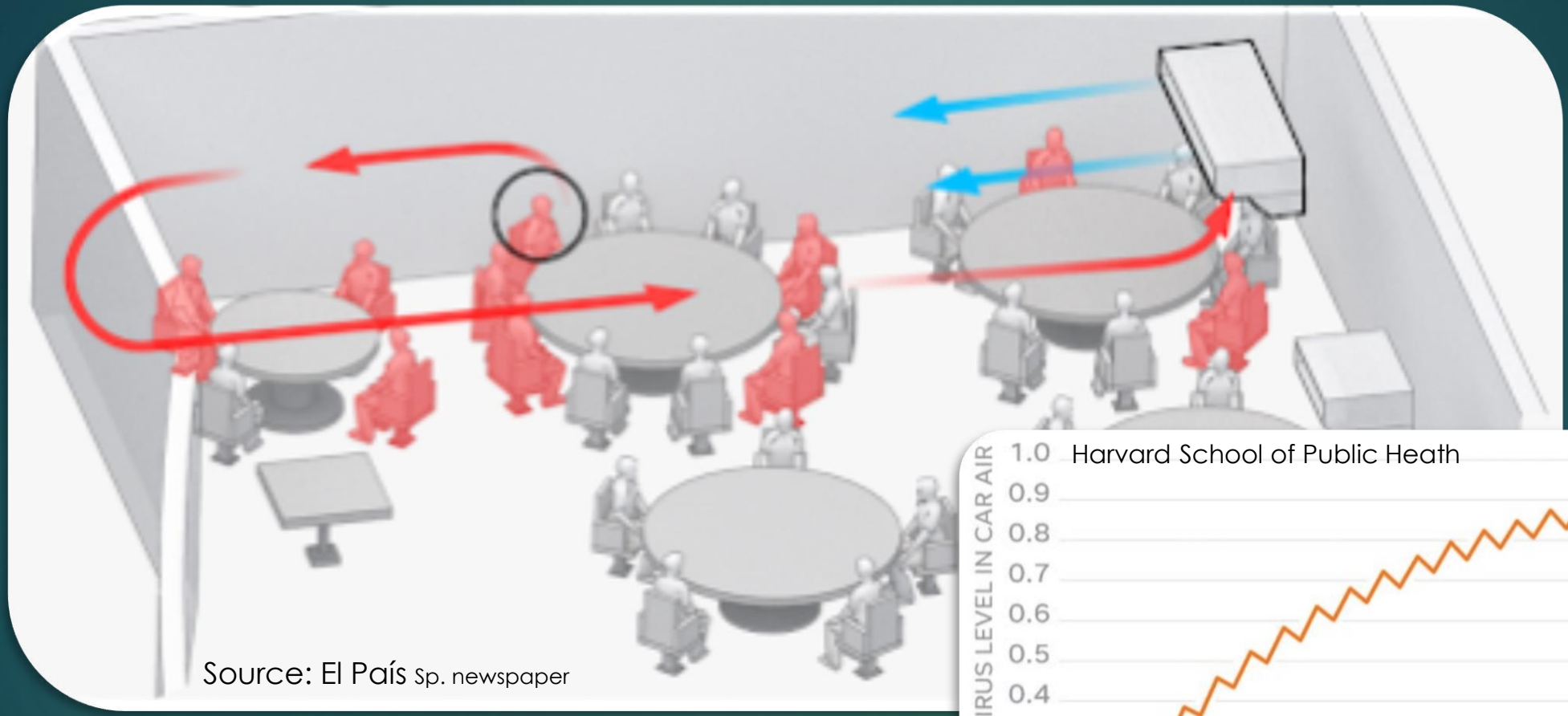


- Aerosols: Small particles spelled when talking & breathing.
- Droplets: Bigger particles spelled when sneeze, coughing.

