

# Breakthroughs in medicine: top virologist on the two most important developments for Africa

By [Oyewale Tomori](#)

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There have been several important breakthroughs in medical science recently. Crispr, mRNA, next-generation cancer treatments and game-changing vaccines are some of them. Oyewale Tomori, a virologist with decades-long involvement in managing diseases in Nigeria, gives his verdict on the most significant discoveries and what they mean for Africa.



Source: City of Hope.

## Are these extraordinary times for discoveries in medicine?

Yes indeed, the world is living through extraordinary times, but not every part of the world has the luxury of these groundbreaking discoveries in medicine. Time stands extraordinarily still for some people in the world, in terms of the application and translation of the accelerated discoveries for medicine.

## Which two do you find the most exciting?

The two I find most exciting, among so many other discoveries, are the new [mRNA](#) vaccine technology and the two malaria vaccines.

The advancements made in the generation, purification and cellular delivery of RNA have enabled the development of [RNA therapies](#) across a broad array of applications. For example RNA therapy destroys tumour cells in cancer.

[Messenger RNA \(mRNA\)](#), as the name suggests, is a messenger protein molecule that has the ability to deliver a specific set of instructions to the cells of the body to make pieces of protein. Once the protein particles are made, they show up on the cell's surface. The presence of the protein alerts your immune system to mount a defence and create antibodies to fight off what it thinks is a possible infection. The body learns to recognise the viral protein as an enemy.

For example, when the [COVID-19 vaccine](#) is injected into the body, the cells are instructed to generate the spike protein that is normally found on the surface of [SARS-CoV-2](#), the virus that causes COVID-19. The protein that the body makes in response to the vaccine causes an immune response without a person ever having been exposed to the virus that causes Covid-19.

Later, if the person is exposed to the virus, the immune system will recognise the virus and respond to it. The [mRNA vaccines](#) are safe and they neither alter the DNA nor cause COVID-19 infection.



## Nobel Prize for mRNA pioneers amid jab controversy

Katja Hamilton 6 Oct 2023



Previous research laid the groundwork for the technology, which resulted in the development, production, approval and deployment of an effective Covid-19 vaccine in less than a year. The [2023 Nobel Prize in Medicine](#) was awarded to two scientists for “groundbreaking findings” on mRNA COVID-19 vaccines.

Since 2019, when Covid-19 was first reported, the disease has caused over [700 million cases and about 7 million deaths](#) globally. The technology is cost-effective and relatively simple to manufacture and can be [applied to the production of other vaccines](#), especially for the neglected diseases that are common in Africa. mRNA is a transformative technology for vaccine development to control infectious diseases.

The approval of two malaria vaccines, the [RTS vaccine](#) in 2021 and the [R21 vaccine](#) this year, though not [accelerated discoveries](#) such as vaccines for Covid-19, are a huge step in the right direction. This is particularly exciting for malaria endemic areas of the world. Malaria causes more than [600,000 deaths](#) annually, the majority in children under five and pregnant women in Africa.

Although the malaria vaccines are no [silver bullets](#), they are steps towards malaria eradication in Africa.

## What do these breakthroughs mean for Africa?

The mRNA technology will serve as a template for the development of vaccines against long-standing diseases that are endemic in Africa, [Lassa fever](#) and other [viral hemorrhagic diseases](#), as well as [cholera](#), [meningitis](#) and others.

## What do African countries need to do to ride the wave of breakthroughs?

Africa’s [vulnerability](#) to lack of access to vaccines was clearly exposed during the Covid-19 pandemic. This calls for greater vaccine-manufacturing capacity and capabilities across the African continent.

Yet, despite numerous declarations in support of vaccine manufacturing in Africa, the [African vaccine-manufacturing industry](#) is still nascent, with little progress made. The continent is manufacturing less than 1% of its required vaccine doses.

African countries must realise that investment in science, research and technology will produce significant returns.

Funding science and technology is a good economic bet. A recent [Science|Business report](#) suggests the long-term payback is in the order of 20% a year.

Africa's poor public funding for research is well documented. In 2006, member countries of the African Union committed to spending 1% of their GDP on research and development. But by 2019, the continent's funding was only [0.42%](#), in sharp contrast to the global average of 1.7%.

Africa has about [25%](#) of the global burden of unrelenting endemic communicable diseases and a rapidly escalating incidence of non-communicable diseases.

Efforts should be channelled to find solutions to [AIDS](#), [malaria](#), [tuberculosis](#) and other neglected diseases including [Ebola](#), [Lassa fever](#) and [mpox](#).

African countries must reduce their dependence on donor funding for local research, but also stop pleading for the crumbs of equity for their health security, social well-being and orderly economic development.

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## ABOUT THE AUTHOR

Oyewale Tomori is a fellow of the Nigerian Academy of Science.

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