PROTECT
A COVID-19 National Core Study

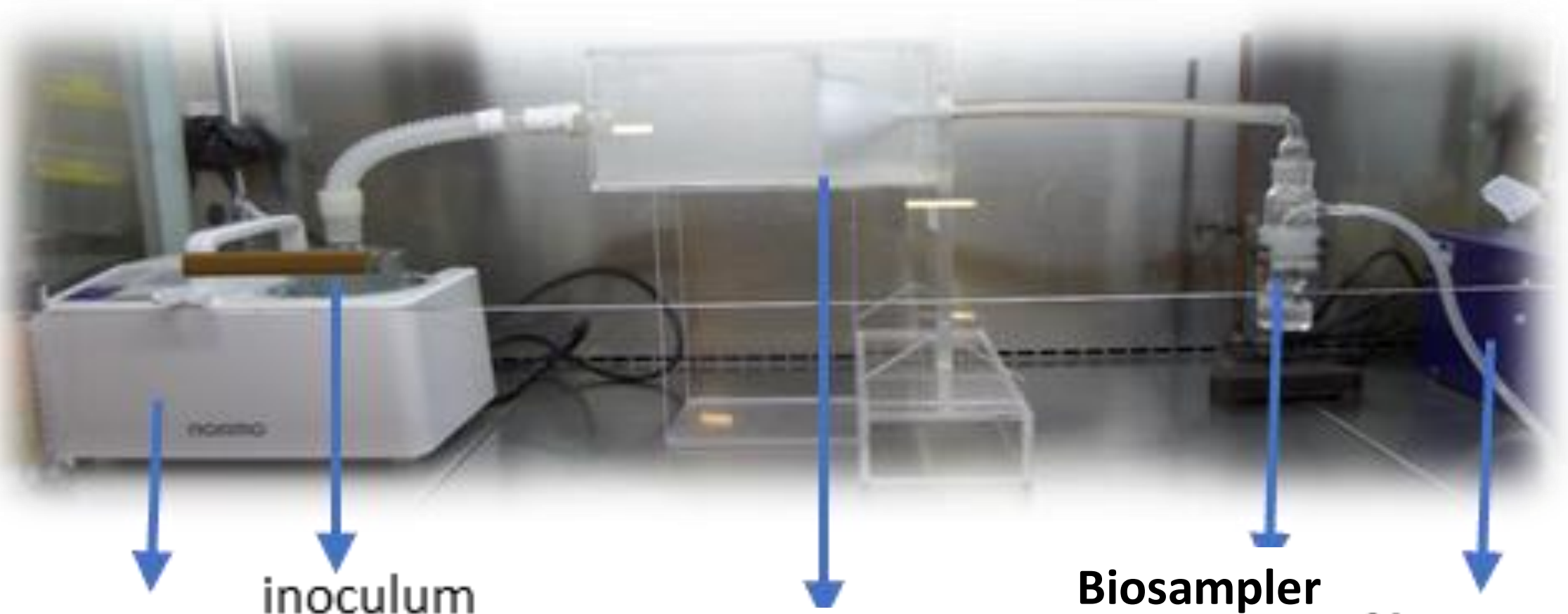
In vitro studies for FMS

Bacterial signals captured from aerosols vary between different breathing activities, sampling matrices and microbial identities inform development of face mask sampling

Mohamad Abdulwhhab, M.D. Ph.D.

