

COVID-19 : Emergence, outbreak and its Management

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INDIAN SCIENCE CONGRESS



What are Viruses

- Viruses are 10 to 100 times smaller than bacteria, size ranges from 20 to 300 nm, can be observed only under the electron microscope, are non-living, can pass through bacteriological (membrane) filters (filterable).**
- Acellular - no cytoplasm, no cell organelles to carry out any kind of metabolism, lack essential enzyme for protein and nucleic acid synthesis.**
- Contains either DNA or RNA as a nuclear material, have spikes which help them to attach on the host cell, capsid is made up of polypeptide molecules, protect nucleic acid from nucleases and other environmental factors.**
- Viruses may be enveloped, made up of lipoproteins and is derived from host cell membrane or may be non – enveloped**
- Viruses are Obligate intracellular parasites, require a living cell or organism for its multiplication, cultured in living media like the embryonic egg, cell or bacterial culture**
- Unaffected by antibiotics,**

Viruses are able to infect all living forms including plants, animals, human beings, bacteria, fungi, algae, protozoans and all other organisms, cause Rabies, AIDS, Mumps, Hepatitis, Influenza, Dengue, common cold and many more diseases including cancer in human beings, birds and animals.

WHAT ARE CORONA VIRUSES?

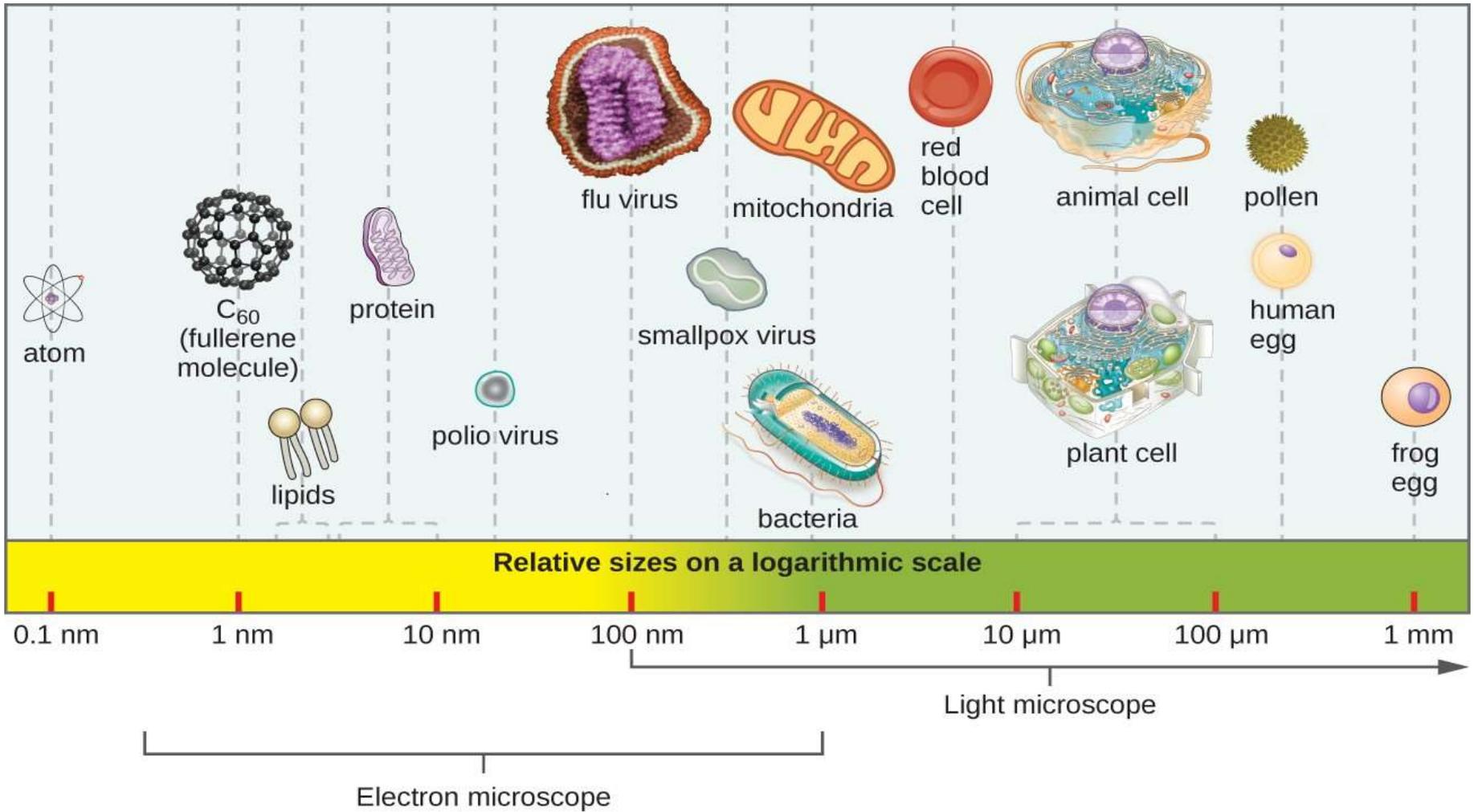
- **Corona viruses - large family, some cause illness in humans, and others in animals (bats, camels, civets).**
- **Human corona viruses cause mild illness, such as the common cold**
- **Previous Corona viruses have included SARS and MERS**
- **A COVID-19 is a new strain of corona virus that has not been previously identified in humans.**
- **The most likely ecological reservoirs for SARS-CoV-2 are bats or Pangollins, but it is believed that the virus jumped the species barrier to humans from another intermediate animal host.**
- **This intermediate animal host could be a domestic food animal, a wild animal, or a domesticated wild animal which has not yet been identified.**
- **Studies conducted on SARS-CoV ad MERS-CoV suggest that they can persist on different surfaces for up to a few days depending on a combination of parameters such as temperature, humidity and light. Depending on the material and the conditions, human corona viruses can remain infectious from 2 hours to 9 days.**

SARS -CoV-2 (COVID-19)

There are reports that first infections took place in September, 2019 in Wuhan city of China, however, official records shows its outbreak in December 2019.

