Applying advanced infectious disease models to study SARS-CoV-2

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The growing spread of emerging infectious diseases, such as COVID-19, or resistant pathogens indicates the need to speed up research on finding prevention or novel treatment options and testing novel innovative compounds. Since effective drugs or vaccines must induce both humoral and cellular responses against pathogenic challenges, novel alternative human approaches are needed and improved methods for delivery have to be tested.

Rapid developments in high content screening as well as organotypic cultures provide groundbreaking new tools to study pathogen transfer at entry sites or to test repurposed drugs and novel vaccination strategies. Therefore, we design optimized intelligent human barrier models combined with infection-relevant immune cells and humoral components in order to characterize and hinder overshooting host responses, pathogen entry and initial transmission steps within a 3D system. These human systems offer improved power to test delivery methods, adjuvants, repurposing of drugs or novel vaccination approaches in high throughput and will be an important challenge with broad interest.