

BIRTH OF THE

mRNA VACCINE

Promise & Beyond



COVID-19

Learning from bats
Can they help us develop immunity?

Conspiracy theory | Ecological connection | Myths vs Facts | A battle of many parts

EDITORIAL

May you live in interesting times!

The cascading effect of an increasing human population on climate change and animal habitats coupled with an exponential increase in travel culminated last year in the attack of the coronavirus. Larger than life and certainly larger and more complex than the normal genome, it changed lives, as it thrived and spread across species and continents. Resistant to most drugs used against RNA viruses, the coronavirus operates by transmitting a messenger, ribonucleic acid (RNA), to relay genetic instructions in DNA and take control of the cell's reproductive machinery. Proofreading enzyme, exonuclease corrects the mistakes it makes as it replicates, forcing researchers to seek drugs that inhibit or bypass its genome-proofreading function and inhibit the virus.

2021 brings with it new hope and cheer, as a slew of vaccines hit the market — over 115 candidates in varying stages of R&D, with over 500 clinical trials of potential treatments and interventions. Including the first ever FDA-approved vaccine based on RNA technology for human use. Today, modern genetic technology races to catch up with a mutating and changing virus. And mRNA technology inspires hope of improved drug design for treating infectious as well as other diseases.

The pandemic has not only exposed our broken connections with our environment, but also laid bare our limited competencies in health. As we try out a cocktail of remedies, happily merging roll-out plans with clinical trials, in our frenetic dash for the vaccine, Let's spare a thought for long-term ecological solutions, and better health care systems. Which need to become far more responsive and resilient, as do our people. After all, stronger immunities respond faster to pathogens. There is no quick-fix method.

Interesting times, indeed!



K C Raghu
Managing Director
raghu@pristineorganics.com

MANAGING EDITOR

K C Raghu

EDITORIAL TEAM

Vineeta Lal
Yamini P

DESIGN TEAM

Deepika Rathnakar
Radhika Rajesh
Pallavi Shetty

PUBLISHED BY

Pristine Organics
www.pristineorganics.com

For any suggestions or feedback
email at [pks@pristineorganics.in](mailto:phs@pristineorganics.in)

For private circulation only



Let us collaborate to promote health,
prevent disease and preserve nature for healthier,
happier tomorrows.

a PRISTINE TRUE HEALTH initiative

PRISTINE Health Science

IN THIS ISSUE

ISSUE 01 | VOL. 03 | 2021

INSIGHT

Top Story

- 7** Birth of mRNA vaccine



- 11** COVID-19 & the ecological connection

UPFRONT

Immunity

- 5** Can bats help us develop immunity?
- 12** A battle of many parts
- 14** Don't believe these vaccine myths

OTHERS

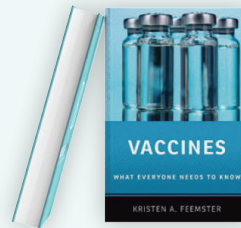
Health

- 4** The gut connection



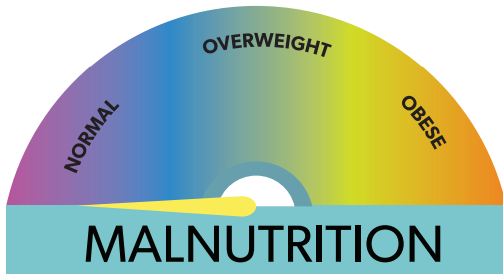
- 16** Consequences of conspiracy theories

Book Shelf



- 17** COVID-19: The Pandemic that Never Should Have Happened and How to Stop the Next One

VACCINES: What everyone needs to know



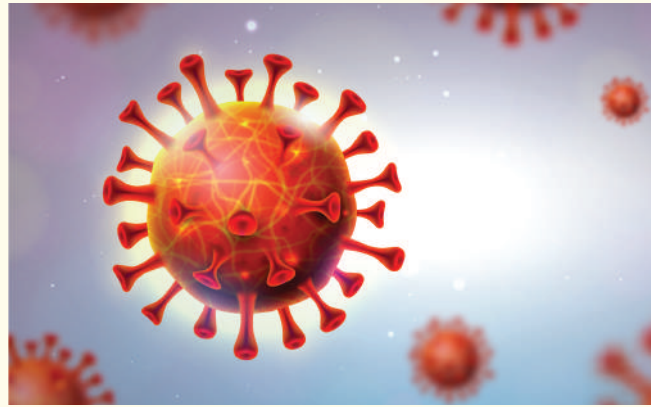
Rising malnutrition

& COVID-19

A UNICEF report states that children and adolescents account for 1 in 9 reported COVID-19 infections. As per early November statistics, children and adolescents accounted for 11 percent of the total infections reported in 87 countries. Today the actual threat to children's health comes from disruption to basic services and rising poverty due to the pandemic. The longer the crisis, the deeper its impact on children's education, health, nutrition, and well-being.