WHO has declared its official new name as “SARS-coV-2” which causes COVID-19. Formerly named as “2019 novel corona virus” or “2019-nCoV”, USA wanted to name it “China Virus”

This name change is to differentiate it from other corona viruses outbreaks that include the common cold, but also the severe acute respiratory syndrome (SARS-CoV) and Middle East Respiratory Syndrome (MERS-CoV) which have previously affected the world, also originated in China



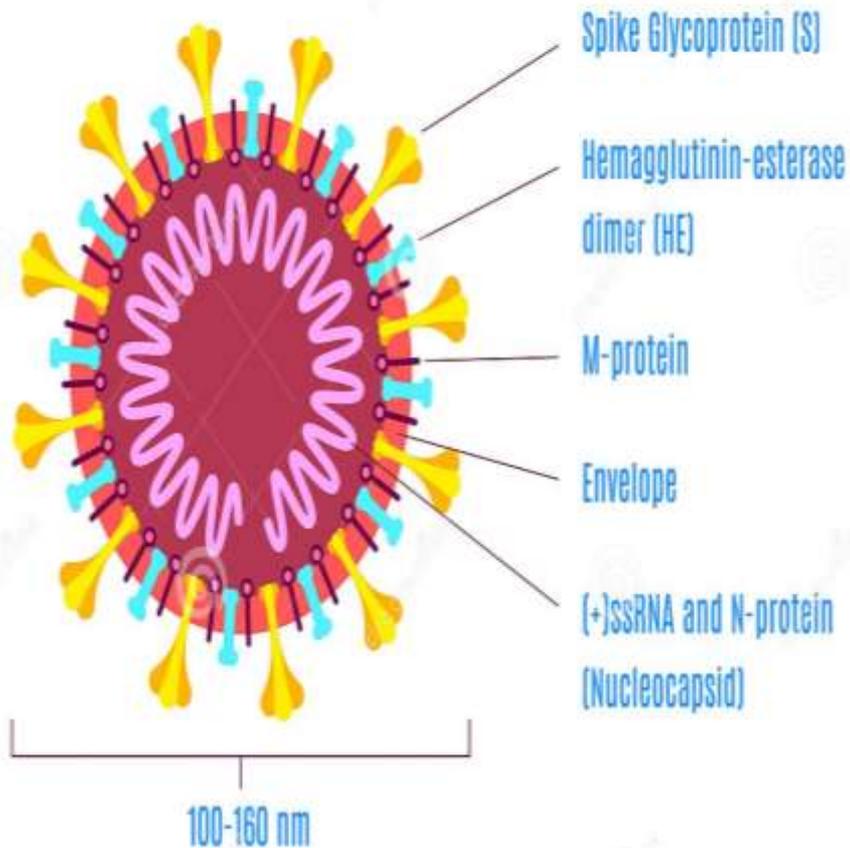
The relative sizes of various microscopic and nonmicroscopic objects. Note that a typical virus measures about 100 nm, 10 times smaller than a typical bacterium (~1 μm), which is at least 10 times smaller than a typical plant or animal cell (~10–100 μm). An object must measure about 100 μm to be visible without a microscope.

Emergence of COVID-19

- **Emergence and spread of the “COVID-19” corona virus, which probably came from bats or Pangolins, is a good reminder that throughout history ecology has often driven infectious disease.**
- **The decreasing populations of these smaller mammals is suspected to transmission of virus from animal to humans.**



Coronavirus structure



Structural Protein	Function of Protein
Nucleocapsid Protein (N)	<ul style="list-style-type: none"> Bound to RNA genome to make up nucleocapsid
Spike Protein (S)	<ul style="list-style-type: none"> Critical for binding of host cell receptors to facilitate entry of host cell
Envelope Protein (E)	<ul style="list-style-type: none"> Interacts with M to form viral envelope
Membrane Protein (M)	<ul style="list-style-type: none"> Central organiser of CoV assembly Determines shape of viral envelope

- It has been noted that some CoVs do not need to have the full ensemble of structural proteins to make virions, highlighting that certain proteins may be dispensable or compensated by the function of non-structural proteins

SPREAD AND PREVENTION

- ***Spread*** through air droplets aerosol; shake hands; contact with contaminated objects; during mass gatherings
- ***Prevention*** personal and community hygiene; mask; avoid contact, cover nose and mouth, social distancing ***Strengthen your Immunity***



SYMPTOMS

Viral incubation period 1-14 Days

Asymptomatic

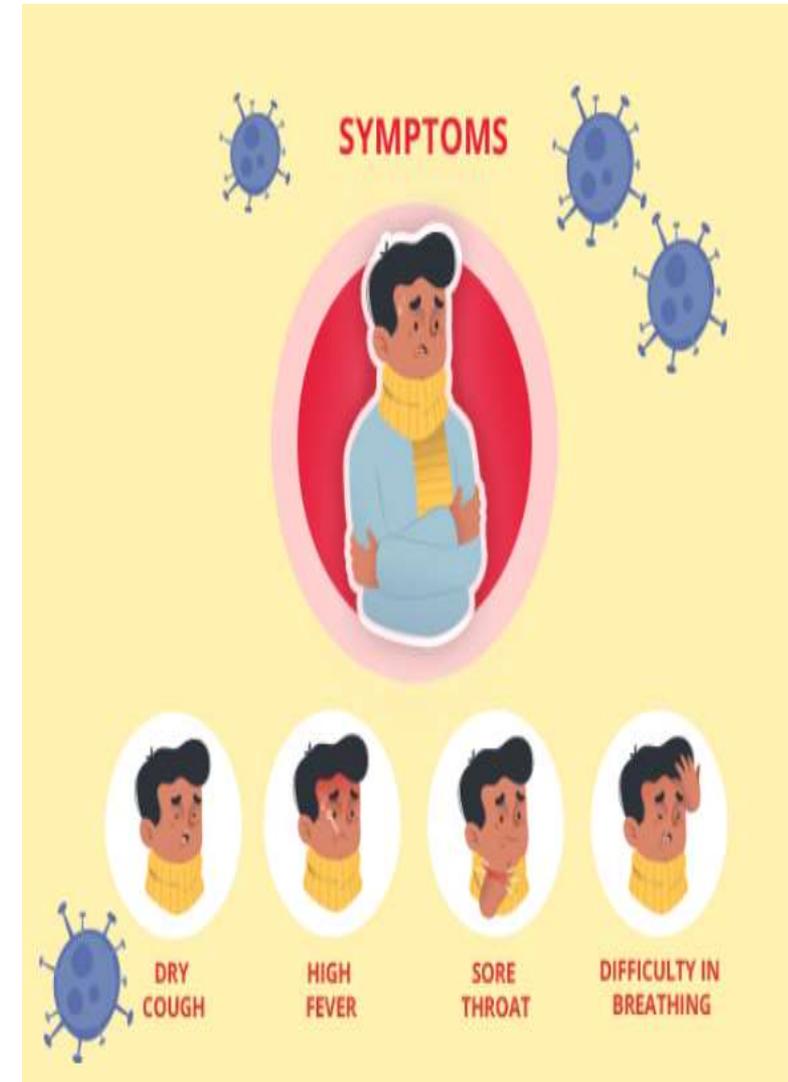
- **SOME PEOPLE HAVE VERY MILD OR NO SYMPTOMS but have infection**

Major Symptoms

- **DRY COUGH, HEADACHE, HIGH FEVER AND TIREDNESS, Shortening of Breeth**

Less common

- **ACHES & PAINS, NASAL CONGESTION, CONJUNCTIVITIS, SORE THROAT, DIARRHOEA, LOSS OF TASTE OR SMELL OR A RASH ON SKIN OR DISCOLORATION OF FINGERS OR TOES, Speech problem,**



HOW TO DIAGNOSE

Diagnosis for COVID-19

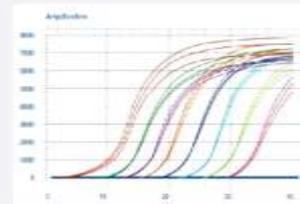
Current Diagnostic Tool for COVID-19 RT-PCR



Sample Collection



Gene Amplification
Genetic Analysis



Result Check

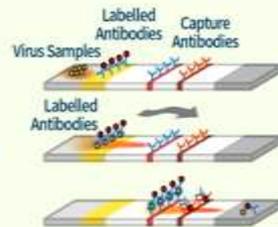


Over 4 hrs.