UNIVERSITY OF LEICESTER

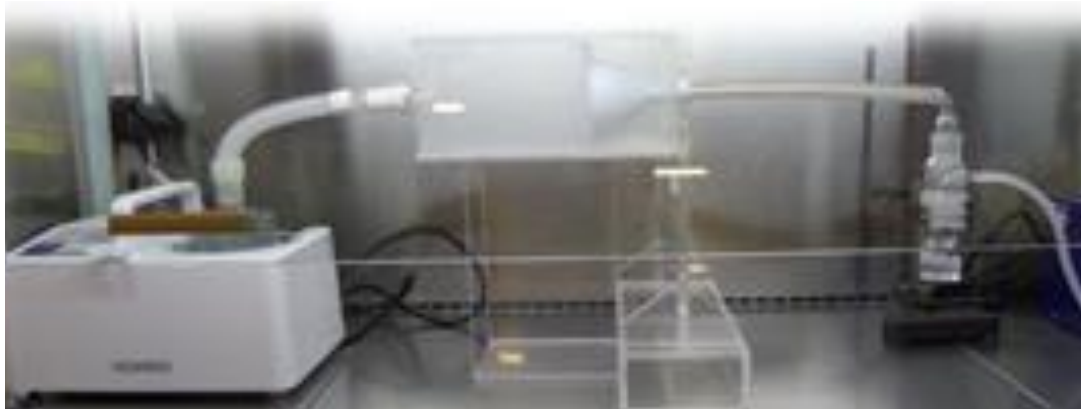
Test rig to assess strip capture efficiency for different microbes