Challenging coronavirus variant

A new study states that some coronavirus variants may pose unexpected challenges to the immune system even in those who have been vaccinated – a development that scientists didn't anticipate. This means people who survived mild coronavirus infections may still be vulnerable to a new variant, and the vaccines may be less effective against the variants. The vaccines work by stimulating the body to produce antibodies against the virus. Over time, the virus may gain mutations that allow it to evade these antibodies called escape mutations. Some studies suggest such mutations would be advantageous to the virus.



Does vitamin D combat COVID-19?

Studies suggest that high sufficient levels of vitamin D play an important role in immune and metabolic functions. It also reduces the risk of community-acquired respiratory illnesses. Even before the current pandemic, the immunomodulatory role of vitamin D has been studied in the treatment of upper respiratory infections. There are receptors found in various innate immune cells and hence vitamin D can help regulate the immune system. The vitamin suppresses the adaptive immune response in the affected lung epithelial cells, thereby preventing the pro-inflammatory agents' harm on the affected areas.

COVID-19

THE GUT CONNECTION

Scientists have found that even in the absence of gastrointestinal problems, COVID-19 patients have an active and prolonged gut viral infection. Researchers at the Chinese University of Hong Kong said that the coronavirus may continue to infect and replicate in the digestive tract after clearing in the airways. The findings, published in the journal *GUT*, have implications for identifying and treating cases, the researchers said.

Generally, SARS-CoV-2 spreads through respiratory droplets, spatters of the virus, laden discharge from the mouth and nose, as per the World Health Organisation. After the first few weeks of the pandemic, scientists said infectious virus in the stool of patients may also play a role in transmission. The study was conducted among 73 patients hospitalized with the coronavirus in China's Guangdong province. More than half tested positive for the virus in their stool.

Researchers earlier claimed that SARS-CoV-2 was a pulmonary or respiratory disease, but over the last few months, a lot of evidence has emerged that SARS-CoV-2 also affects the intestinal tract.

They studied stool samples from 15 patients to gastrointestinal tract. In seven of them, they found active gut infection. Some of them had no nausea, diarrhea, or other digestive symptoms. Their stool continued to test positive even a week after their respiratory samples were negative.

They did further tests to demonstrate that virus particles from the stool are capable of causing disease after finding surrogate biomarkers that indicate they are infectious. But researchers are wondering how SARS-CoV-2 made its way to the gastrointestinal tract to cause an infection there. Could infectious particles survive the stomach's acidic environment?

The gut bacteria of patients with a gastrointestinal coronavirus infection showed a loss of protective microbes and an increase in disease-causing ones. The effects were worsened in COVID-19 cases treated with antibiotics. Researchers believe that the stool test is accurate and safe, making it suitable and more effective for COVID-19 screening for specific groups of people.

Learning from bats

Ever since COVID-19 devastated the globe all bats have been getting bad press. Except, possibly, for Batman of the Avengers fame. The novel coronavirus is bringing out the worst in humanity towards these winged nocturnal creatures. There has been huge uproar regarding the removal of bat roosts and even killing them, suspecting them to be carriers of SARS-COV-2, the viruses that cause COVID-19.

Just like humans, bats live in large dense groups and they spread germs amongst the populace. But their longevity enables viruses to persist for years in each individual animal. Bats have a remarkable immune system and this helps tame and tolerate many viruses that create problems when they spread to humans, including the coronavirus.

Scientists and researchers are of the opinion that humans should look at bats and what they are doing to control the virus and adapt to them in their life.

Immunity, in layman terms, means resistance to disease. But immunologists think of immunity as how rapidly an individual's responds to a pathogen. Coronaviruses have been affecting bats for millions of years. But it started moving to people only recently, perhaps recently in the case of the SARS CoV-2 virus, responsible for COVID-19.

Several zoonotic diseases have spread to humans via bats through an intermediate animal host. This includes viruses Nipah, Ebola as well as coronaviruses that caused Sars, Mers, and now COVID-19. But the compelling aspect about the bat is how they control infections. These flying mammals differ from others in their innate immune system. Researchers say that bats produce interferons, molecules that help in activating the immune response, and in preventing the virus from replicating. Coronaviruses such as SARS COV-2 spread and thrive in bats by subverting interferons.