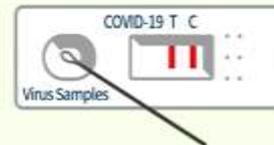
Celltrion's COVID-19 RDT KIT



Sample Collection



Rapid Diagnostic Test (RDT)



Result Check



Less than 20 min.

AVOID CORONA VIRUS – Keep your Throat and Lungs Infection Free



Preventing Coronavirus



Wear masks



Frequently wash your hands



Avoid contact with live animals



Do not consume raw meats



Avoid direct contact with suspected patients



Observe good personal hygiene



Cough into a tissue and dispose directly



Consult a doctor if you are feeling unwell

**D
XD**

WHY INFECTIONS FROM ANIMALS TO HUMANS?

- ***There are 1.7 million unidentified viruses living in animals, have potential threat to human life on their transmission***
- ***The COVID-19 pandemic is a strong reminder of our dysfunctional relationship with nature.***
- ***Studies show deforestation and loss of wildlife/biodiversity cause increases in more infectious diseases.***
- ***Half of the world's GDP is highly or moderately dependent on nature. For every dollar spent on nature restoration, at least \$9 of economic benefits can be expected.***
- ***Many people are wondering when life will get back to normal after the COVID-19 crisis. We should be asking: can we use this opportunity to learn from our mistakes and build something better?***
- ***A focus on nature can help us understand where pandemics come from and how the socio-economic fallout from the crisis could be mitigated.***

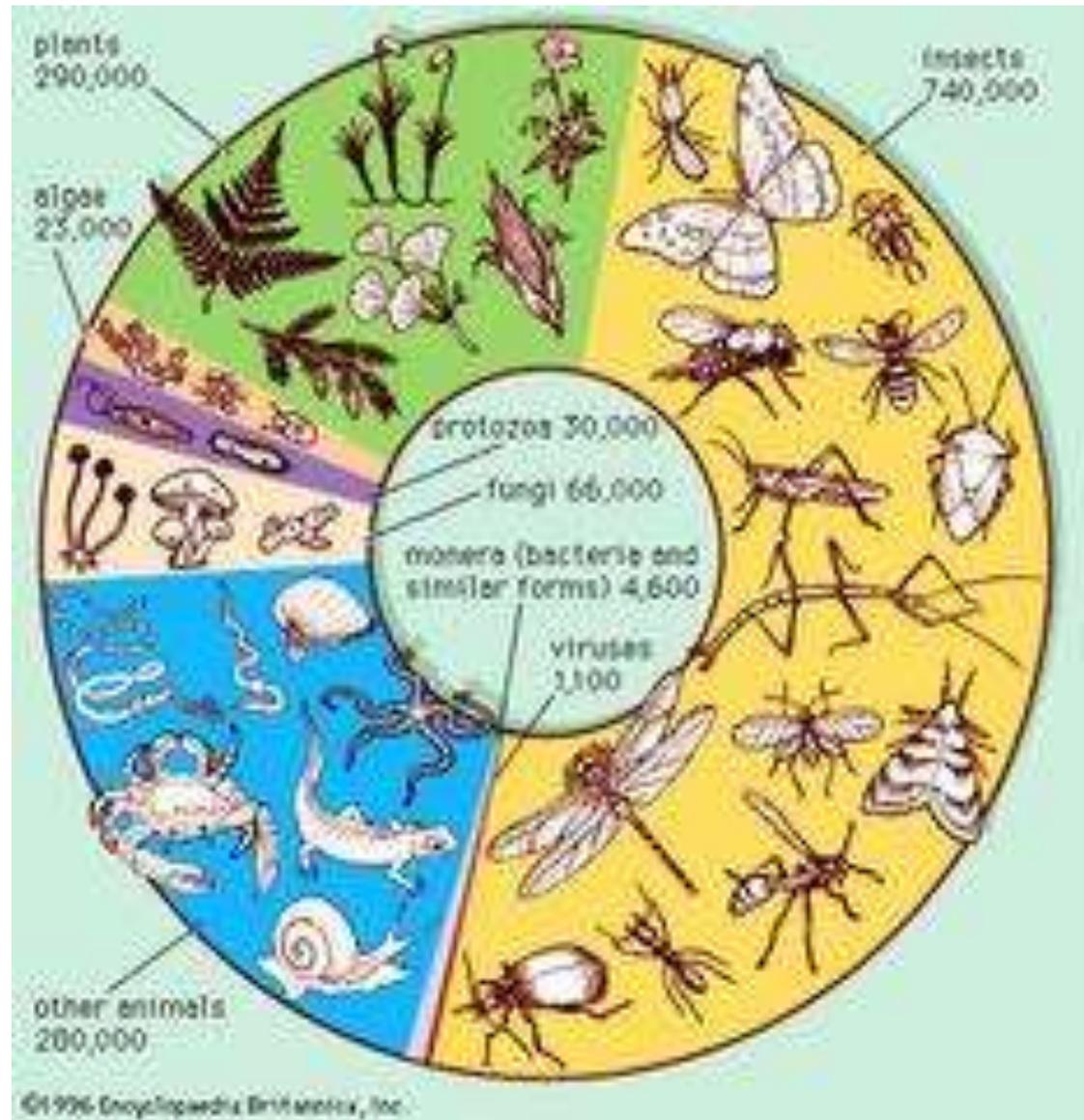
Latest estimate, 8.7 million eukaryotic species on our planet,

Previous estimate in between 3 to 100 million.

1.4 million species of flora, fauna and microbes have been examined, named and classified.

It means 86% of land species and 91% of marine species remain undiscovered.