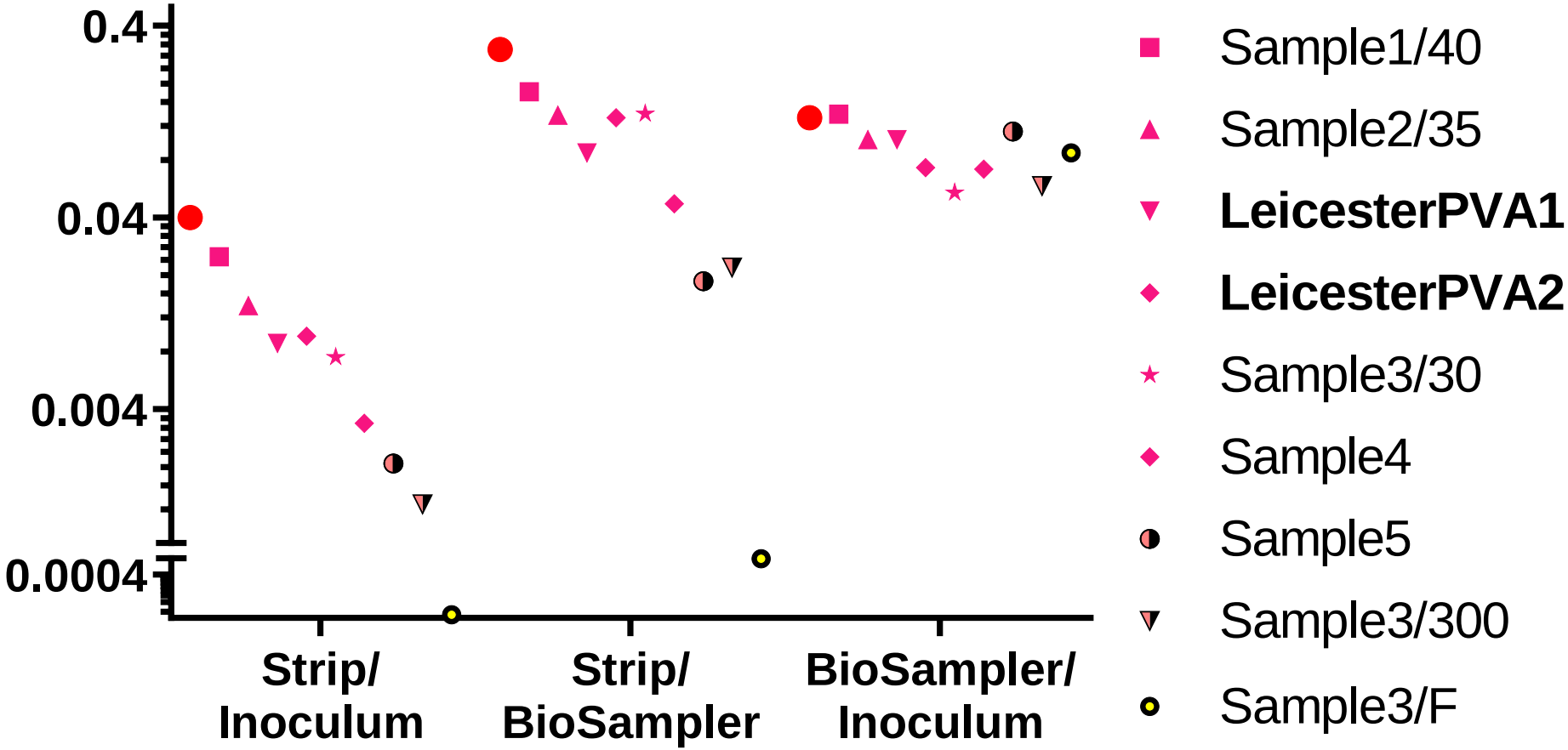


UNIVERSITY OF LEICESTER

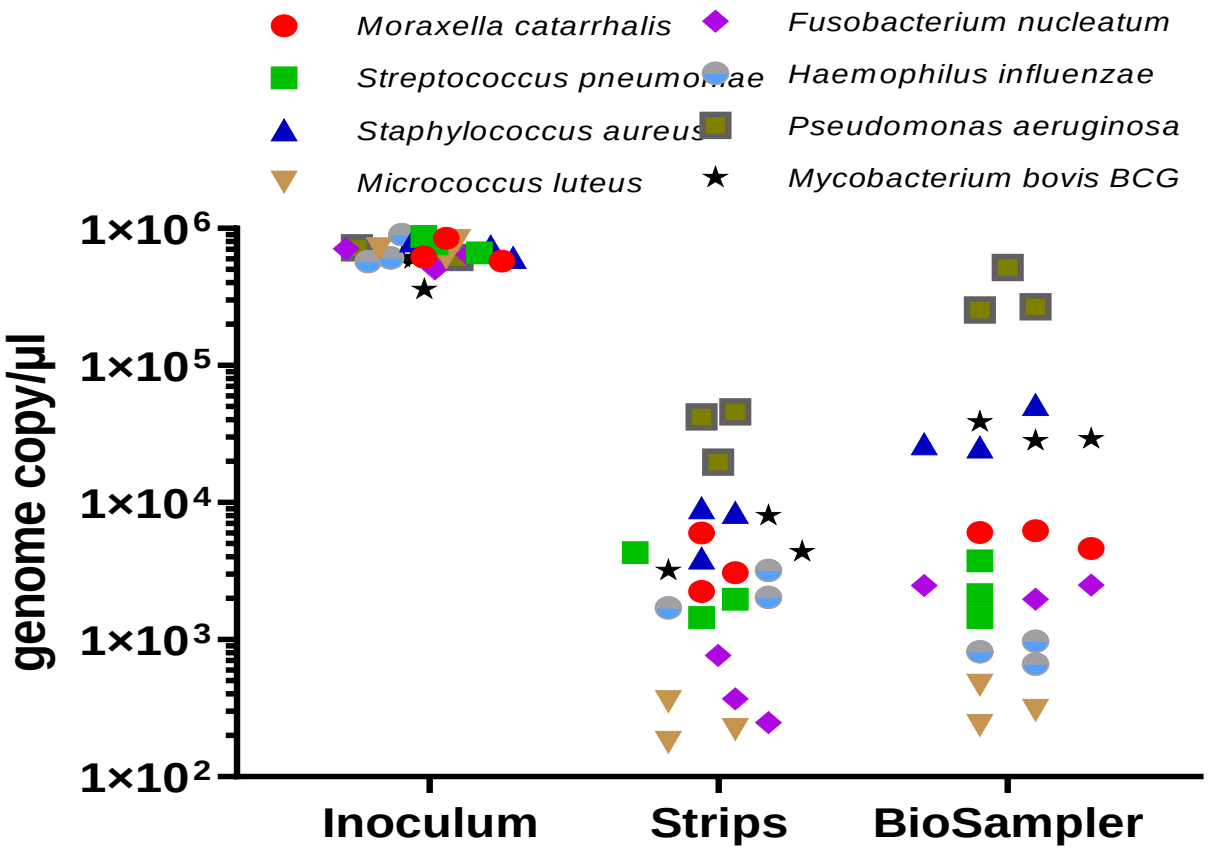
PROTECT
A COVID-19 National Core Study

Different strip materials show different efficiencies to capture *M. luteus*





Different organisms fly and are captured with different efficiencies (Coronavirus OC43 soon)