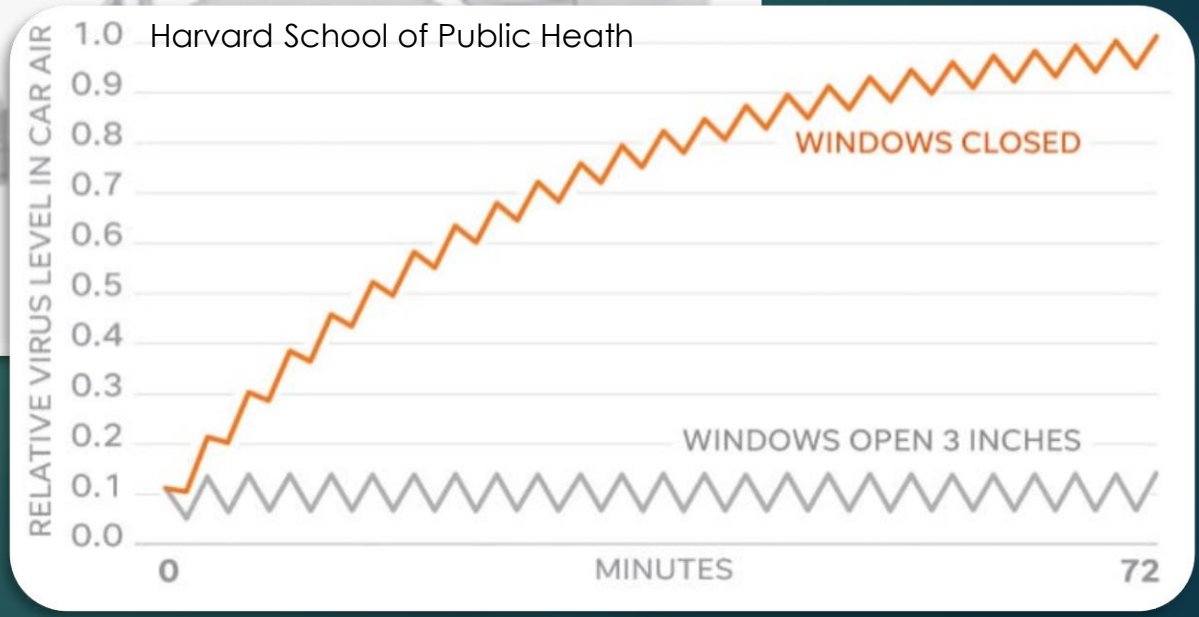


Source: WHO (BBC)