1.7 million viruses unidentified



PRIMARY DRIVERS

HABITAT LOSS

Thinning, fragmenting, or outright destruction of an ecosystem's plant, soil, hydrologic, and nutrient resources

INVASIVE SPECIES

Any nonnative species that significantly modifies or disrupts the ecosystems it colonizes

OVEREXPLOITATION

Process of harvesting too many aquatic or terrestrial animals, which depletes the stocks of some species while driving others to extinction

POLLUTION

Addition of any substance or any form of energy to the environment at a rate faster than it can be rendered harmless

CLIMATE CHANGE ASSOCIATED WITH GLOBAL WARMING

Modification of Earth's climate associated with rising levels of greenhouse gases in the atmosphere over the past one to two centuries

INFLUENCERS

- Human population growth
- Increasing consumption
- Reduced resource efficiency

BIODIVERSITY LOSS

Reduction in the number of genes, individual organisms, species, and ecosystems in a given area

Biodiversity Dilution Effect

Does biodiversity loss aggravate transmission of infectious diseases spread from animals to humans?

Answer-

Several studies reveal that there is a 'biodiversity dilution effect' in which declining biodiversity results in increased infectious-disease transmission.

West Nile Virus

West Nile Virus is transmitted by the bite of a mosquito, by most common species *Culex pipiens*. The disease is transferred when a mosquito bites an infected bird and pass on the virus on by feeding on other birds, or susceptible mammals including humans.



Increased biodiversity provides an advantage against infection. Scientists have shown that areas with more bird species tend to have fewer mosquitoes carrying WNV and fewer cases of human infections (Ezenwa et al., 2006; Swaddle and Carlos, 2008).

Relationship of Lyme Disease with Loss of Biodiversity

Borrelia burgdorferi, a bacterium that causes Lyme, is not a new arrival to the human body. Ötzi, the 5,300-year-old mummy discovered in an Italian glacier, had the infection.



A doctor near Old Lyme, Connecticut, first described the disease in 1975: a mysterious illness that featured malaise, arthritis-like joint pain, and occasionally neurological problems. Infectious disease doctors eventually linked the ailment to a corkscrew-shaped bacterium transmitted by black-legged “deer” ticks. After that initial description, the number of reported infections soared, increasing roughly fourfold in the past 40 years or so.

Loss of Biodiversity Leads to More Infectious Diseases

- ***Richard Ostfeld, a disease ecologist says his team's research shows a "consistent, general pattern that loss of biodiversity is associated with increases in transmission of infectious diseases."***
- ***This relationship occurs not only for human diseases, but also for diseases of wildlife, livestock, and plants,***
- ***"It is not found in every disease system, but it is found in most and is often quite strong."***
- ***When humans disrupt or destroy natural ecosystems, some species are lost, but unfortunately not the weedy ones that "often thrive in these human-impacted systems with reduced biodiversity," and act as reservoir of the disease.***

Climate Change leads to Loss of Biodiversity that Results in Rise in Zoonotic Diseases

- ***Zoonotic diseases are those that spread from animals to humans.***
- ***The rise in zoonotic diseases like the corona virus disease is linked to the loss of biodiversity and forests, public health experts and scientists have said.***
- ***There is a consensus among scientists that a rise in zoonotic diseases--Nipah, Ebola, Zika, Corona virus to name a few in recent decades – is driven by biodiversity loss and climate change.***
- ***The World Health Organization has said there is now evidence of the link between the Covid-19 and other similar known corona viruses (CoV) circulating in bats. But the route of transmission to humans is still unclear.***
- ***Experts opine “There is no doubt that zoonotic diseases are on the rise. One of the reasons for their rise, among many others, is that animals are coming in contact with human habitation...,”***

Humans are More at Risk from Diseases as Biodiversity Disappears

- ***“Biodiversity loss tends to increase pathogen transmission across a wide range of infectious disease systems,”*** Barnard College ecologist ***Felicia Keesing.***
- ***Pathogens can include viruses, bacteria and fungi. And humans are not the only ones at risk: all manner of other animal and plant species could be affected.***

Healthy Biodiversity is Essential to Human Health (Nature, Dec., 2019)

- **As species (marine, terrestrial, and airborne) disappear, infectious diseases rise in humans and throughout the animal kingdom, so extinctions directly affect our health and chances for survival as a species. <https://blogs.scientificamerican.com/extinction-countdown/humans-are-more-at-risk-from-diseases-as-biodiversity-disappears/>**
- **There are 26,500 species threatened with extinction, according to the International Union for Conservation of Nature (IUCN), a global network of some 16,000 scientists. That includes 40 percent of amphibian species, 33 percent of reef-building corals, 25 percent of mammals, and 14 percent of birds. Hawaii has had its share of extinctions, primarily birds, with over 50 species now extinct, and averaging one bird species going extinct every decade for the past 50 years. https://en.wikipedia.org/wiki/List_of_extinct_animals_of_the_Hawaiian_Islands**
- **Another indicator of a global biosystem in trouble is Earth's insect species, essential to both the food chain of humans and animals alike — the total number and variety of insects is estimated to be dropping by 2.5 percent every year. “There are examples of species all over the world that are essentially the walking dead,” said biologist Paul Ehrlich.**

***My Suggestion as Sectional
President of Environmental
Science (2020-21)-Indian
Science Congress***

- ***Develop Small Jungles / Forest (10 to 25%) of area of residence / factory / other place as reservoir of Biodiversity and not as grass lawns***

Outbreak of Covid-19

- ***1 May Nationwide lock-down further extended till 17 May***
- ***2 May 10,000 confirmed recoveries***
- ***7 May 50,000 confirmed cases***
- ***10 May 2,000 confirmed deaths***
- ***11 May 20,000 confirmed recoveries***
- ***17 May Nationwide lockdown further extended till 31 May***
- ***19 May 100,000 confirmed cases***
- ***23 May 50,000 confirmed recoveries***
- ***27 May 150,000 confirmed cases***
- ***30 May Lockdown extended in containment zones till 30 June***
- ***31 May 5,000 confirmed deaths***

Continued

- **3 June** 100,000 confirmed recoveries
- **10 June** Reported recoveries surpassed active cases
- **13 June** 300,000 confirmed cases
- **17 June** 10,000 confirmed deaths
- **On 2 May, in Punjab, around 4,000 stranded pilgrims returned from Hazur Sahib in Nanded, Maharashtra. Many of them tested positive, including 27 bus drivers and conductors who had been part of the transport arrangement. Till 13 May, 1,225 pilgrims had been tested positive.**
- **Hide Major events of COVID-19 pandemic in India since 21 June**
- **27 June** 500,000 confirmed cases
- **28 July** about 50,000 per day increasing in India