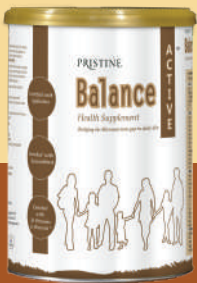
It was believed that interferons were potential wonder drugs in the 1970s and 80s. But they have not lived up to the expectation later on. Their role in modulating the immune system is still relevant in the world's fight against COVID-19

This brings to us to one of the pertinent questions: How do these zoonotic diseases spread? Andrew Cunningham, a professor at the Zoological Society of London has an answer. He says that when bats are stressed- by being hunted, by being kept in wet markets, or habitat damaged by deforestation- their immune system is challenged and makes it harder for them to cope with the pathogens. This is similar to that of humans. When humans catch a cold, they get the cold sore virus, and in turn, get a cold sore. This means that the virus is being expressed. This can happen in bats also. Environmentalists say that bats, far from being harbingers of death, hold an important role in the ecosystem they inhabit. The genetic blueprints of bats have provided scientists some clue about their unique immune systems. Scientists hope that an understanding of how bats can tolerate viruses without getting sick could help in the development of the treatment of viruses including Covid-19. Bats being pollinators, seed dispersers, and pest controllers may provide solutions to help human health during this and future pandemics. To sum it up, evolutionary theory suggests that viruses don't want to kill their hosts but to spread through them as efficiently as possible while doing little harm.

Scientists and researchers are of the opinion that humans should look at bats and what they are doing to control the virus and adapt to them in their life.

HELP YOUR PATIENTS FIND THEIR BALANCE

Balance dietary supplements help bridge the nutrient gap in daily diets. Our range, scientifically designed and nutritionally superior, is customized for varying needs.



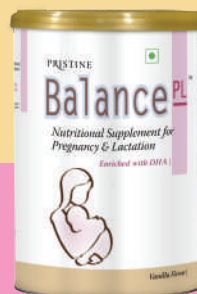
ACTIVE



DIABETES
MELLITUS



HIGH
PROTEIN



PREGNANCY &
LACTATION



KIDS

Margaret Keenan, 90, is a happy person now. On December 8, 2020, she became the first person in the UK to receive the Pfizer-BioNTech mRNA vaccine. This came a week after the United Kingdom gave its emergency nod to the vaccine produced by US drug-maker Pfizer and Germany's BioNTech. Rival products developed by US biotechnology company Moderna and a collaboration between Oxford University and AstraZeneca are also reviewing vaccines along with other companies.

mRNA vaccines present a promising alternative to the traditional vaccine approach due to their high potency, capacity for rapid development, and potential for low-cost manufacture and safe administration. But their application has until recently been restricted by the instability and inefficient delivery of mRNA. After recent technological advances, multiple mRNA vaccine platforms have demonstrated positive results in both animals and humans

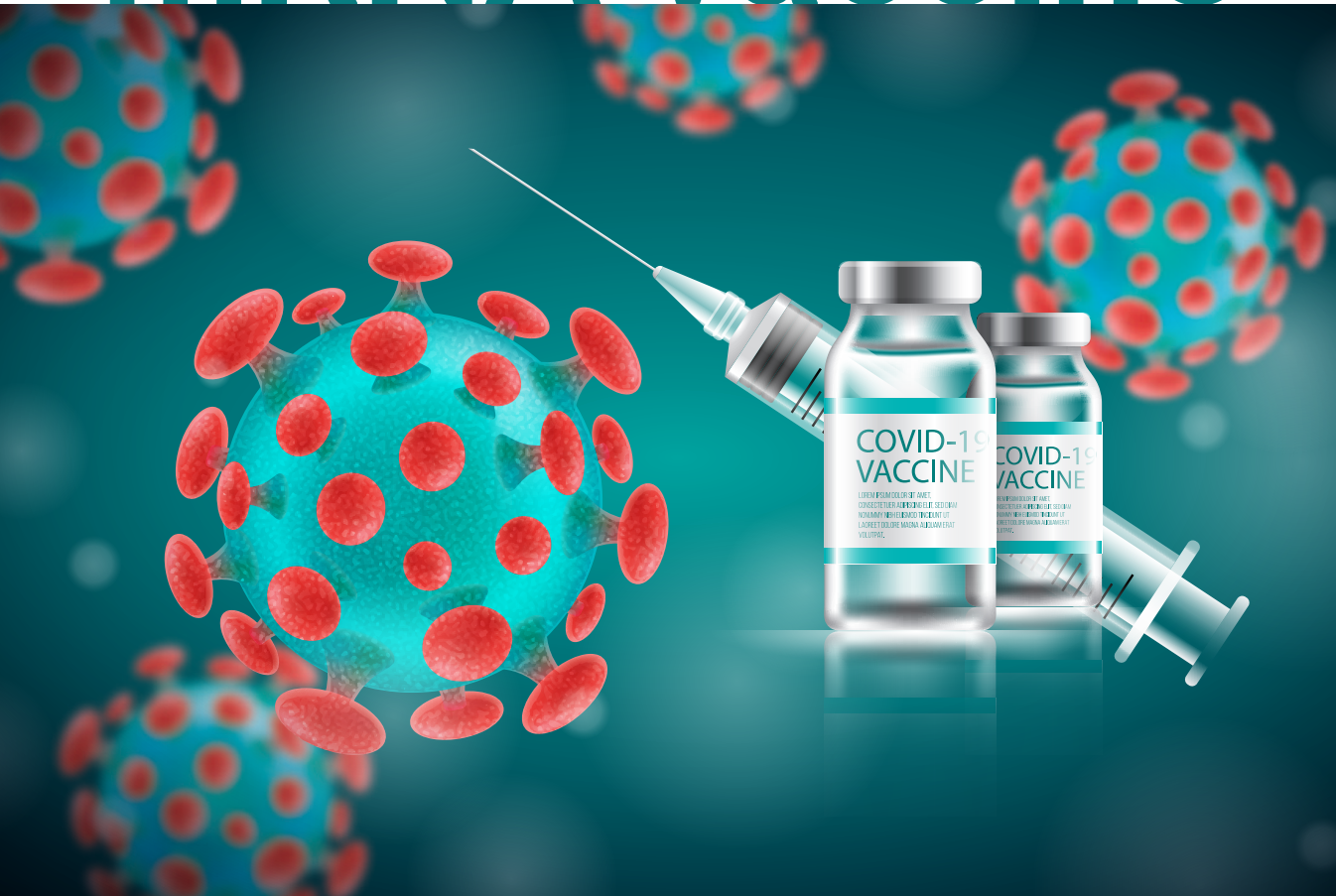
How does the mRNA vaccine differ?