Enclosed places transmission

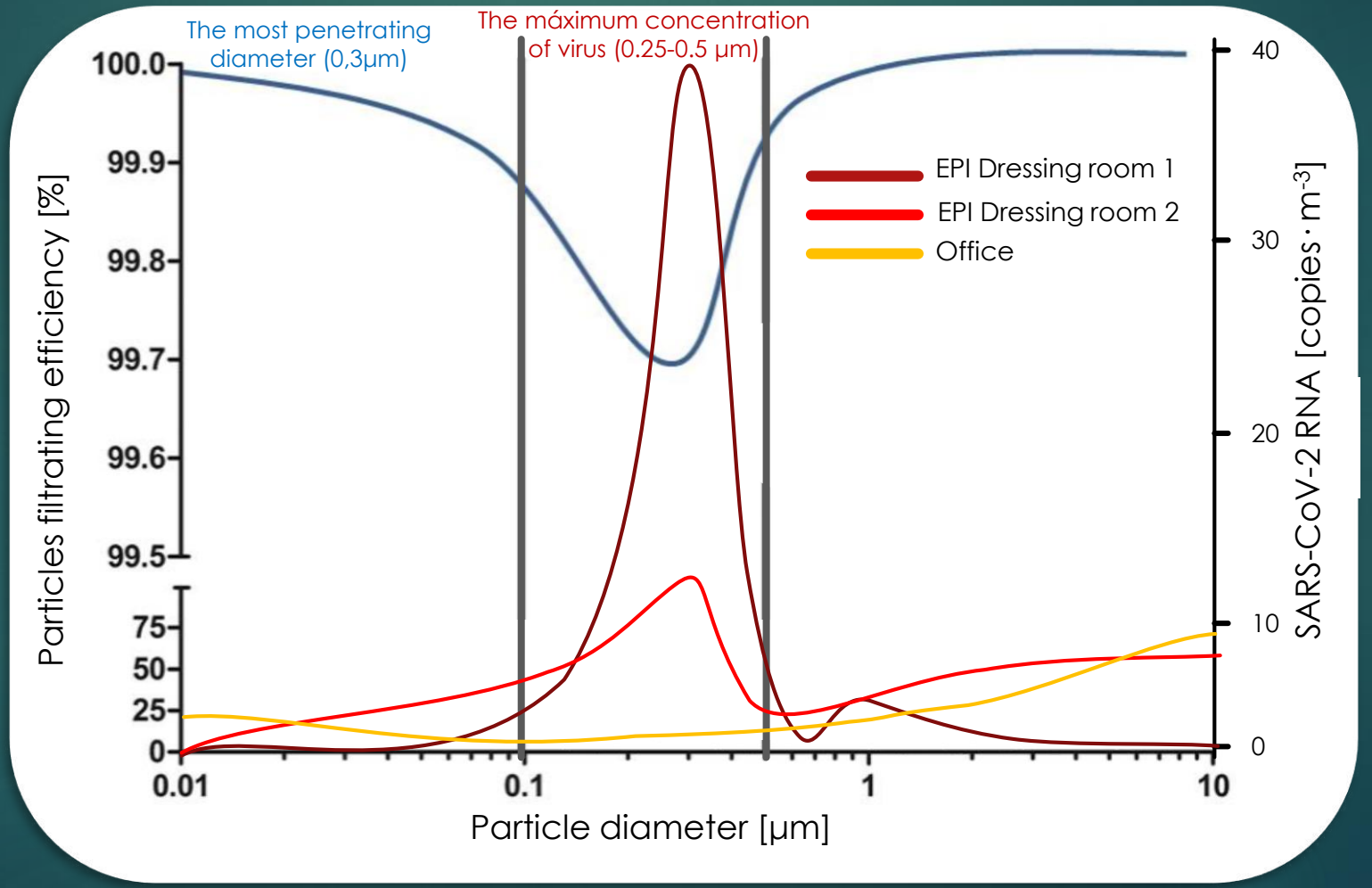


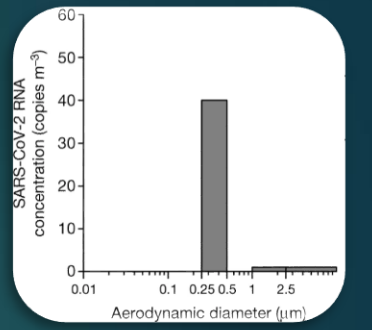
Source: El País Sp. newspaper



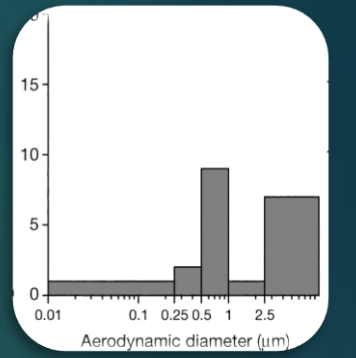