Capture vs source

Capture vs Exposure

Efficiency of aerosol-ization and flight

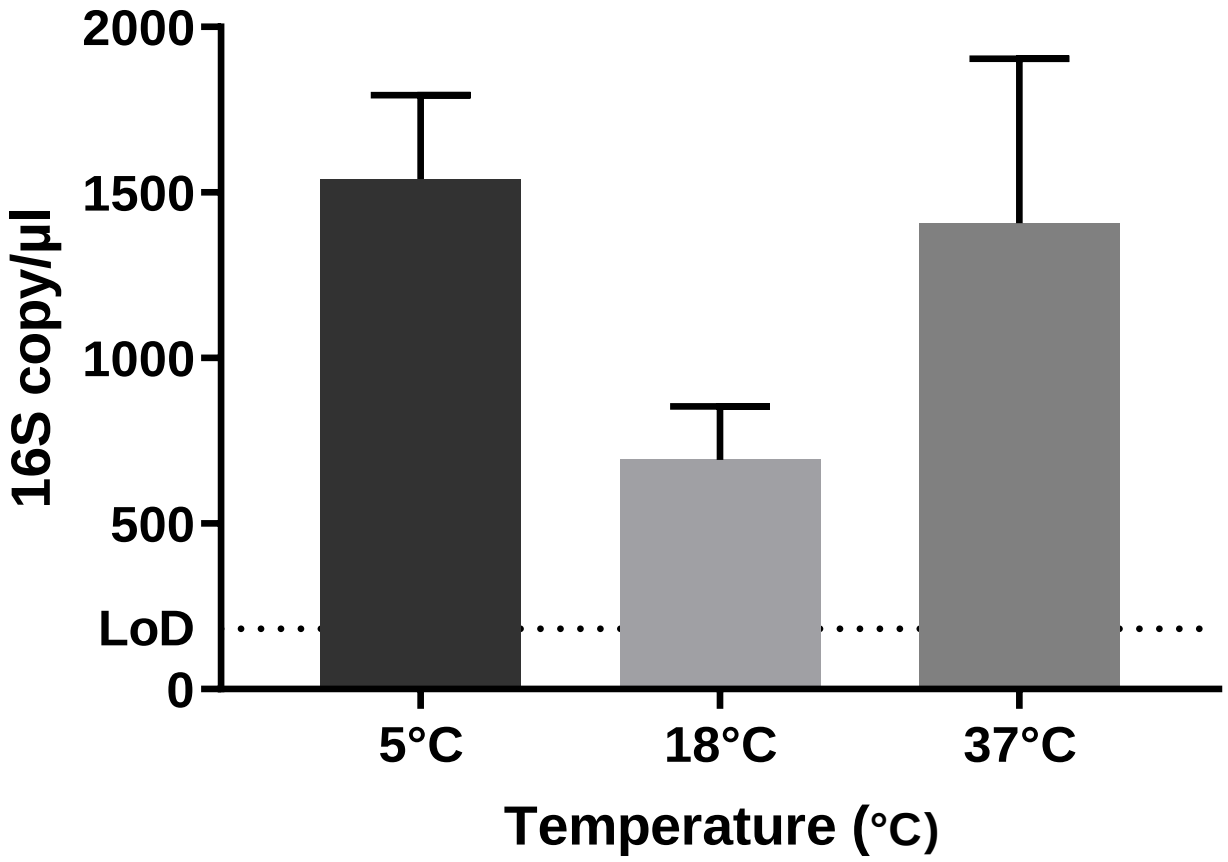
Table 1

	Strip/ Inoculum		Strip/ BioSampler		BioSampler/ Inoculum	
	Mean	SD	Mean	SD	Mean	SD
Ps. aeruginosa	528.0	184.7	1096.2	525.6	5114.3	1827.9
M. bovis BCG	102.2	42.4	1570.8	475.3	638.4	171.0
S. aureus	97.0	28.5	2192.4	1051.1	482.6	193.5
M catarrhalis	57.3	34.2	6674.9	2959.0	86.6	28.1
S. pneumoniae	35.8	25.9	11851.4	7719.9	32.5	16.1
H. influenzae	32.9	2.8	28168.1	6376.2	12.0	2.0
F. nucleatum	8.1	6.1	1929.1	975.3	38.5	9.8
M. luteus	3.6	1.4	7449.3	180.7	4.8	1.8

Capture Efficiency

Capture is affected by ambient conditions

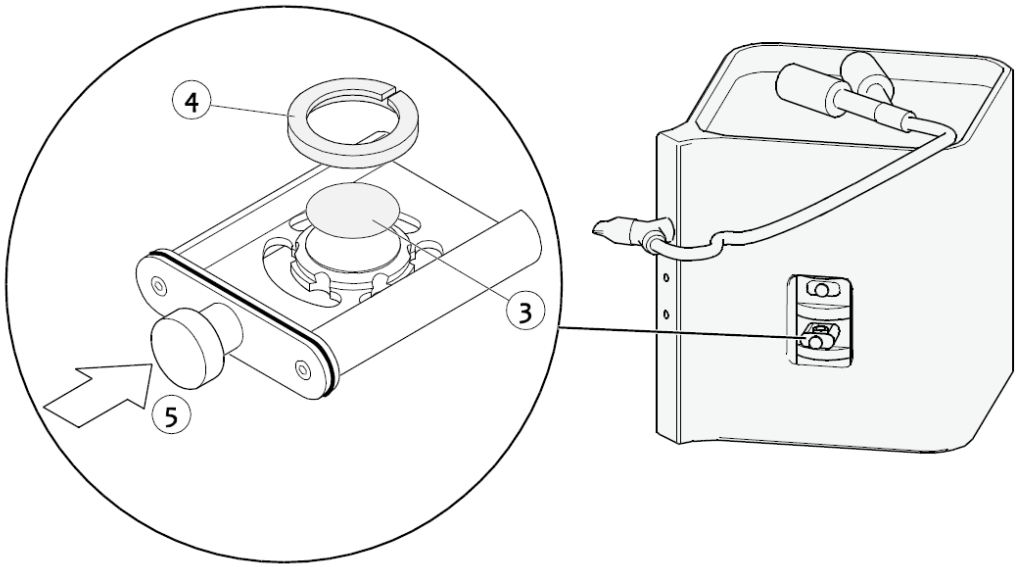
A ‘volunteer’ student in cold and hot rooms