The goal of a vaccine for any infectious agent is to teach the immune system what the virus looks like. Once educated, the immune system vigorously attacks the virus, if it enters the body.

All viruses contain a core of genes made of DNA or RNA wrapped in a coat of proteins. To make the coat of protein, the DNA or RNA gene makes messenger RNA (mRNA), which in turn makes the protein. An mRNA of a structure makes a protein of a specific structure. Traditional vaccines use weakened viruses, while others use a critical piece of the virus's protein coat.

In COVID-19, a piece called spike protein is the critical piece. Growing large amounts of a virus and then weakening the virus or extracting the critical piece takes a lot of time.

Birth of the mRNA vaccine



Early days

About 30 years ago a group of scientists began researching to see whether vaccines could be made more simply. Comparatively, it is easy to make mRNA in the laboratory. It started when researchers asked themselves what would happen if mRNA was injected into someone. The mRNA travelled through the bloodstream and were, in turn, gobbled up by the immune cells, which then started to make the spike protein. And so the mRNA vaccine was born.



Plenty of obstacles

The process may sound simple. But it took decades of work for mRNA vaccines to overcome their hurdles. Initially, scientists modified mRNA so that it did not produce any violent reactions in the immune system. Later they learned to encourage immune system cells to gobble up the mRNA as it passed through the blood. They also understood how to coax those cells into making large amounts of a critical piece of protein. Finally, they enclosed the mRNA inside minute capsules to protect it from being destroyed by chemicals in the blood.

Researchers also realised that by stimulating the immune system to make antibodies and immune system killer cells, mRNA vaccines generate a stronger immunity than do traditional vaccines.

COVID-19 & mRNA vaccine

Then came COVID-19 and these painstaking experiments found form in the Pfizer vaccine. Companies began to believe that an mRNA vaccine could be developed for any pathogen by inserting the right mRNA sequence for that disease. Once the first case of COVID-19 was identified in China, scientists determined the structure of all its genes, including those which

make the spike protein. Within minutes of the first case, scientists started working on the design of the mRNA vaccine.

In a few weeks, they started testing it on animals, and then on people. A mere 11 months after the discovery of the SARS-CoV-2 virus, researchers in the UK and the US confirmed that the mRNA vaccine was effective and safe, paving the way to widespread immunization.

How does mRNA vaccine work?

Any vaccine's primary job is to train the immune system to recognize the disease-causing part of a virus. Vaccines contain either weakened viruses or purified signature proteins of the virus.

In the mRNA vaccine, rather than having the viral protein injected, a person receives genetic material, mRNA, that encodes the viral protein. These genetic instructions are injected into the upper arm; the muscle cells translate them to make the viral protein in the body.

Scientists take a part of the virus's genetic code to make a vaccine. The vaccine then enters the cells to produce the coronavirus spike protein. The body's immune system reacts, produces antibodies, and activates the T-cells to destroy cells with spike protein.