1st tech. approach : HEPA filters

Typical HEPA 99.97% vs infected air

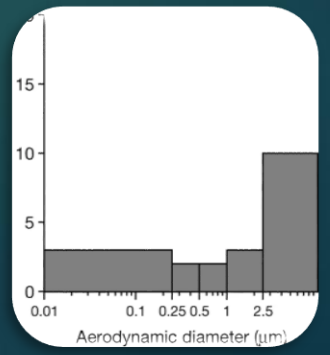




EPI Dressing room 1



EPI Dressing room 2



Office

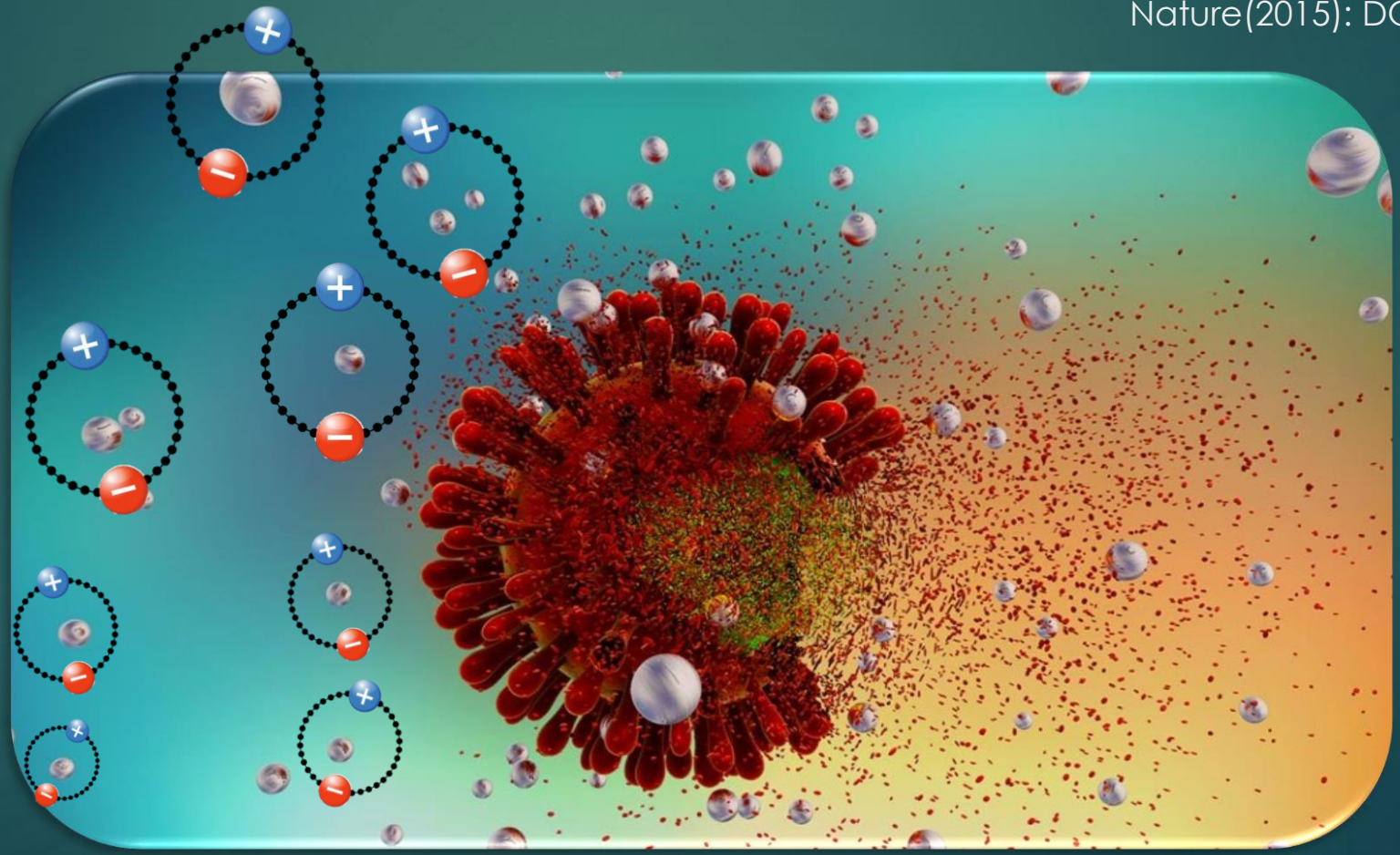
Source: Nature

Our proposal: Air plasma ionization.

What we know?

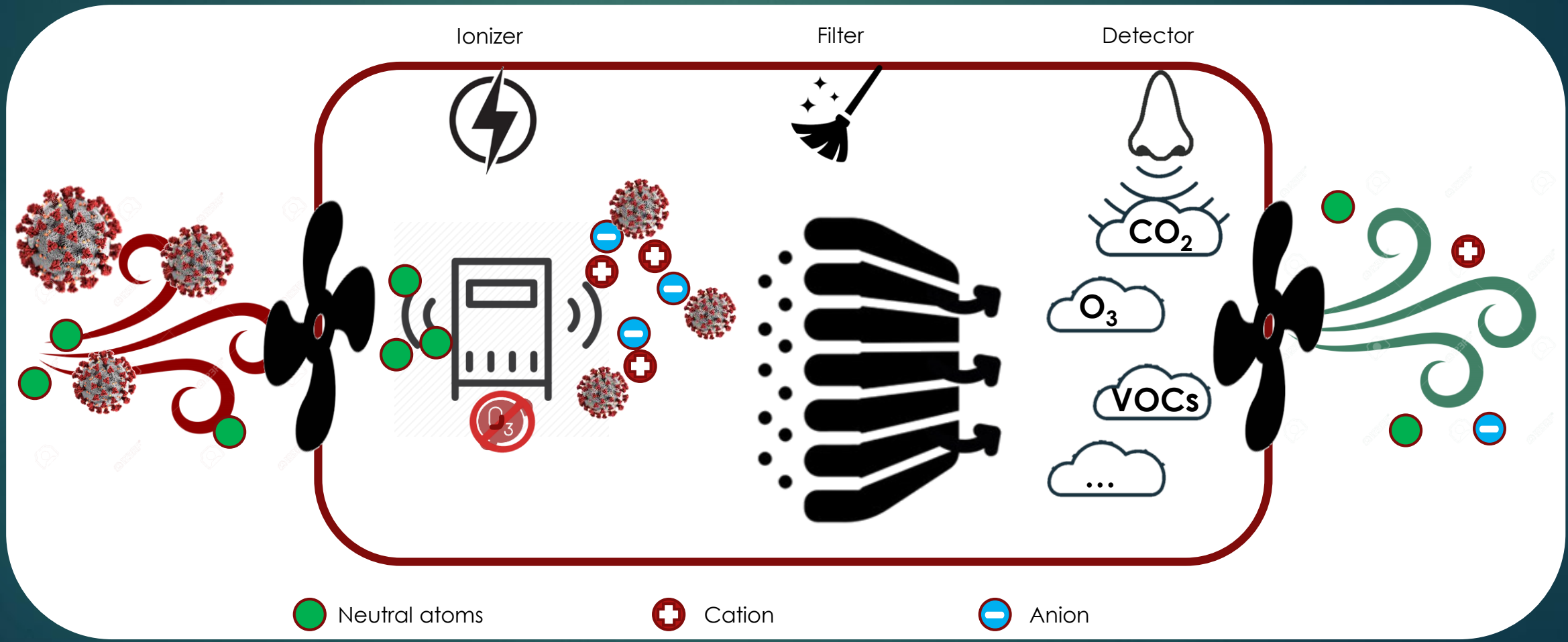
Ionization reduce virus capacity to infect