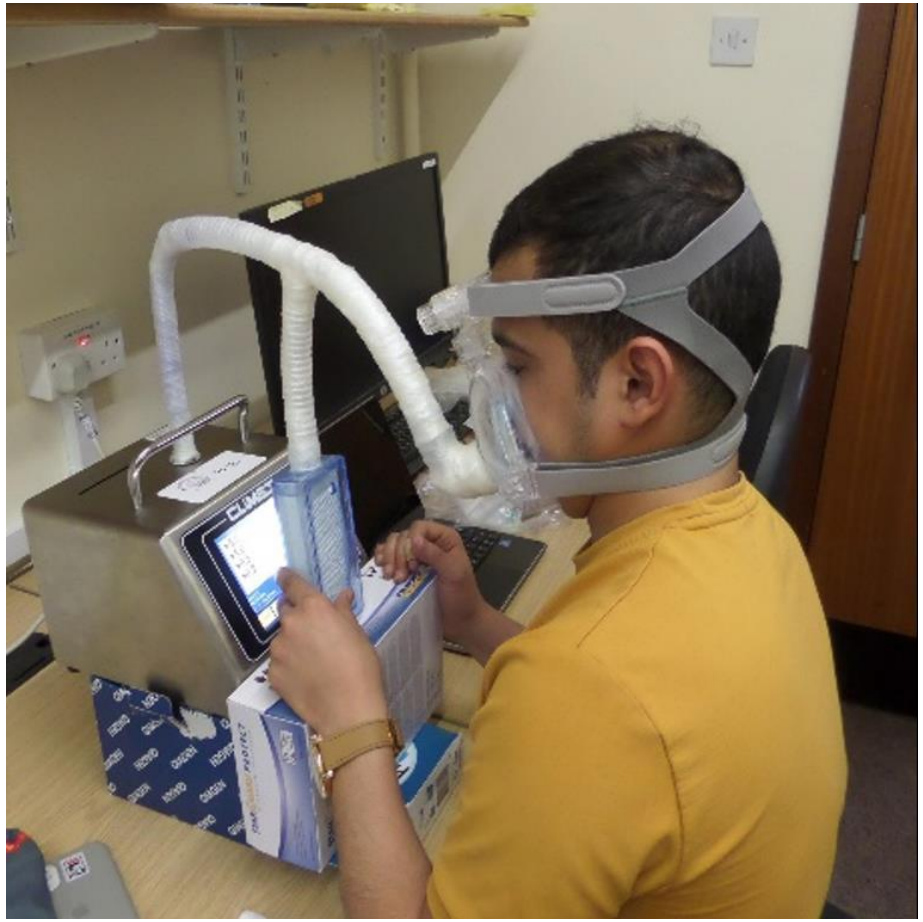
Plan to test effects of ambient temperature and humidity on capture in environment chamber

What about particle sizes?