PRISTINE[®]
fields of gold

*Pink salt
rocks*

*unprocessed pink Himalayan salt is naturally low in sodium,
high in calcium, magnesium and potassium.
Not just healthier, tastier too.*





Thus if the patient gets infected with the coronavirus, these antibodies and T-cells fight the virus.

Promising therapeutic tool

The use of mRNA vaccine has several beneficial features over sub-unit, killed, and live attenuated virus as well as DNA-based vaccines. Firstly, it is a non-infectious, non-integrating platform and there is no potential risk of infection or insertional mutagenesis. Secondly, it is efficacious.

Various modifications make mRNA more stable and highly translatable. Since mRNA is the

minimal genetic vector, anti-vector immunity is avoided. Lastly, mRNA vaccines have a huge potential for rapid, inexpensive, and scalable manufacture.

The road ahead

Information about the vaccine's lasting protection will come in gradually. If immunity doesn't last, it may be necessary to have annual vaccines, like for the flu. As per initial data, the RNA vaccine protects 94 percent of adults over 65 years and its third stage trial says that it works in all age groups. Except those with a weak immune system. The future seems bright, and the clinical data and resources provided by these companies are likely to add to the basic research into mRNA-based therapeutics.



Ready-to-eat healthier?



- *Organic ingredients*
- *Pure ghee*
- *No preservatives*

PRISTINE

OvenOrgTM

Ready to eat treats

Promise & Beyond

Recent improvements in mRNA vaccines act to increase protein translation, modulate innate and adaptive immunogenicity and improve delivery.

mRNA vaccines have elicited potent immunity against infectious disease targets in animal models of influenza virus, Zika virus, rabies virus, and others, especially in recent years, using lipid-encapsulated or naked forms of sequence-optimized mRNA.



Diverse approaches to mRNA cancer vaccines, including dendritic cell vaccines and various types of directly injectable mRNA, have been employed in numerous cancer clinical trials, with some promising results showing antigen-specific T cell responses and prolonged disease-free survival in some cases.

Therapeutic considerations and challenges include scaling up good manufacturing practice (GMP) production, establishing regulations, further documenting the safety of the vaccine, and increasing efficacy.

Important future directions of research will be comparison and elucidation of immune pathways activated by various mRNA vaccine platforms, to improve current approaches based on these mechanisms, and to initiate new clinical trials against additional disease targets.



(Courtesy: Nature)

Liquid gold

Our blossom honey, fresh from the forest is loaded with antioxidants and the protective power of phytonutrients.

Not just healthier, tastier too.



COVID-19

THE ECOLOGICAL CONNECTION



Environmentalist Aldo Leopold once wrote: A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community; it is wrong when it tends otherwise. This holds true especially in these times of the COVID-19 pandemic. It's true that we are in the lockdown wave, but it's also important that we should leave our narrow shell, open our mind and respect other species in the universe. Corona and other viruses actually constitute socio-ecological problems, relating to how human beings, the microcosmos, keep the equilibrium in the universe as the macro cosmos. Equilibrium means being in an equal relationship between different species. An unequal relationship between species causes ecological imbalances that may end up in various problems including deadly viruses.

Some viruses such as human immunodeficiency virus (HIV) or Ebola, which was transmitted to people from wild animals, and the new coronavirus, which was also transmitted between humans and animals, show that our ecosystem is in a critical state. Experts say that this is because humans cut down forests and expand industrial activities. This gives animal microbes pathways to adapt to the human body. On the other hand, COVID-19 and its shelter-in-place orders have come as a welcome relief to places with air pollution and unhealthy environments. Environmentalists say that trends of climate change, habitat destruction, and urban pollution play a role in the appearance of the virus and its spread. Though there are no proven theories, a few discussions

are connected to this aspect. The rapid dismantling of life on earth is due to habitat loss, which happens mainly from growing crops and raising livestock for people. When there are fewer places to live and even fewer food sources to feed on, animals enter human habitations in search of food and this in turn leads to disease spread.

States need to implement an integrated nutrition policy to address the broader determinants of under-nutrition. Focus should be given to providing clean drinking water, reducing open defecation and food and nutrition security.

There are several ways in which ecosystem disruption can exacerbate infectious diseases. For eg: humans are increasingly encroaching tropical forests, home to different species of animals and within them unknown and potentially new viruses. When humans disrupt and stress these species and their ecosystems, it unleashes the viruses from their natural hosts, that jump to humans.

The ongoing pandemic should serve as shock therapy and teach us not to look down on human viruses. Our primary concern should be to seek ecological remediation. Coronavirus is zoonotic, which means it can jump from animals to humans. The virus' spread and eradication depends on the human socioecological relation with other species. Clearly, the better our relationship, the greater our chances of survival.