The World's Seven Deadliest Infectious Diseases Kill 12.5 Million People

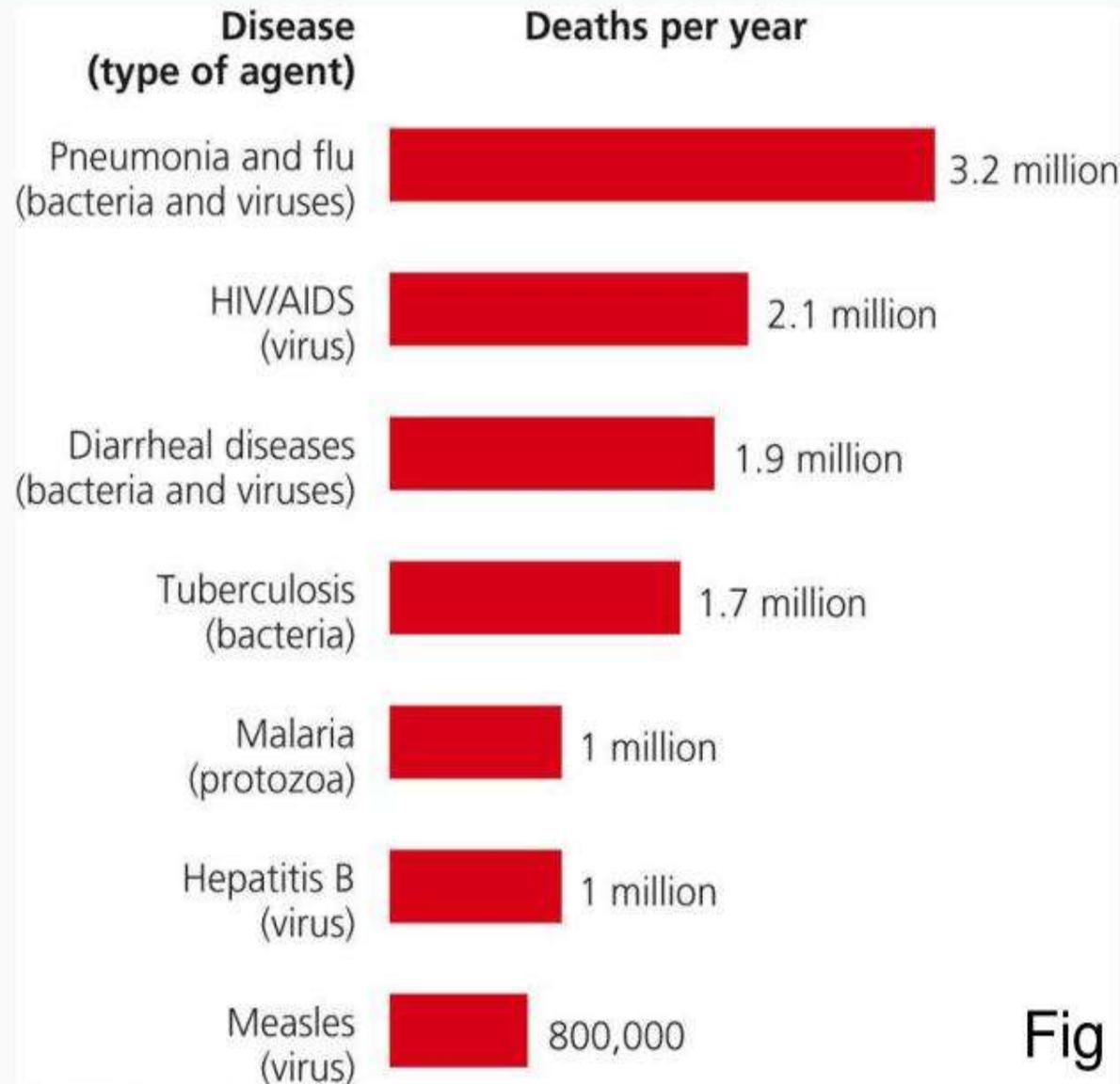


Fig 17-6

MANAGEMENT OF COVID-19 and Economy

- ***Social Distancing (minimum 6 feet)***
- ***Wearing Mask in Public Places and while talking to others***
- ***Personal and Community Hygiene***
- ***Drink Tea with black pepper, clove, tulsia, lemon grass, ginger, mulahati, + lemon and honey as per taste***
- ***Healthy nutritious diet with immun-boosters***
- ***7-8 h sleep***
- ***Yoga and meditation***
- ***Mental Peace***
- ***80% of world population will shift towards plant based, quality nutritious diet (great opportunity for India to focus on organic farming)***
- ***Ayurveda will replace allopathy (focus on herbal plantation)***

Role of Vitamin C in Immune System

- Most popular supplement to protect against infections due to its important role in immune health.***
- Supports the function of various immune cells and enhances their ability to protect against infection. Removes old cells and replace them with new ones***
- Powerful antioxidant, protecting against damage induced by oxidative stress, which occurs with the accumulation of reactive molecules known as free radicals.***
- Studies with 11,306 people have demonstrated that vitamin C at an average dose of 1–2 grams per day reduced the duration of colds by 8% in adults and 14% in children***
- High dose of intravenous vitamin C treatment has been shown to significantly improve symptoms in people with severe infections, including sepsis and acute respiratory distress syndrome (ARDS) resulting from viral infections***
- The upper limit for vitamin C is 2,000 mg. Supplemental daily doses typically range between 250 and 1,000 mg***

Role of Vitamin D in Immune System

Fat-soluble nutrient, essential to health immune system.

Enhances pathogen-fighting effects of monocytes and macrophages — white blood cells that are important parts of your immune defense — and decreases inflammation, which helps promote immune response

Many people deficient in this important vitamin, which may negatively affect immune function. In fact, low vitamin D levels are associated with an increased risk of upper respiratory tract infections, including influenza and allergic asthma

Taking this vitamin may protect against respiratory tract infections.

11,321 people, supplementing with vitamin D significantly decreased the risk of respiratory infections in people deficient in this vitamin and lowered infection risk in those with adequate vitamin D levels (2019 Research)

Other studies reveals that vitamin D supplements may improve response to antiviral treatments in people with certain infections, including hepatitis C and HIV

1,000 and 4,000 IU of supplemental vitamin D per day is sufficient for most people, though those with more serious deficiencies often require much higher doses

Role of Zinc in Immune System

Zinc is a mineral that's commonly added to supplements and other healthcare products like lozenges that are meant to boost your immune system, needed for immune cell development and communication and plays an important role in inflammatory response.

Its deficiency affects your immune system resulting in an increased risk of infection including pneumonia

Zinc deficiency affects around 2 billion people worldwide and is very common in older adults. In fact, up to 30% of older adults are considered deficient in this nutrient

What's more, supplementing with zinc may be beneficial for those who are already sick.

In a 2019 study in 64 hospitalized children with acute lower respiratory tract infections (ALRIs), taking 30 mg of zinc per day decreased the total duration of infection and the duration of the hospital stay by an average of 2 days, compared with a placebo group.

Taking zinc long term is typically safe for healthy adults, as long as the daily dose is under the set upper limit of 40 mg of elemental zinc

Excessive doses may interfere with copper absorption, which could increase your infection risk.

Citrus fruits

Vitamin C build up your immune system.

Increase the production of white blood cells, which are key to fighting infections.

All citrus fruits are high in vitamin C.

