

THE TROUBLE WITH A NOBEL FOR MRNA COVID VACCINES

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At the Karolinska Institute in Stockholm | Photo Credit: AFP

The 2023 Nobel Prize for Physiology or Medicine has been awarded to Katalin Karikó and Drew Weissman for developing the mRNA vaccine technology that became the foundation for history's fastest vaccine development programme during the COVID-19 pandemic. The prizes acknowledge work that has created benefits "for all mankind", but if we had to be stricter about holding scientific accomplishments up to this standard, the subset of mRNA vaccines used during the COVID-19 pandemic may not meet it. Yet, Dr. Karikó and Dr. Weissman, and others, deserved to win the prize for their scientific accomplishments. Instead, their triumph tells us something important about the world in which science happens and what "for all mankind" should really mean.

Dr. Kariko and Dr. Weissman began working together on the mRNA platform at the University of Pennsylvania in the late 1990s. The University licensed its patents to mRNA RiboTherapeutics, which sublicensed them to CellScript, which sublicensed them to Moderna and BioNTech for \$75 million each. Dr. Karikó joined BioNTech as senior vice-president in 2013, and the company enlisted Pfizer to develop its mRNA vaccine for COVID-19 in 2020.

Much of the knowledge that underpins most new drugs and vaccines is unearthed at the expense of governments and public funds. This part of drug development is more risky and protracted, when scientists identify potential biomolecular targets within the body on which a drug could act in order to manage a particular disease, followed by identifying suitable chemical candidates. The cost and time estimates of this phase are \$1billion-\$2.5 billion and several decades, respectively.

Companies subsequently commoditise and commercialise these entities, raking in millions in profits, typically at the expense of the same people whose taxes funded the fundamental research. There is something to be said for this model of drug and vaccine development, particularly for the innovation it fosters and the eventual competition that lowers prices, but we cannot deny the 'double-spend' it imposes on consumers — including governments — and the profit-seeking attitude it engenders among the companies developing and manufacturing the product.

Once Moderna and Pfizer began producing their mRNA COVID-19 vaccines, they were also mired in North American and European countries' zeal to make sure they had more than enough for themselves before allowing manufacturers to export them to the rest of the world; their use in other countries (including India) was also complicated by protracted negotiations over pricing and liability.

COVAX, the programme to ensure poorer countries did not become the victims of their subpar purchasing power and had sufficient stocks of mRNA vaccines, fell far short of its targets. India, Russia, and China exported billions of doses of their vaccines, but their efforts were also beset by concerns that manufacturing capacity had been overestimated — in India's case — and over quality in Russia's and China's. There were reports of several countries in Africa having to throw away lakhs of vaccine doses because they had been exported too close to their expiry dates. The World Health Organization did urge these countries to use the expired doses, but such a task presumed an existing base of community engagement and risk communication, which was absent in many of these countries.

A counterexample to the path that Dr. Karikó followed is Corbevax: researchers at the Baylor College of Medicine, Houston, and the Texas Children's Hospital Centre for Vaccine Development developed this protein sub-unit vaccine and licensed it to India's Biological E for manufacturing. They did not patent it. In February 2022, Texas politician Lizzie Fletcher wrote a letter nominating the vaccine's developers for a Nobel Prize for Peace "for their work to develop and distribute a low-cost COVID-19 vaccine to people of the world without patent limitation". Kenya's Ambassador to the United Nations Martin Kimani commended the developers for "providing sorely needed ethical and scientific leadership".

We cannot blame our scientists for trying to profit from their work; the mRNA vaccine story during the COVID-19 pandemic simply placed an extraordinary premium on altruism on their part — a result of administrators' botched decisions. The technology could have benefited everyone during the pandemic, but it did not. So, history should remember what actually happened during the pandemic and what the 2023 Medicine Nobel claims happened differently.

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