Nature(2015): DOI: 10.1038/srep11431



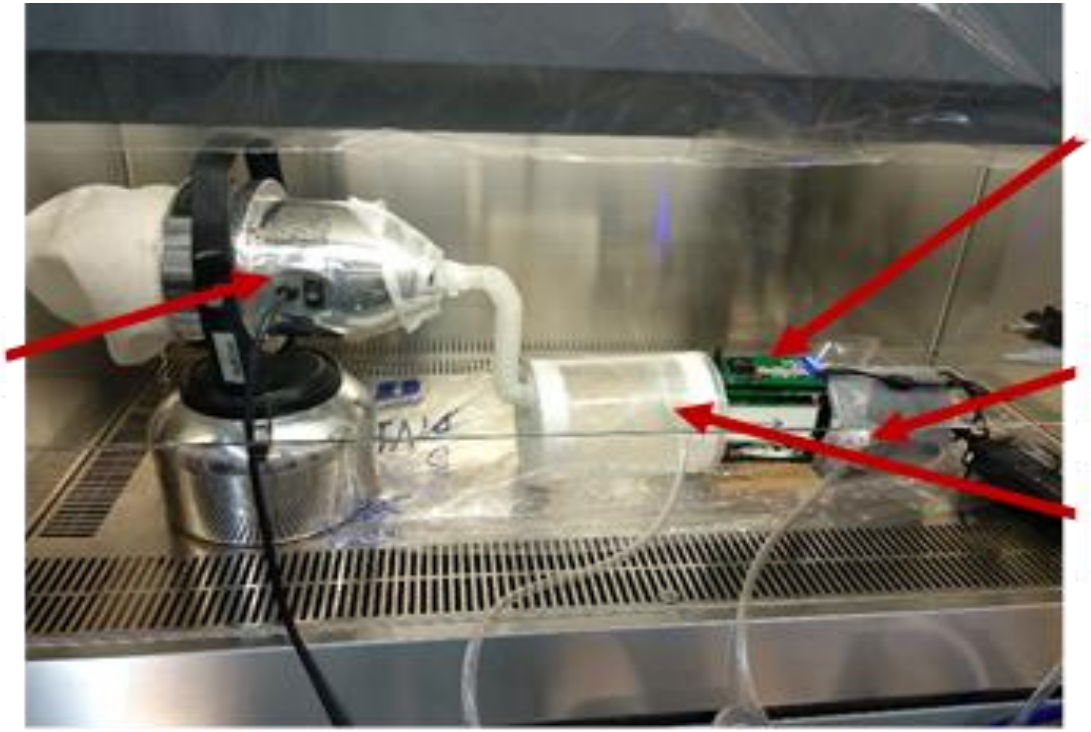
Operating diagram

Coupling technologies



Our tests

Pathogens & aerosols generator



Ionizer device

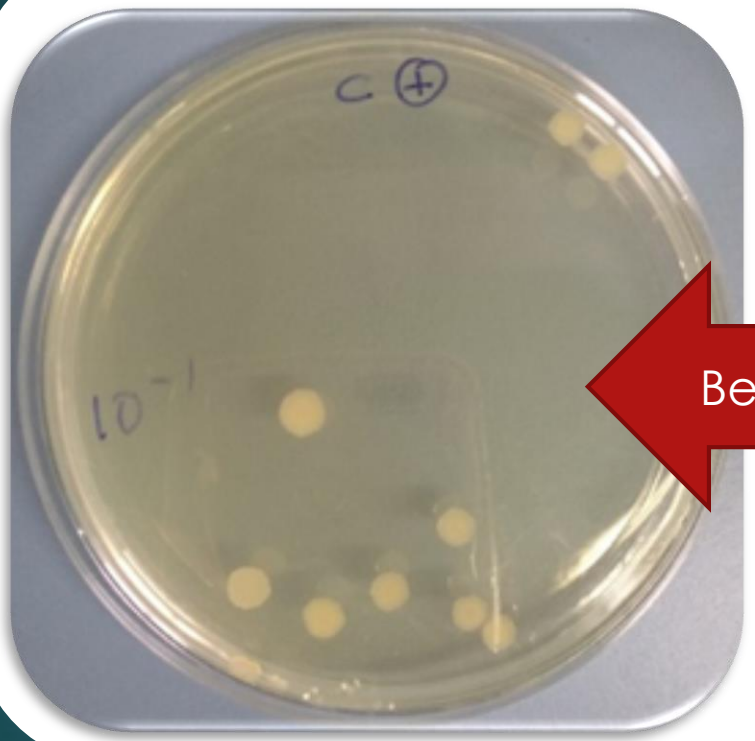
Sampler after ionizer

Sampler before ionizer

Spanish Biological Defense Department

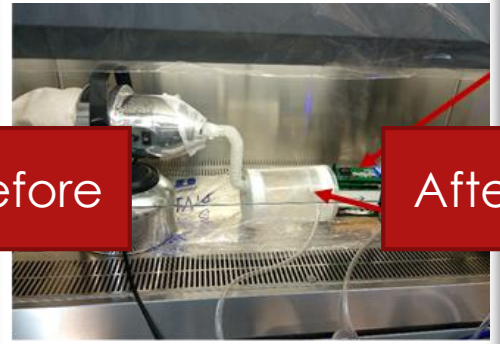
Our results

virus & bacterial growth inhibited!

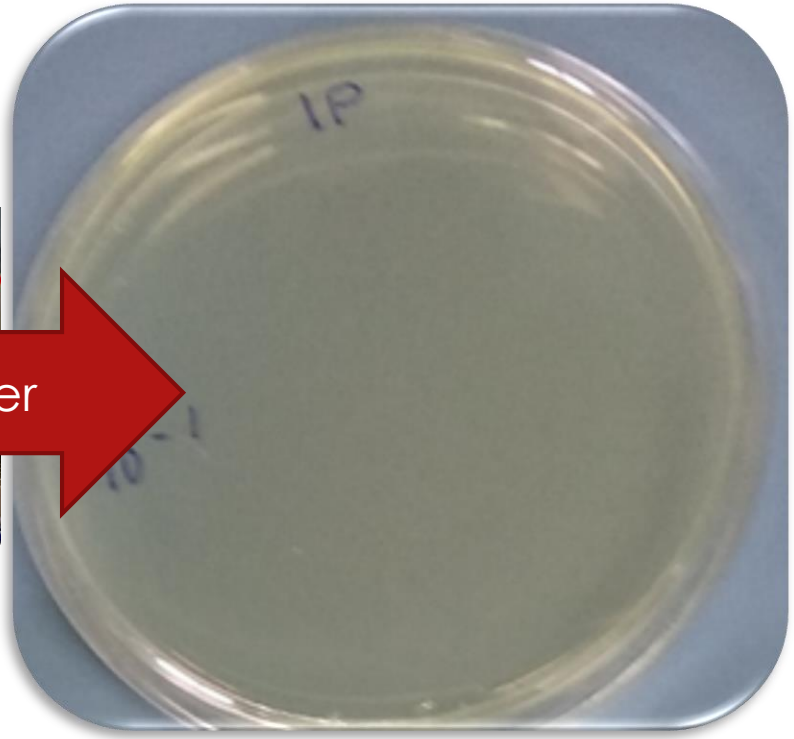


Before

Lab. test



After



Pathogen rate depleted from **2 to 3** magnitude orders

First steps:
2 Prototypes

2.5 L/min
99.9%

Purifier Mark1

Can we couple ionization, filtering and UV-C?