Popular are :-

- **grapefruit**
- **oranges**
- **clementines**
- **tangerines**
- **lemons**
- **Limes**

Because your body doesn't produce or store it, you need daily vitamin C for continued health.

Also keep in mind that while vitamin C might help you recover from a cold quicker, there's no evidence yet that it's effective against the new coronavirus, SARS-CoV-2.



**Vitamin C Rich
VEGETABLE & FRUITS**

Vitamin C good antioxidant and other properties that protect your cells from substances that damage the body.

A deficiency of vitamin C can lead to delayed wound healing, inability to properly fight infections, and impaired immune response.

Rich Sources of Vitamin C



Eat The Rainbow



Red for Heart



White for Immunity



Yellow for Skin



Green for Cleansing



Orange for Inflammation



Purple for Antioxidants

Spinach

Rich in vitamin C, also packed with numerous antioxidants and beta carotene, which may both increase the infection-fighting ability of our immune systems.

Similar to broccoli, spinach is healthiest when it's cooked as little as possible so that it retains its nutrients.

However, light cooking makes it easier to absorb the vitamin A and allows other nutrients to be released from oxalic acid, an anti-nutrient.



Kale is a staple for many green juices, but the Kale Mary — Serious Eats' take on a bloody Mary — is truly one of a kind.

Instead of cutting the taste of kale with fruits, this recipe uses tomato and celery juice, adding more than enough vitamin A.

The horseradish in this recipe may also provide anti-inflammatory benefits.

Blend it up for a drink that'll awaken your senses.

***Notable nutrients
vitamins A and C***

Magnesium, Potassium, Iron, fatty acids



TOMATO JUICE

Make fresh and without added ingredients yourself.

No juicer or blender required, although you may like to remove pieces through a sieve.

Tomatoes are rich in folate, which help lower your risk of infections

Notable nutrients
Vitamins A and C
Iron
Folate



Watermelon

Veg Recipes of India in summer

It helps your immune system, and relieve muscle soreness. Muscle soreness is a common symptom of the flu, especially in older adults.

The heavy water content of this fruit may also make it easier to make juice.

You can also include watermelon juice in other plain fruit juices, such as apple or orange, that may not have as much vitamin A.

Notable nutrients

- ***Vitamins A and C***
- ***Magnesium***
- ***Zinc***



Papaya

Papaya is another fruit loaded with vitamin C.

You can find the daily recommended amount of vitamin C in a single medium fruit.

Papayas also have a digestive enzyme called papain that has anti-inflammatory effects.

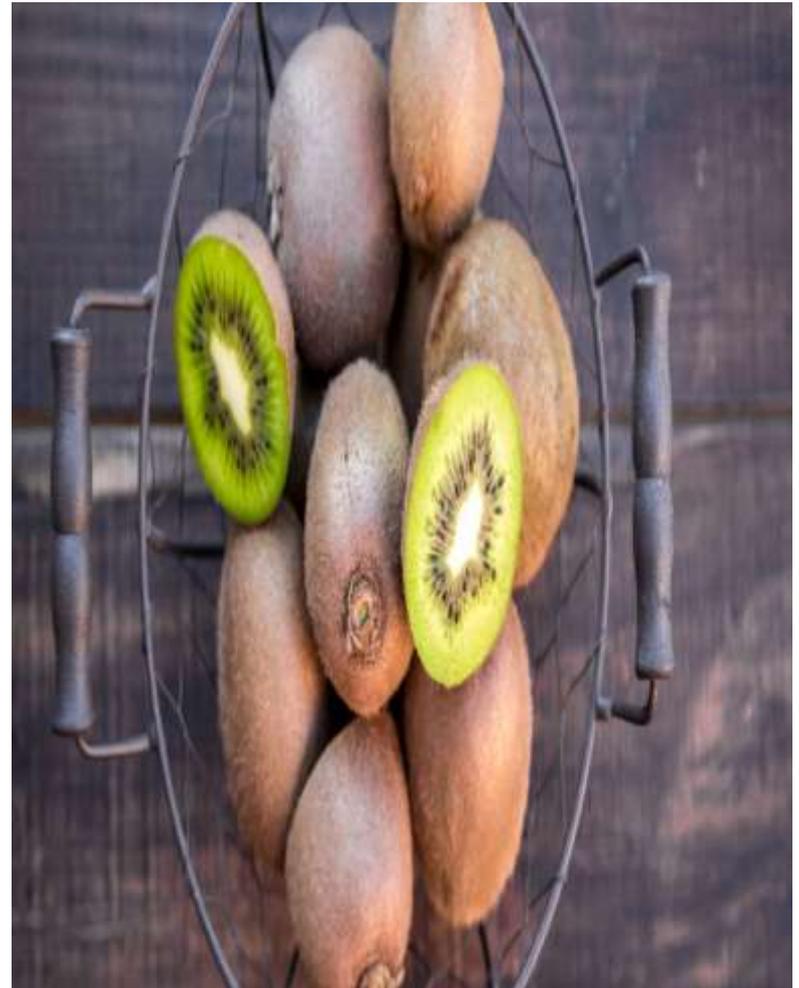
Papayas have decent amounts of potassium, magnesium, and folate, all of which are beneficial to your overall health.



Kiwi

Like papayas, kiwis are naturally full of essential nutrients, including folate, potassium, vitamin K, and vitamin C.

Vitamin C boosts the white blood cells to fight infection, while kiwi's other nutrients keep the rest of your body functioning properly.



Red bell peppers

If you think citrus fruits have the most vitamin C of any fruit or vegetable, think again.

Ounce for ounce, red bell peppers contain almost 3 times as much vitamin C as a Florida orange

They're also a rich source of beta carotene.

Besides boosting your immune system, vitamin C may help you maintain healthy skin.

Beta carotene, which your body converts into vitamin A, helps keep your eyes and skin healthy.



Broccoli

Broccoli is supercharged with vitamins and minerals.

Rich in vitamins A, C, and E, as well as fiber and many other antioxidants,

It is one of the healthiest vegetables you can put on your plate.

The key to keeping its power intact is to cook it as little as possible — or better yet, not at all.

Steaming is the best way to keep more nutrients in the food.



Pumpkin seed

***Pumpkin seed milk.
It's one of the freshest, most
natural recipes and works as a
great base for fruit smoothies.***

***This milk not only benefit your
immune system, it may also help
your:***

- ***bone health***
- ***menopause symptoms***
- ***urinary health***
- ***hair and skin***
- ***mental health***
- ***prostate health (for men)***

Notable nutrients

- ***Vitamins A, C, and B-6***
- ***Magnesium***
- ***Zinc***



Sunflower seeds

Sunflower seeds are full of nutrients, including [phosphorous](#), [magnesium](#), and vitamins B-6 and E.

Vitamin E is important in regulating and maintaining immune system function.

Other foods with high amounts of vitamin E include [avocados](#) and dark [leafy greens](#).

