mRNA Vaccine Misinformation: Myth vs. Fact

Misinformation is often spread about vaccines via the internet and word of mouth. When patients have encountered misinformation about mRNA vaccines, providing fact-based information can help them make evidence-based choices health decisions. Below are common myths and their corresponding explanations, backed by proven facts. *This information is not intended to guide clinical practice. Health care providers should use their independent medical judgement for individual patients' clinical decision-making. Refer to your local Health Authority for the latest recommendations.*

mRNA Vaccine Safety

MYTH: mRNA vaccines change DNA.

Learn more

FACT: mRNA vaccines can't change DNA.[1] Vaccine-delivered mRNA never encounters DNA – it stays in the cytoplasm of cells, unable to enter the nucleus where DNA is housed, and is broken down by the body after protein assembly is complete.[2]

MYTH: The mRNA vaccines for COVID were developed too quickly – there's no way to know if they're actually safe.

FACT: Scientists have been studying mRNA and mRNA vaccines since the 1960s and 1990s, respectively.[2,3] All mRNA COVID-19 vaccines went through the full clinical trial process, completing phase 1, 2, and 3 trials with tens of thousands of study volunteers.[4] The FDA was then able to authorize the COVID-19 vaccines within weeks of clinical trial completion by having staff work around the clock to prioritize their review.[4] COVID-19 vaccines underwent the most intensive safety analysis in U.S. history during the pandemic and continue to be monitored to ensure they continue to meet FDA's standards for safety and effectiveness.[5]

MYTH: mRNA vaccines are so new that they probably have negative long-term side effects that we're not aware of.

FACT: More than 13 billion doses of COVID-19 vaccines have been safely administered worldwide, making them one of the most studied vaccines in history.[6] Common side effects – such as chills, fatigue, and injection site pain - are generally mild and temporary.[5] Serious side effects are rare and generally occur within six weeks of administration.[7] Myocarditis has been identified as a rare potential side effect – with the highest incidence in 12-24 year old males - but these cases are generally short-lived and less severe than myocarditis cases associated with COVID-19 infection.[5,8] There is no link between mRNA vaccines and autism.[9]

MYTH: Side effects from mRNA COVID vaccines are worse than getting COVID.

FACT: Common side effects of COVID-19 vaccination – such as chills, fatigue, and injection site pain - are generally mild and temporary and serious side effects - such as myocarditis - are rare.[5,7] A COVID-19 infection can range from mild to severe.[5] Even in mild cases, COVID-19 infection can result in long COVID.[10] In addition to the risk of Long COVID, research has found that patients have a higher risk of new diagnoses of diabetes and cardiovascular and autoimmune disorders following COVID-19 infection.[11-13]

MYTH: mRNA vaccines impact pregnancy, menstruation, and the ability to get pregnant.

FACT: mRNA COVID-19 vaccines are safe for people who are pregnant, breastfeeding, or trying to conceive.[14] There is no evidence that they cause infertility, and medical groups - including the American College of Obstetricians and Gynecologists (ACOG) - recommend COVID-19 vaccination for pregnant people.[15,16] Some people may experience temporary menstrual cycle changes following vaccination,[15] but these are likely due to the body's natural immune response - not the vaccine itself – and typically resolve within 1-2 cycles.[17,18]

How Immunity and mRNA Vaccines Work

MYTH: I've had COVID-19 before, so I have natural immunity against it and don't need a vaccine.

FACT: Even for those who have previously been infected, vaccination remains the best available protection against the most severe outcomes of COVID-19.[19] Vaccination is a controlled way to boost immunity without causing illness and can produce a more predictable immune response than natural infection.[20] Immunity following a COVID-19 infection may vary depending on the severity of the patient's illness, age, and the time since infection, and gradually wanes over the following months.[21] The CDC states that those who recently had COVID-19 should still to stay up to date with vaccines, but may consider delaying their next COVID-19 vaccine dose by 3 months.[19]

MYTH: mRNA vaccines don't provide durable or strong protection – if they did, it wouldn't be necessary to get them every year.

FACT: When the SARS-CoV-2 virus mutates, its spike protein can change and may no longer closely match the one that a previous vaccine taught the body to recognize. Vaccine formulations are adjusted periodically in an effort to keep pace with the evolving virus and help protect against newer circulating strains. Another reason for repeat vaccination is antibody levels, which quickly increase following vaccination but naturally wane over time. Staying up to date with recommended vaccinations helps to maintain antibody levels against circulating strains and reduce the risk of severe outcomes.[19,21]

MYTH: mRNA vaccines work just like traditional vaccines.

FACT: Traditional vaccines usually contain a piece of the virus (such as a protein) or a virus that's been inactivated (killed), so the body can recognize and mount an immune response if it ever encounters the full live virus.[22] mRNA vaccines, on the other hand, provide an mRNA 'blueprint' that the cells' natural machinery use to make a protein piece of the virus. Exposure to this protein allows the immune system to train to recognize and fight the virus in the future without being exposed to the full virus.[1]

Think of your immune system like a barn cat that needs to hunt mice and vaccines as a way to train the cat to recognize mice. A traditional protein-based vaccine would give the cat a store-bought toy mouse. An mRNA vaccine would instead give the instructions to make a toy mouse in-house that would then be given to the cat. While the method of getting the toy mouse differs between the vaccine types, both train the cat to identify mice for future hunting.

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