300 L/min
98%

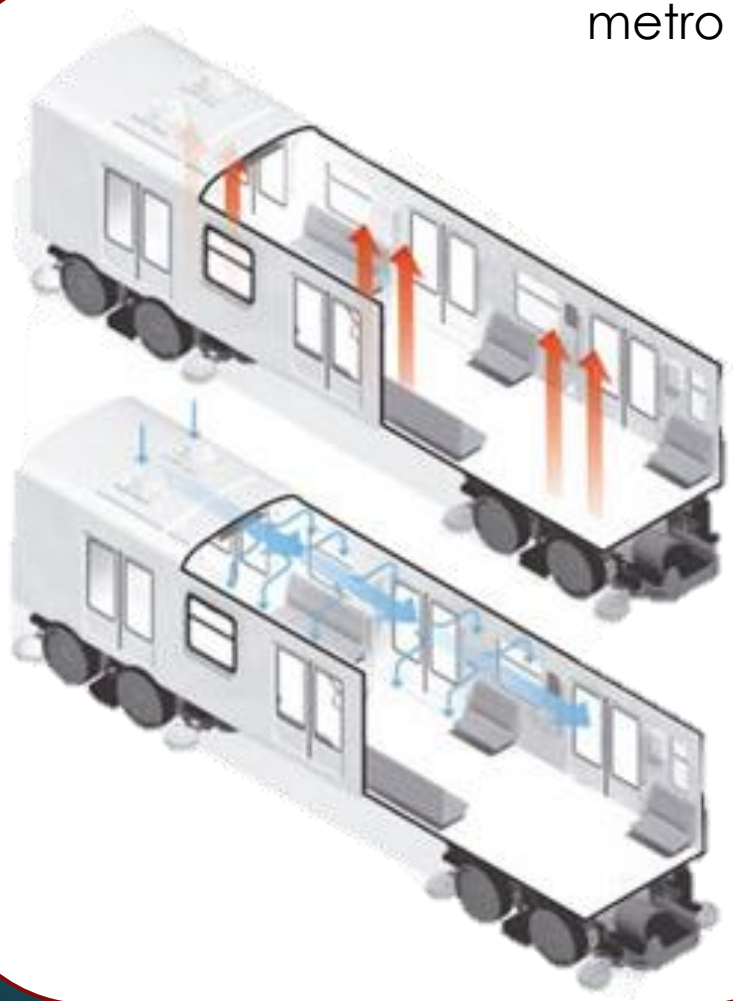
Air-conditioning Mark2

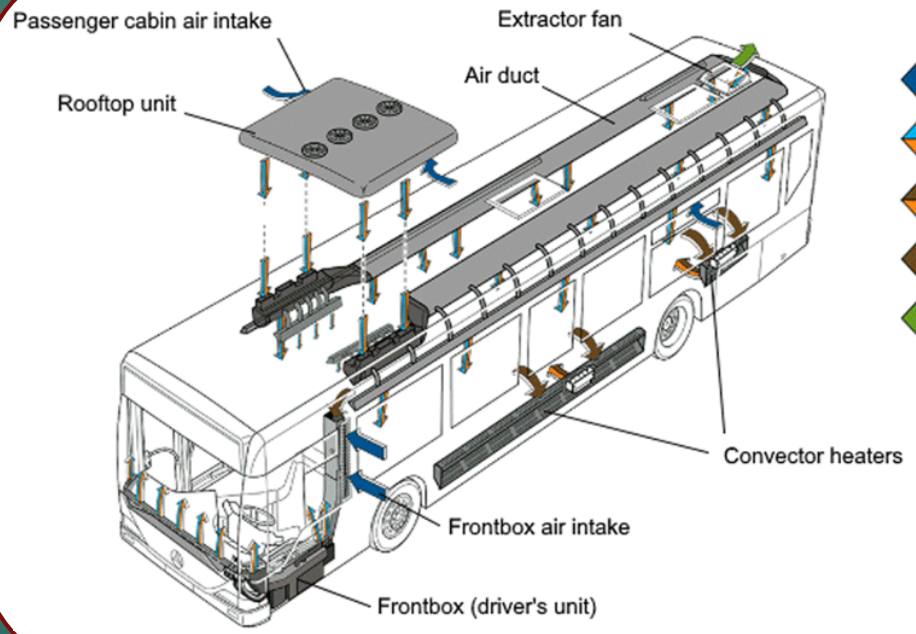
Can we scale prototypes?