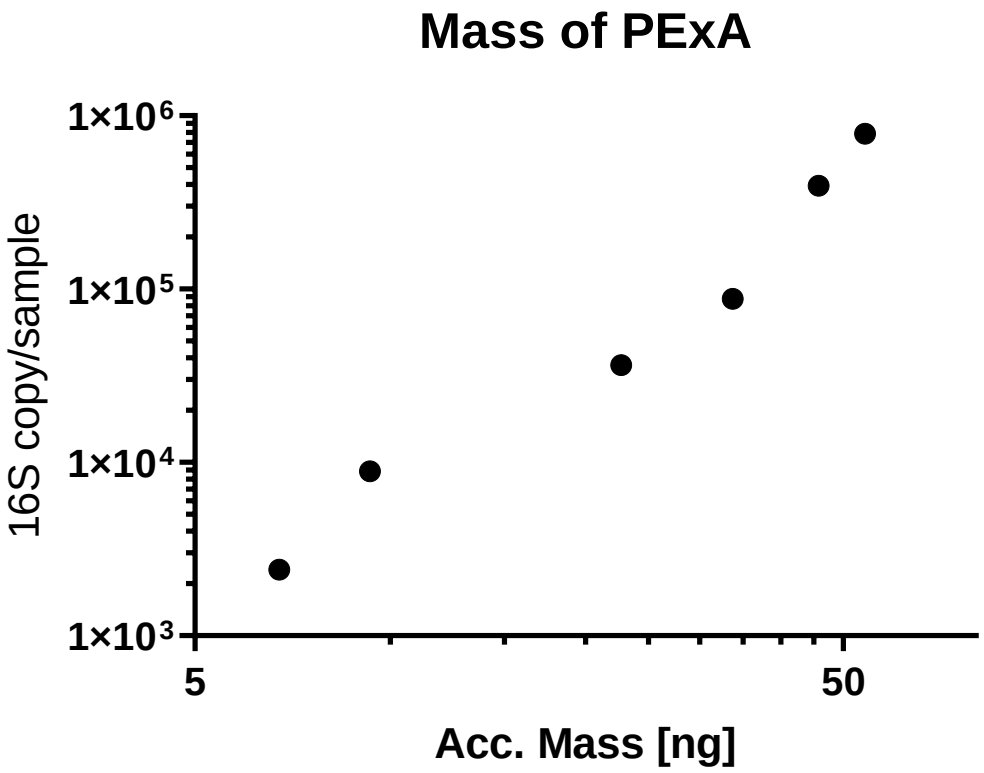
PExA Particles of Exhaled Air

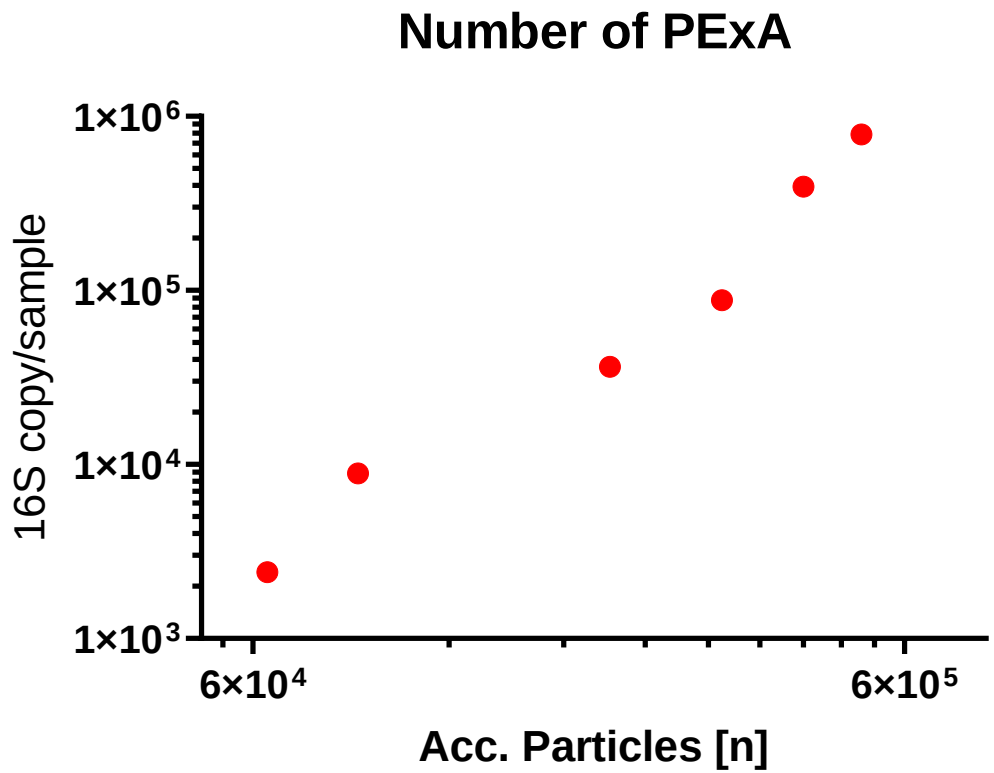


Climat 350 (David Edwards)

