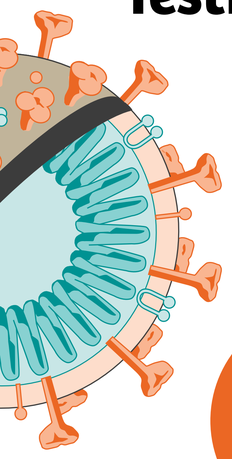
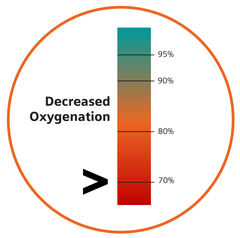
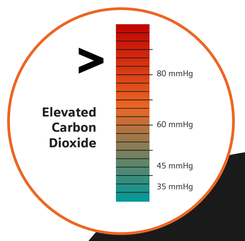
Staying ahead of cytokine storm syndrome

Testing for key inflammation markers



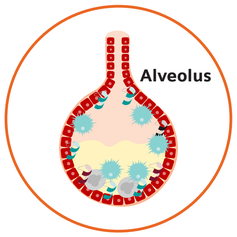
1 of 5
COVID-19 patients develop severe pneumonia[1]



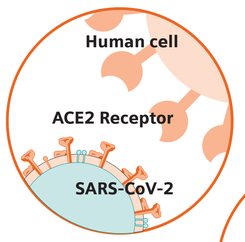


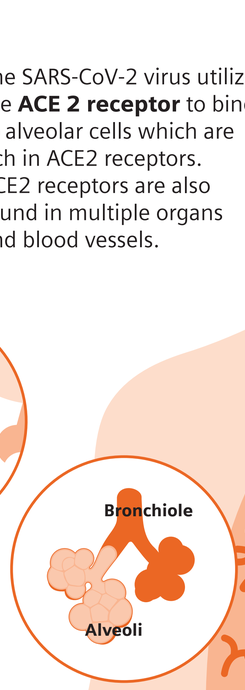
As fluid and damage accumulate in the lungs, it becomes more and more **difficult for the lungs to absorb oxygen and exchange it for carbon dioxide.**

COVID-19 pneumonia is caused by inflammation and fluid accumulation in the **alveoli**, the site of oxygen absorption and diffusion into the blood stream.



The SARS-CoV-2 virus utilizes the **ACE 2 receptor** to bind to alveolar cells which are rich in ACE2 receptors. ACE2 receptors are also found in multiple organs and blood vessels.

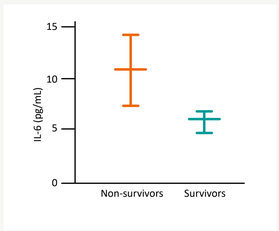




~5%
of severe COVID-19 patients develop a **systemic dysregulated cytokine response**[1,2]

Extreme immune response that can cause wide-scale cellular and organ tissue damage

IL-6 levels were higher in COVID-19 patients who did not survive.[3]



High serum levels of **pro- and anti-inflammatory cytokines** were found in patients with severe COVID-19.[4,5]

Key Marker **IL-6***

IL-1ß* | TNF-α* | IL-8*

IL-2 R* | IL-10*

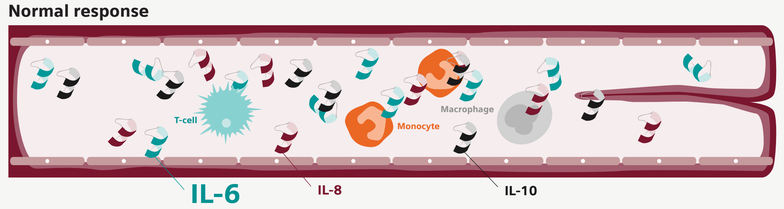
Other useful lab tests for cytokine storm patients:

ALT	AST	BIL	LDH	CRE KIN
PT/INR	D-DIMER	PCT	CREA	CYS C
SAA*	CTNI	CRP	FERR	

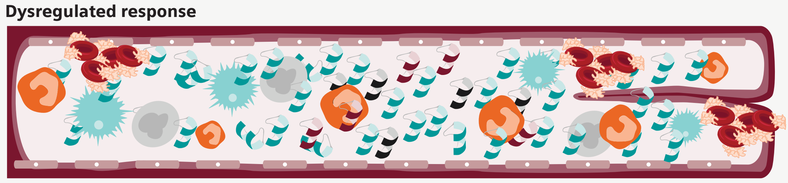
IL-6 activity blockers such as tocilizumab, sarilumab and others

Dysregulated cytokines can cause fluid leakage from capillaries generating the formation of multiple blood clots.

Normal response



Dysregulated response



Early detection of inflammation markers

can indicate the onset of a cytokine storm and assist clinicians with timely interventions

The onslaught of cytokines can cause multi-organ failure and disseminated intravascular coagulation, both contributing to death.

1. Siddiqi HK, et al. *J Heart Lung Transplant*. 2020. https://doi.org/10.1016/j.healun.2020.03.012
2. Zhou Y, et al. *National Science Review*. 2020. DOI: 10.1093/nsr/nwaa041
3. Zhou F, et al. *The Lancet* 2020. https://doi.org/10.1016/S0140-6736(20)30566-3
4. Qin C, et al. 2020 *Clin Infect Dis.* https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa248/5803306
5. Del Valle, Kim-Schulze, Huang, et al. https://doi.org/10.1101/2020.05.28.20115758

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