A battle of many parts

Be it COVID-19 or any other diseases born out of similar virus variants, the battle against them depends on your body's immune response. In severe cases of the COVID-19 attack, the battle between viruses and the immune system carries on much longer.

Mild and severe cases

The levels of virus increases as the virus replicates and spreads from cell to cell. When the level of the virus increases to the maximum, symptoms start appearing. If you have symptoms like cough, fever, cold, etc., it means that the body is fighting the virus. Normally in mild cases, the body doesn't have any symptoms, and the immune system reduces the viral load by itself without medical intervention. But in severe cases, the symptoms continue in the body for longer and hence the immune system reduces the viral load slowly. Most severe cases result in death when other body parts, not directly connected with viruses, are impacted.

Rapid and adaptive responses

Generally, the immune system responds in two ways: rapid innate response and adaptive response. Firstly, the immune system produces cytokine molecules, which produce inflammation at the site of the attack and send signals to other immune cells. In mild cases of corona attack, the innate response is effective in bringing down the viral load. But if the defense mechanism falls, then the virus starts increasing. In such cases, the innate immune cells continue to replicate in the affected areas. This may lead to excessive

inflammation and can damage vital organs like the heart, kidney, etc.

In an adaptive response, T cells and B cells work together to produce antibodies or instruct infected cells to self-destruct. In severe cases, if the innate response comes late, the immune system will not be able to keep up with the increasing number of viruses even with the adaptive response.





Anti-immune medicines

If patients are at severe risk, the immune system goes into overdrive to fight the virus but ends up damaging healthy tissues and vital organs. In such cases, doctors use anti-immune medicines. Some of them use a dose of dexamethasone, a steroid that dulls the immune response by curbing the cytokines' activity. Dexamethasone has reduced death rates in COVID-19 patients who need ventilator support.

Antivirals in the early stages

Once the virus enters our body, it creates copies of itself and then takes over the body's cells. Antivirals are used to reduce viral load. Since there is no proven cure yet for Sars-CoV-2, experts say that antiviral treatments are effective in the early stages of treatment. A cocktail of monoclonal antibodies have been shown in early trials to speed up recovery and reduce the viral load. For instance, Remdesivir, cleared for use in India as well, works against the viruses that have already entered cells. This helps prevent the replication of viruses and reduces hospital stay.

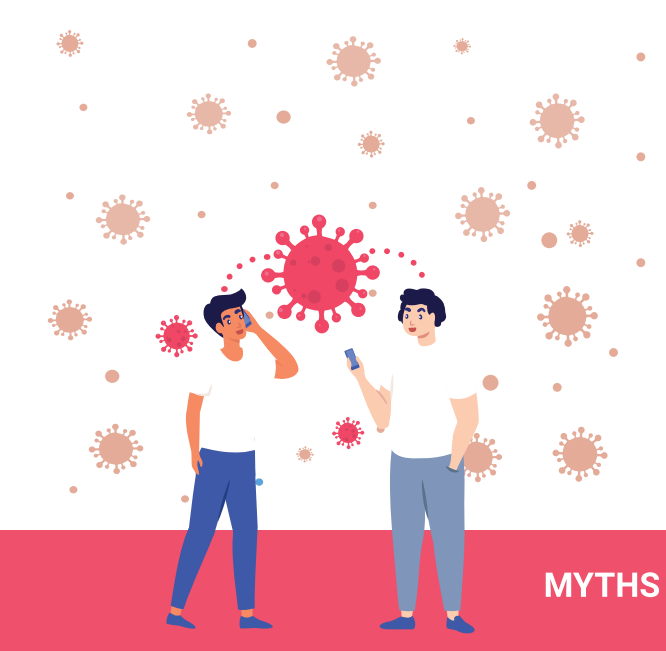
Comfort food

bisibele bath & millet khichdi
made in ghee



- Organic ingredients
- Pure ghee
- No preservatives

PRISTINE
OvenOrgTM
Ready to eat treats



MYTHS / FACTS

Don't believe these vaccine myths

You may have shared them on social media, knowingly or unknowingly. But most of these so-called claims about vaccines are untrue. From claims that vaccines may tweak your DNA to claims that they give you COVID-19, myths are part and parcel of vaccine research. Here are a few myths that are buzzing around from mouth to mouth and on social media.

Side effects are worse than COVID-19

A recent social media post that is doing rounds claims that vaccines could kill up to seven lakh people. This post, claiming to be a message from Bill Gates is fake. Gates simply said that up to 7 lakh people could have side effects. Some side effects like fever and pain at the injection site are normal during vaccination and it will not do long-term harm. Another fake claim is that vaccines will have a higher mortality rate than the virus attack itself.

The vaccine will give you COVID-19

Now, this is another bizarre myth. It is certainly not true. COVID -19 vaccines don't contain the virus but only a part of it. There may be fever or other minor reactions as part of the vaccination. But that is a sign of your immune system's response.

