



Acting Now to Save Lives and Dollars; The National Institute of Allergy and Infectious Diseases Pandemic Preparedness Research Planⁱ

The ongoing COVID-19 pandemic has underscored the need for readily available medical countermeasure platforms to expedite the development of vaccines and therapeutics against emerging infectious diseases (EIDs).

Previous responses to EIDs have been pathogen-specific, prioritizing research on a select number of pathogensⁱⁱ deemed to be a significant threat to human health. A major weakness in this approach is that often pathogens of concern are only recognized after an outbreak has occurred. Even the most robust predictive algorithms have failed to adequately predict the introduction and impact of public health threats such as Zika, SARS (2002), and COVID-19.¹⁻³

There is a better way. Years before COVID-19 emerged, prominent researchers were advocating for a strategy in which: 1) research gaps are filled for viral families from which deadly pandemics could emerge; and 2) this knowledge is used to develop flexible platform technologies that would empower rapidly deployable prototype vaccines and therapeutics. These objectives are part of a proposed Pandemic Preparedness Research Plan put forth by The National Institute of Allergy and Infectious Diseases (NIAID) at the National Institutes of Health (NIH). Importantly, NIAID has also proposed intensified efforts to develop “universal” vaccines that can provide protection beyond single, discrete threats. We believe that it is in the best interests of our nation for the Biden Administration and Congress to consider including funding for this NIAID plan in the next supplemental spending bill.

Background: Most EIDs are viruses.⁴ Viruses are organized within larger viral families based on shared functional and structural properties, meaning that effective treatments and vaccines against different viruses within the same family are likely to be similar.^{2,3}

A “prototype pathogen” approach, as proposed within the NIAID plan, would apply knowledge of prototype viral pathogens within each family to the development of vaccines and therapeutics for all closely related family members.³ Once developed, these prototypes together with rapid, “plug-and-play” technology platformsⁱⁱⁱ could be customized to specific viruses as they arise — significantly shortening the timeline between outbreak, approval, and use, as well as significantly reducing the associated costs.^{1,3}

Further, use of the prototype approach to identify vaccine and therapeutic platforms effective against related viruses may also empower the development of “universal” vaccines that can offer broad protection against numerous viruses within the same family.² Within the scope of future pandemic preparedness, development of universal vaccines could ensure that populations quickly have some level of blanket, protective immunity against a previously unidentified virus related to a targeted family, buying time to produce more specific treatments and vaccines.

ⁱ This summary was produced by Research!America and externally reviewed, but is not a product of NIAID

ⁱⁱ Here defined as microorganisms capable of causing disease in humans

ⁱⁱⁱ Platforms are flexible technology frameworks that have multiple applications, for example a platform enabling the development of vaccines for different viruses within a viral family

Recent progress has been made toward a vaccine effective against numerous COVID-19 variants.⁵ However further work, proposed by NIAID, is needed to develop a universal coronavirus vaccine. A universal vaccine would not only be effective against present and future COVID-19 variants, but also in offering broad protection against future threats from the larger viral family COVID-19 belongs to. As the COVID-19 pandemic is ongoing and, as Omicron has shown, its trajectory cannot be predicted. NIAID's proposal to outpace COVID-19 and other coronaviruses is of paramount importance.

Beyond the uncertainty surrounding the current pandemic, we cannot predict when the next pandemic threat will arise. The sooner we execute this proactive approach, the greater the chance that we save millions of lives and trillions of dollars going forward.

A pandemic preparedness strategy featuring a prototype platform-based approach as a key pillar was first proposed by Dr. Barney Graham, previous deputy director of the Vaccine Research Center at NIAID, years before the COVID-19 pandemic.^{1,4} With a newfound focus on mitigating the effects of future pandemics, the idea has received increased attention over the past year.⁶

Conclusion: A COVID-19 variant capable of bypassing the immune protection offered by presently available vaccines, or a completely new pandemic-level viral threat, could emerge at any time. The sooner we fill knowledge gaps to speed our response and develop preemptive interventions, the more lives, and dollars we can save. The COVID-19 pandemic has taken more than 846,460 lives in the U.S. alone, and our nation has thus far spent more than \$3.5 trillion in response to it.^{7,8} In our view, providing the funding needed to accomplish this offensive against pandemic threats should take place at the same time as additional emergency response funding is provided in response to Omicron. If we continue to treat preparedness as less urgently important than emergency response, we are needlessly rolling the dice on the future of our nation and world.

Sources:

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