Sunflower seeds are also incredibly high in selenium. Just 1 ounce contains *nearly half the selenium that the average adult needs daily.*

A variety of [studies](#), mostly performed on animals, have looked at its potential to combat viral infections such as [swine flu \(H1N1\)](#).



Strawberry and Mango

Strawberry mango mocktail is the healthy way to satisfy your cravings for a bottomless brunch. May use frozen fruits, which have the same nutritional punch as fresh ones.

You can also opt for fresh if you have them on hand.

The vitamin E from the mangos add extra antioxidant benefits to enhance your immune system, especially in older adults.

Notable nutrients

- Vitamins A, C, and E***
- iron***
- folate***



Carrots, Apples, and Orange

Combination of various antioxidants.

Carrots contain the antioxidant beta carotene which turns into Vitamin A and helps to form and maintain healthy glowing skin.

Vitamin C - stimulates the production of collagen in our skin

One glass a day enough.

Important Components

vitamins A, B-6, and C

potassium

folic acid



Strawberry-kiwi mint

Strawberries and kiwis are other healthy alternatives for a vitamin C-

Four cups of strawberries to make one cup of juice, you may blend these fruits into a smoothie rather than a juice.

Greek yogurt is a good source of magnesium and probiotics.

Probiotics may help cells maintain an antimicrobial barrier.

Notable nutrients

- **Vitamins A, C, and B-6**
- **Magnesium**
- **Zinc**



Beetroot, Carrot, Spinach



Spinach, lettuce, and kale

A vegetable-based green juice is a powerhouse of nutrients for a strong immune system.

Throw in a handful of parsley for an extra serving of vitamin B-6.

This vitamin plays an important role in immune cell proliferation and antibody production.

Notable nutrients

- ***Vitamins A, C, and B-6***
- ***Iron***
- ***Calcium***



Garlic

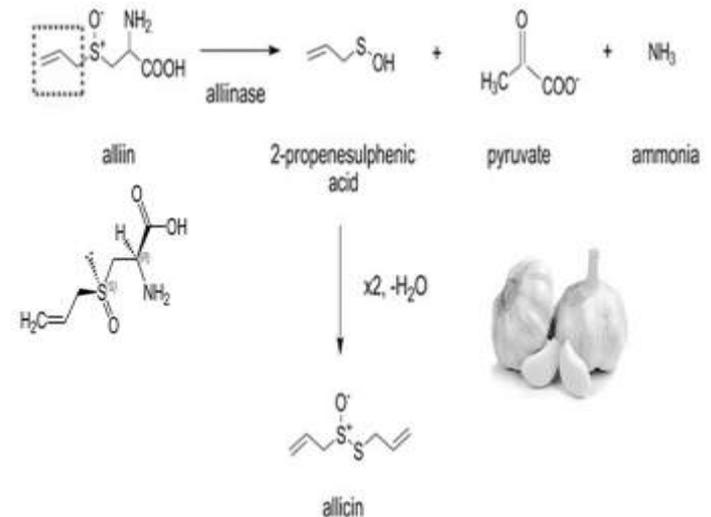
Garlic almost in every cuisine in the world.

It adds a little zing to food and it's a must-have for your health.

Early civilizations recognized its value in fighting infections.

Garlic may also slow down hardening of the arteries, and there's weak evidence that it helps lower blood pressure.

Garlic's immune-boosting properties seem to come from a heavy concentration of sulfur-containing compounds, such as allicin.



Ginger

Ginger is another ingredient many turn to after getting sick.

Ginger may help decrease inflammation, which can help reduce a sore throat and inflammatory illnesses.

Ginger may help with nausea as well.

While it's used in many sweet desserts, ginger packs some heat in the form of gingerol, a relative of capsaicin.

Ginger may also decrease chronic pain and might even possess cholesterol-lowering properties



Phytochemicals

- **Volatile oils – Camphene, Zingiberene, Zingiberol**
- **Phenols - Gingeol, Zingerone**
- **Oleoresin - Gingerol, Shogaol**
- **Proteolytic enzyme – Zingibain**
- **Nutrients and Vitamins – Ca, Mg, P, Na, Fe
Vitamin A, B Complex & C**

Turmeric

Key ingredient in many curries.

This bright yellow, bitter spice has also been used for years as an anti-inflammatory in treating both [osteoarthritis](#) and [rheumatoid arthritis](#).

High concentrations of curcumin, which gives turmeric its distinctive color, can help decrease exercise-induced muscle damage.

Curcumin has promise as an immune booster (based on findings from [animal studies](#)) and [an antiviral](#).

Turmeric milk at night helps to fight flue, gives peaceful sleep and kill harmful microbes, improves immunity



Yogurt

Look for yogurts that have the phrase “live and active cultures” printed on the label, like Greek yogurt.

These cultures may stimulate your immune system to help fight diseases.

Try to get plain yogurts rather than the kind that are flavored and loaded with sugar.

You can sweeten plain yogurt yourself with healthy fruits and a drizzle of honey instead.

Yogurt can also be a great source of vitamin D, so try to select brands fortified with this vitamin. Vitamin D helps regulate the immune system and is thought to boost our body’s natural defenses against diseases.

Clinical trials are even in the works to study its possible effects on COVID-19.



Almonds

When it comes to preventing and fighting off colds, vitamin E tends to take a backseat to vitamin C.

However, this powerful antioxidant is key to a healthy immune system.

It's a fat-soluble vitamin, which means it requires the presence of fat to be absorbed properly.

Nuts, such as almonds, are packed with the vitamin and also have healthy fats.

Adults only need about 15 mg of vitamin E each day.

A half-cup serving of almonds, which is about 46 whole, shelled almonds, provides around 100 percent of the recommended daily amount.



Green tea

Both green and black teas are packed with flavonoids, a type of antioxidant.

Where green tea really excels is in its levels of epigallocatechin gallate (EGCG), another powerful antioxidant which enhance immune function.

The fermentation process of black tea destroys a lot of the EGCG.

Green tea, on the other hand, is steamed and not fermented, so the EGCG is preserved.

Green tea is also a good source of the amino acid L-theanine which aid in the production of germ-fighting compounds in your T cells.



Poultry

Chicken soup, it's more than just the placebo effect that makes you feel better.