Microchip myth

Another baseless claim started when a US company said it was making pre-filled syringes

COVID-19 vaccines, which have radio frequency (RFID) tags in their labels for tracking. Hence, the chip stays on the box. But this is not right as microchips are too large to be injected into people.

The vaccine will tweak your DNA

Another myth. The new vaccines from Pfizer and Moderna are indeed built around mRNA. But that doesn't mean they are gene-editing tools. The mRNA inserts genetic instructions into cells, but it never enters the nucleus of the cell, where the DNA is present.

Lifelong immunity

It's too early to say if you get lifelong immunity with the COVID-19 vaccine. Immunity builds up over a few weeks after vaccination. But it is not known whether it will last a year, just like the flu shot, or several years like the tetanus vaccine or lifelong like measles or polio. In any case, the COVID-19 vaccine will significantly reduce the chances of getting an infection.

Goodbye to masks

Not possible soon. COVID-19 vaccines will eventually create herd immunity and stop the spread of the virus. But it is going to take several months. There is also no clear picture as to how long the immunity will last. Therefore, masks will be an essential part of your life for some time to come.

**More millet in
this loaf than
in any other.
Anywhere.**

PRISTINE
OvenOrg™

MULTI MILLET BREAD

*Made From Rare
Organic Millets*



60%
MILLET



Certified Organic • 60% Mixed Millet • No Maida • No Vanaspati



Conspiracy theories have disturbing consequences

While the deadly coronavirus was spreading like wildfire, the misinformation and rumours accompanying it spread even faster. From the theory that eating garlic could kill the virus to one that claimed that the virus was created in a Chinese lab as a bioweapon, the COVID-19 pandemic became a paradise for rumormongers. As per a recent study, more than 2000 rumours, conspiracy theories, and reports were hatched during these times.

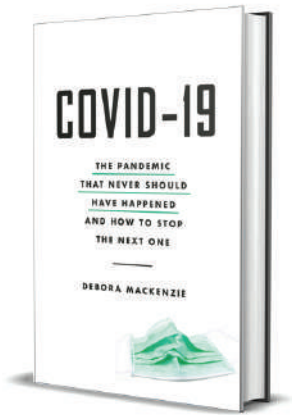
Sadly, such false information can have serious consequences. A recent study claimed that COVID-19 related rumours were linked to thousands of hospitalisations and hundreds of deaths. For example, the myth that consumption of alcohol would kill the virus led to more than 6000 hospitalisations and around 1000 deaths. Many cases were in Iran, where alcoholic beverages are illegal. In India, 12 people got sick after drinking liquor made from the toxic seed *Datura*, believing it as a cure for COVID-19.

The study was published by a group of authors in the American journal of tropical medicine and hygiene. As part of the study, a team of social scientists, doctors, and epidemiologists reviewed content on social media, including Twitter, Facebook, and newspaper and TV reports from December 2019 to April 2020. Like the pandemic, this 'infodemic' of misinformation also went through three waves. The first wave was between January 21 and February 13, the second between February 14 and March 7, and the third between March 8 and March 31. According to reports, the

third was the largest in terms of the number of news. Among the claims, most were related to the illness, transmission, and mortality, while a few others were related to the treatment and cures of the disease. Among them claims that keeping the throat moist, avoiding spicy food, eating garlic, drinking bleach, and even drinking cow's urine would help, topped the chart.

The United States of America conducted a survey to determine American's beliefs and actions regarding the pandemic. The study, conducted by the University of Pennsylvania, says that conspiracy theories are not only commonplace, but they are gaining traction. When the virus started spreading in March, around 28 percent of people believed that the Chinese government created the coronavirus as a bioweapon. This number rose to 37 percent in July.

More than 24 percent believed that the US disease control and prevention centre exaggerated the virus' danger to hurt Trump politically. Around 15 percent believed that the pharmaceutical industry created the virus to boost vaccine sales. So where are people picking these conspiracy theories? Most believers are heavy users of social media where information flows in without any cross-checking. Meanwhile, people who watch television news channels were more likely to follow public health guidances. Researchers feel that simply correcting false information usually doesn't work. Instead, such corrections can have the opposite effect, causing people to believe such false theories even more deeply.



Insightful and well-researched

Mackenzie's book on COVID-19 is an eye-opener on three main aspects. Firstly, it describes in detail the origin of the coronavirus in Wuhan, China. She then sets the current pandemic in its historical context, wherein she dismisses the modern anti-vaxxers as a privileged generation. Later, she effectively advocates the role of government and dismisses market solution as inefficient to support the development of vaccines, anti-viral drugs and antibiotics.