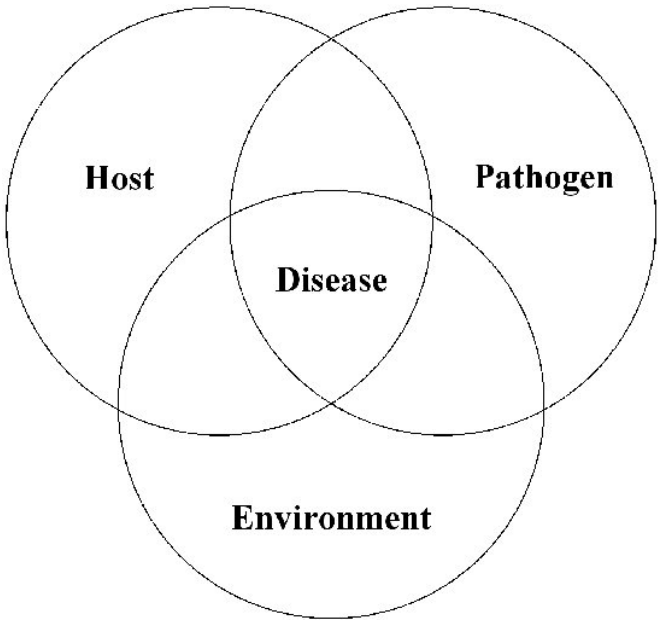


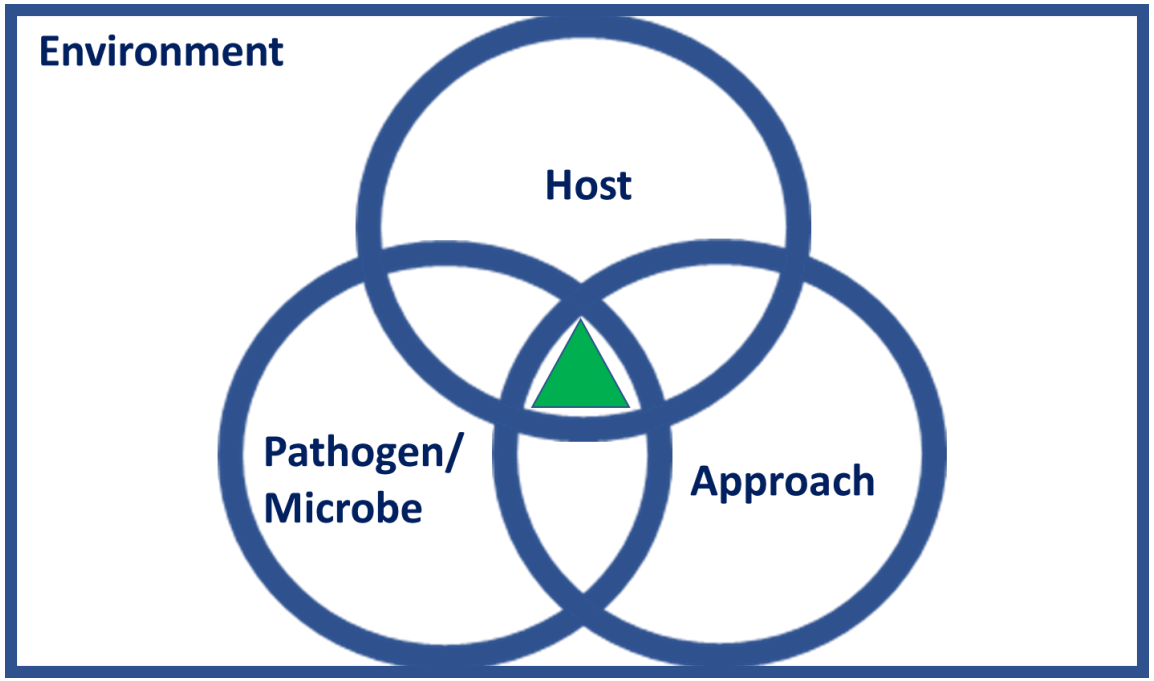
PExA collection of mass and particles on PVA





Trinity and Tetractys





PROTECT
A COVID-19 National Core Study

PLANS

- Assess Coronavirus in nebulisation system.
- If unaffected when fixed, compare variants
- Determine effects of ambient conditions on mask capture
- Healthy volunteer studies on respiratory efforts 16S capture and particle output (what microbes are in what size particles and how does this depend on respiratory efforts?

UNIVERSITY OF LEICESTER