

Editorial

Human Progress and Survival is Linked with Curiosity

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Introduction

Microbes and viruses have shaped the lives we live today.¹ There is not a time during when our immune systems are not fending off microbial insults. It is down to nature's marvelous gift of immunity that an individual, a community or even the entire geographical region, evades regular threats posed by microbiota around and within us. While working silently but constantly, these biological defense mechanisms are remarkably adaptable in recognizing the invader forever and confer lifelong immunity against them. Balanced diets and lifestyles are probably the most practical means to keep immune systems healthier.² Historic outbreaks have taught a lesson to stay abreast with biological mechanisms underlying human immune systems to successfully survive the everchanging potential of harm posed by even the most harmless microbe that we have learnt to live over thousands of years of evolution. Public health practices of today owe their emergence to such outbreaks and continue to evolve to maintain the interactive equilibrium between humans, the causative agents, and the environment.

The ongoing SARS-CoV-2 (COVID-19) pandemic has catalyzed fusion of what is currently known to what might be in scientific terms.³ The pandemic has galvanized fraternities like medical researchers, scientists, and administrators to collectively test ideas that lay in the proverbial waste-bins of history. From off-label drugs to vaccines, a plethora of research activity has been documented on clinical trial registries in last one year. The traditional linear chronology of new drug/ biologic product development has run a different course this time with each trial phase running in parallel.⁴ Correspondingly, a record number of Emergency Use Authorizations (EUA) have been issued. Similar to handwashing that dramatically reduced oral-fecal contamination to save millions of children in past century and quarantine that emerged as protec-

ting against medieval bubonic plague, COVID-19 might end up shaping the manner and time it takes to develop new drugs and biologics.

Successful understanding of immune mechanisms has led to the concept of vaccine – introducing potentially harmful microbe (wholly or in part) within human body to develop a lifelong immune response.⁴ Successful implementation of this scheme has saved countless lives in last two centuries. From high-tech labs mostly in industrialized world, research is being constantly translated into injectable compounds that find their way into communities across the globe through complex financing mechanisms and efficient supply chains.⁵ Traditionally, a whole microbe that has been weakened in laboratory is introduced in the body to elicit defensive response. These are referred to as live-attenuated vaccines with MMR as an example. Compare live attenuated to inactivated vaccines like inactivated polio vaccine (IPV) where a virus incapable of replication is injected. Acellular or recombinant protein-based vaccines use only a viral protein to be introduced in the body through a harmless vector – spike protein as in case of corona virus – to develop effective antibody response through disrupting the mechanism of viral action by denying it attachment to healthy cells. The ongoing pandemic has opened a relatively new frontier of vaccines based on messenger RNA (mRNA).⁶

mRNA platforms are often considered superior in terms of their apparently simpler mechanism.⁶ So far used against diseases such as cancer, it simply aims to teach body the making of antigenic protein to develop antibodies against it while self-destroying the initial (mRNA) code along the way. While mRNA-based vaccines are being administered under EUAs in different countries, a comprehensive data based on large-scale clinical trial is still awaited. Nevertheless, the technology is sophisticated and could offer a new way of developing vaccines besides promoting precision

medicine further. The challenge, however, lays in making these cutting-edge technologies more accessible and equitable particularly considering the lack of a definite choice to defend against coronavirus.

Unlike ever before, medical fraternities in low-and-middle-income countries (LMICs) have also contributed to large-scale vaccine trials.⁷ Biologic products from Chinese laboratories have found unprecedented interest in LMICs that have historically remained out of western countries pharmaceutical sphere. For the first time, Pakistan recruited a total of 18000 volunteers for CanSino BIO vaccine candidate from Beijing Institute of Biotechnology. A total of five reputed institutions participated nationwide with National Institute of Health Islamabad as the national Principal Investigator.⁸ University of Health Sciences Lahore, the only public-sector recruiting site, and Shifa International Hospital Islamabad, both ended up with recruiting over 5000 volunteers each. It represents a breath of fresh air in a gloomy past year or so. The opportunity could open those markets and avenues that have remained elusive so far. Another vaccine candidate ZF-2001 is also recently approved for testing across 10 centers in Pakistan under framework of Good Clinical Practices.⁹

Invisible microbes, both new and old, challenge our way of life from time to time.¹ The unifying of professionals and communities during the COVID-19 might end up being a silver lining. One can expect it to save more lives and reduce health disparities as new

and more infectious agents emerge in future.

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