

Discovery of Drugs for COVID-19

Innovation in the Time of COVID Associated Medical Schools of New York

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February 11, 2021



COVID-19

Research Challenges as the Pandemic Emerged

- Inadequate systems for studying SARS-CoV-2 biology
 - Non-human or cancer cells
 - Broad spectrum of disease
 - Mild disease (80%) to multi-organ failure (1-5%)
- Poor understanding of which cells are infected
 - Respiratory system is a primary target
 - Clear complications of the heart, gut, brain, etc.





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Goal: Develop a human pluripotent stem cell-based platform



- Human cells will better represent cellular response to infection.
- In principle, many cell and tissue types can be evaluated.



Can be adapted for high-throughput small drug screens.

Yang et al. 2020. Cell Stem Cell: 27:125.

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It Takes a City: A New York Consortium



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COVID-19 colon biopsy



SARS-CoV-2 RNA



Han et al. 2021. Nature. 589: 270

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A screening platform to identify drugs that block SARS-CoV-2 infection





Summary

- Human stem cells can be used to model SARS-CoV-2 infection.
- Lung, colon, liver, pancreas and cardiac cells support SARS-CoV-2 infection and these cells respond similar to COVID-19 patient cells.
- Screens could identify FDA-approved drugs that inhibit SARS-CoV-2 and can be considered as candidates for clinical trials.





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