Tactfully tailoring her knowledge of national and international systems and networks, Mackenzie, a science journalist gives us incisive insights into what exactly happened in China in the early days of the outbreak, thereby demolishing the many conspiracy theories surrounding it.

This book comes exactly at that time when the WHO is giving warning on how to control and avert a pandemic. This book can perhaps be called the first post-mortem of the disease. A gripping eye-opener that gives details about how the virus spread, our failings, and measures to be taken to control future threats, Mackenzie clears most of the rumours surrounding the epidemic.

A frontrunner in the coverage of SARS, ebola, rabies, and AIDS in the last three decades, Mackenzie uses her expertise to make a way forward by learning from past experience.

In this time of the pandemic, the first thing that crosses our mind is the need for a vaccine. And the book *Vaccines: What everyone needs to know*, released in 2018, provides an overview of the science, manufacture, and culture of vaccines.



Scientifically grounded overview

Taking annotation from various institutes in the United States, it gives an unbiased resource of this much-debated subject and provides accessible, authoritative overviews on various aspects of the topic. It includes how vaccines work, their history, the vaccine policy, the manufacturing of vaccines, vaccine injury, the link between vaccines and autism, and finally vaccines and new outbreaks.

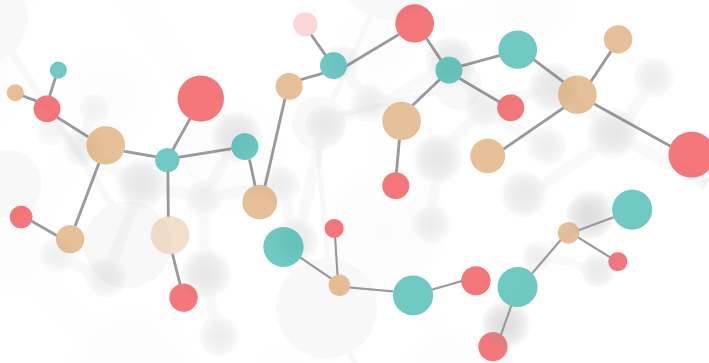
Since information is provided in a QnA format, it makes for a great reference guide for readers. As the author Dr. Feemster is a researcher, clinician, and public health medical director, the book has information related to vaccines from a firsthand perspective.

Written by a national leader in vaccine education and clinical practice, this answers questions around the most complex questions related to vaccines, including vaccine delay, and its manufacture. It also gives a global perspective about the vaccine, including vaccine economics.

A must-read for journalists, prospective parents, and anyone interested in health care, this book gives a compassionate and engaging account of one of the important public advances in the past 200 years.

Pristine Organics.

The first in India to offer diets for inborn Metabolic Disorders.



Pioneers in nutritional R&D, Pristine offers a range of specific diets to help correct metabolic imbalances and promote growth and development. We partner with leading hospitals, paediatricians and geneticists to offer nutritional support for infants with rare disorders.

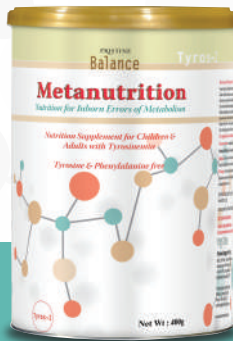
Our diets, the result of over 2 decades of experience in nutritional research and development, are specifically designed for Phenylketonuria (PKU), Maple Syrup Urine Disorder (MSUD), Methylmalonic Acidemia (MMA), Propionic Acidemia (PA), Glutaric Acidemia (GA), Tyrosinemia (TYROS), Urea Cycle Disorders (UCS), Homocystinuria (HCY), Isovaleric Acidemia (IVA), Carbohydrate and Lipid Metabolic disorders.

We also provide food-based solutions for nutritional requirements and a balanced diet with customized formulations for those who need it. Also available are individual sachets of Betaine (TMG), Arginine, Camitine, Citrulline, Sodium Benzoate, Methionine, Isoleucine, Sialic Acid, Valine and Riboflavin.

PRISTINE
Balance

Metanutrition

Nutrition for Inborn Errors of Metabolism



Available online
www.pristineorganics.com
amazon

*Successful recovery from critical illness
requires strength and energy.*

The right nutrition is critical.

Critical care demands early and precise nutritional solutions specific to the medical condition. The Pristine Metanutrition range provides optimal formulae for specific clinical conditions including epilepsy, cancer, TB, renal problems, autism and Alzheimer's.



KETO
AD CARE
B 12-Plus
ONCO CARE
DIALYSIS CARE
RENAL CARE
ASD CARE



Customized formulations are available too.
Contact nutritionist@pristineorganics.com

PRISTINE

Balance

Metanutrition

Nutrition Supplements For Specific Clinical Conditions

Where Nutrition Does Matter