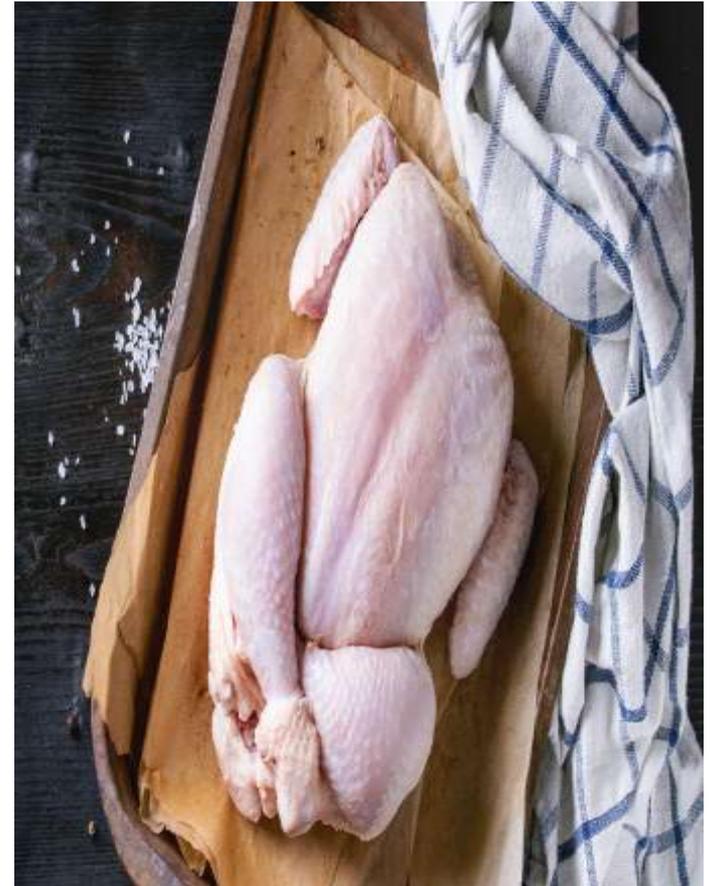
The soup may help lower inflammation, which could improve symptoms of a cold.

Poultry, such as chicken and turkey, is high in [vitamin B-6](#).

About 3 ounces of light turkey or chicken meat contains [nearly one-third](#) of your daily recommended amount of B-6.

Vitamin B-6 is vital for the formation of new and healthy [red blood cells](#).

[Stock or broth](#) made by boiling chicken bones contains gelatin, chondroitin, and other nutrients helpful for gut healing and immunity.



Shellfish

packed with zinc which is required for our immune cells to function well.

Varieties of shellfish include:

- oysters***
- crab***
- lobster***
- Mussels***

daily recommended amount of zinc in your diet:

- 11 mg for adult men***
- 8 mg for most adult women***

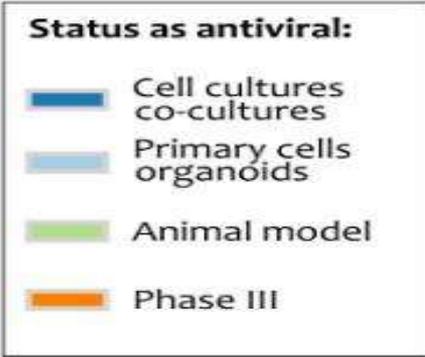
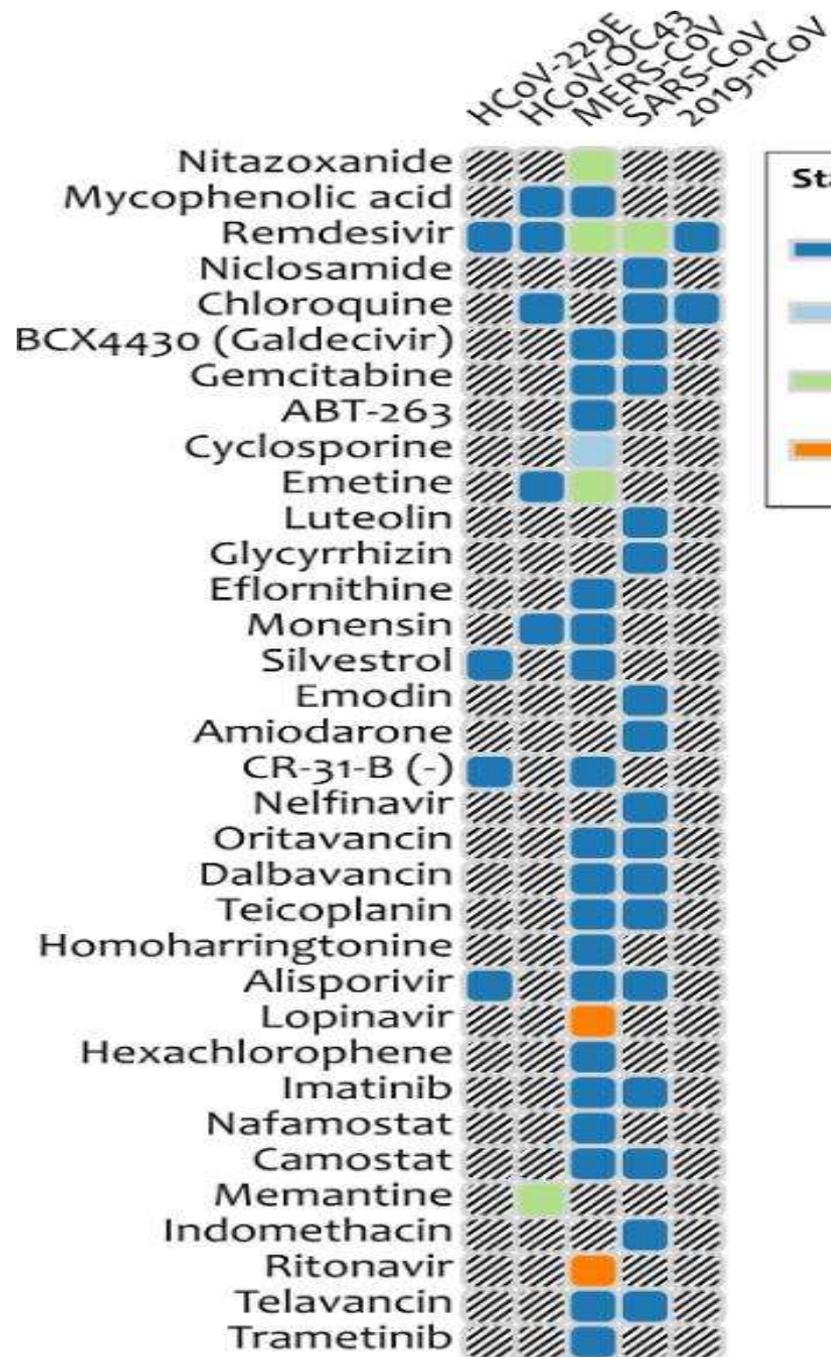
Too much zinc can actually inhibit immune system function.



Common Mushrooms:-

***Lentinus edodus , Agaricus
subrufescens , Agaricus blazei,
Tricholoma matsutake, Suillus
granulatus , Agaricus camphorate,
Agaricus subrufescens, Ganoderma
lucidum Amauroderma rude,
Antrodia camphorate, Phellinus
linteus, Coriolus versicolor, Inonotus***

Corona virus Treatment Could Lie in Existing Drugs



Medicinal plants



Thanks