Possible application:

Public transportation media

metro





bus

Conclusions:

1- Prevent air-propagation pathogens

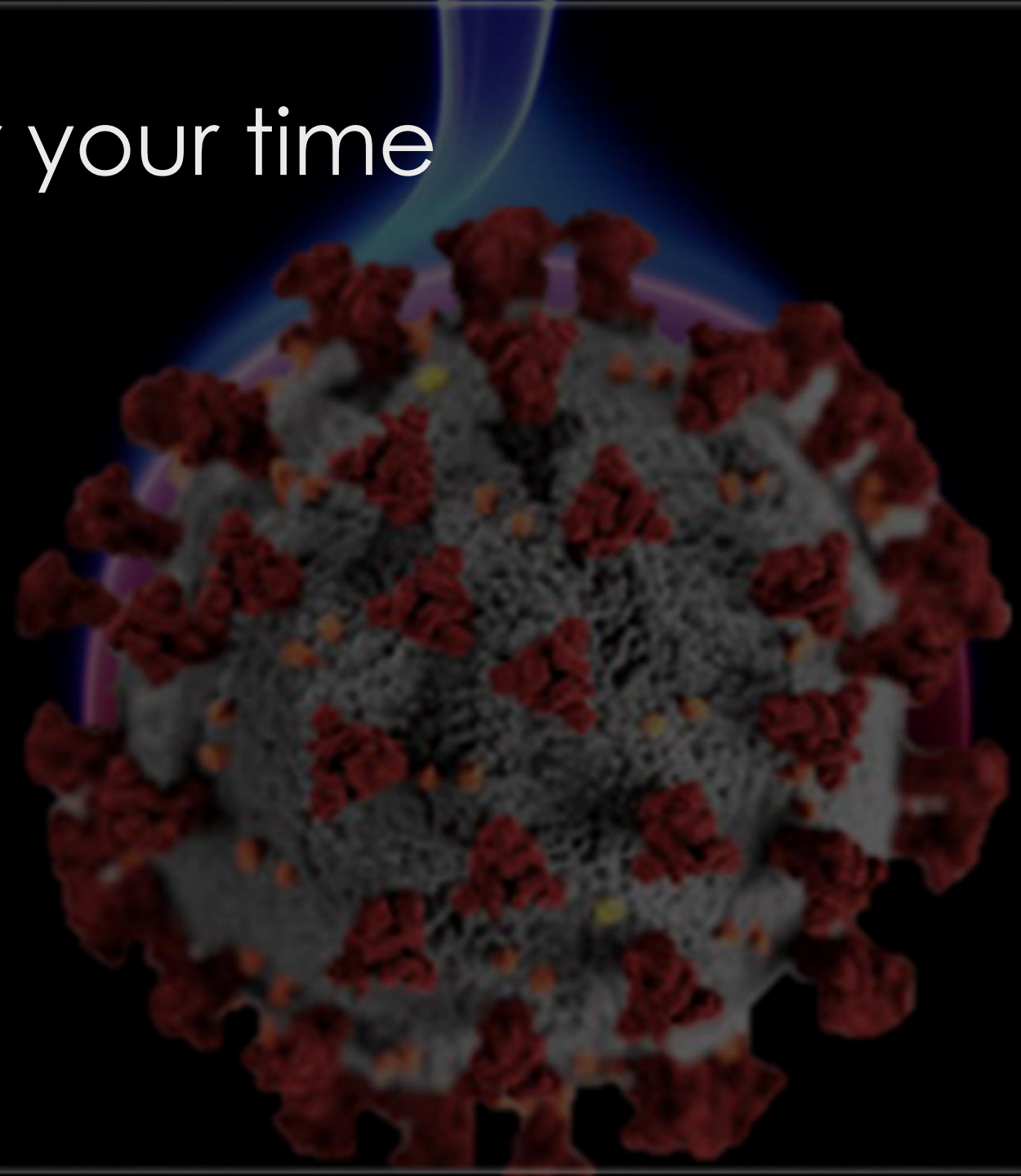
2- Human presence compatible & materials friendly

3- Energy efficiency improvement

4- Low pressure drop in air-conditioning systems

5- Low cost & integral treatment compatible with pre-existing facilities

Thanks for your time



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