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Corona Virus and Immunity: An Ayurvedic Inception

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Abstract

The fatal coronavirus SARS-(COVID-19) has been declared a pandemic word widely. It is well known that there is no antidote available for the disease, only the patients are treated symptomatically. Besides it no confirm time duration information to develop the vaccine Previous consideration was as the virus affects, in a certain time duration the signs arise, but the recent study indicates, the virus may be in the body as an inactive form for a long. The Ayurvedic assumption about the disease is, if the body has stronger immunity, then the secondary impact of disease goes down, for which patients are treated. This way the virus shows low affectivity in the individual.

Keyword: Coronavirus, COVID-19, DNA, MERS, SARSCoV2, Immunity, Ayurveda,

Introduction

The latest plot of Coronavirus disease (COVID-19) is capable of severe acute respiratory syndrome, (SARS-CoV 2). The disease was declared a pandemic by the World Health Organization, on 11 March 2020. The coronavirus was firstly identified in Wuhan, China in December 2019. Due to this pandemic, the global economy has disturbed, and various events have been postponed like sporting, religious, political, and cultural activities. Nevertheless, there are some atmospheric benefits as pollution has decreased. [1]

Till now the possible treatment of coronavirus is based symptomatic, no confirm the medication is there yet. The basic systemic treatment against this pandemic is supposed to maintain or improve immunity, which can help to save lives and fight against corona. Ayurveda has the maximum possibilities at the positive end to maintain the immunity since Vedic era including various proofs and has to be used on different conditions and at different times. There are so many herbs, plants, and the distillations of their contents used for the above-said purpose. Prime Minister Mr. Narendra Modi during his phone calls with international ministers also talked about the power of Ayurveda & Yoga during the time of the lockdown. [2]

Coronavirus

The novel coronavirus 2, (SARS CoV 2) Severe acute respiratory syndrome was first diagnosed in three people with pneumonia in Wuhan. This SARS CoV 2 is

closely related to SARS CoV and is thought to have a zoonotic origin.

The genus of SARS CoV 2 is Betacoronavirus, which has a genomic correlation with the 96% to other bat coronavirus samples and 92% to pangolin coronavirus. [3]

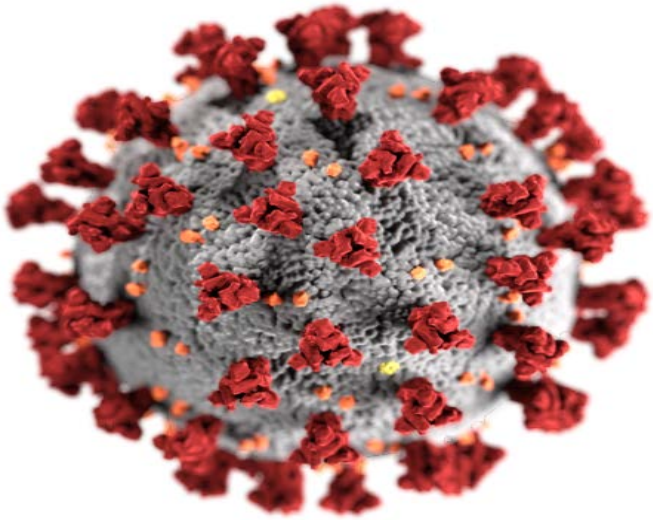

Figure 1 : Corona Virus

A coronavirus is a group of RNA viruses that are essential to cause diseases in mammals and birds as well. Structurally they are large, rough spherical particles including bulbous surface projections. [4]

The average diameter of the virus particles is around 125 nm (.125 μm). The diameter of the envelope is 85 nm and the spikes are about 20 nm. [4]

This virus was first discovered in the 1930s with the symptom of an acute respiratory infection characterized by gasping and listlessness in domesticated chickens and was supposed to be caused by the infectious bronchitis virus (IBV).[5]

Human coronaviruses were discovered in the 1960s, [6,7] and were isolated by using two different methods in the UK and the US.[8]

The researchers E.C. Kendall, MalcomByone, and David Tyrrell jointly working at the Common Cold Unit of the British Medical Research Council (1960) and unfortunately isolated it from a boy a novel common cold virus B814.[9,10,11]

This virus was just not able to be cultivated using standard techniques, as those which had successfully cultivated rhinoviruses, adenoviruses, and other known common cold viruses. In 1965, Tyrrell and Byone successfully cultivated the novel virus by serially passing it through the organ culture of the human embryonic trachea. [12]

Till now seven human coronaviruses are identified:

1) OC43 (HCoV-OC43), β-CoVHuman coronavirus
2) HKU1 (HCoV-HKU1), β-CoV Human coronavirus
3) 229E (HCoV-229E), α-CoV Human coronavirus
4) NL63 (HCoV-NL63), α-CoV Human coronavirus
5) MERS-CoV, (β-CoV) Middle East respiratory syndrome-related coronavirus
6) SARS-CoV, (β-CoV) Severe acute respiratory syndrome coronavirus
7) SARS-CoV-2, (β-CoV) Severe acute respiratory syndrome coronavirus 2

The first four are considered mild to moderate symptoms, while the last three are considered for very severe symptoms.

About the structure of coronavirus, the Envelop of the virus is made up of a bilayer of lipid. Within the Envelop (E), membrane (M), and spike (S), which are structural proteins attached to it. [13]

This virus is consisting of a single strand RNA genome size ranging from 26.4 to 31.7 kilo-bases [14] with positive sense. This genome size is considered one of the largest among RNA viruses. [15]

Transmission

About COVID-19 there are many aspects to be researched. The disease is spread during close contact, in the form of small droplets produced during coughing, sneezing, or talking. Thus people catch the

disease after inhaling contaminated droplets. Sputum and saliva carry large amounts of virus. However, the relatively heavy droplets usually fall immediately to the surrounding surfaces, while light droplets float and fall at a long distance. As the individual touch contaminated surfaces or droplets come in contact with eyes, nose or mouth, got infected. This is known as airborne transmission. The settled active virus on any surfaces becomes start to turn decreases over time. [15]

However, experimentally, the virus can survive on various surfaces as on copper or cardboard for a few hours and on plastic or steel for a few days. Surfaces are easily disinfected with household disinfectants. For any reason, if the disinfectants or bleach when swallowed or injected in the body, as a treatment or preventative measure, they become potentially fatal. [15]

After the onset of symptoms in the infected individual, the virus becomes most contagious during the first three days. The symptom arises at that time when the spread of disease started two days before that and is known as presymptomatic transmission. [15]

As the viruses enter the host cell, they un-coat themselves and their genome enters the cytoplasm of the host cell. Now, this genome which has a 5′ methylated cap and a 3′ poly-adenylated tail allow translating with the ribosome of the host cell as the initial overlapping open reading frame of the virus genome to form long polyproteins. These polyproteins have proteases that cleave the polyprotein into multiple nonstructural proteins. [15]

The uncertainties remain in terms of asymptomatic transmission because some patients have been infected and recovered without showing any symptoms of the disease. [15]

Symptoms

The most common symptoms are Fever, Dry Cough, and Tiredness, while its serious symptoms are difficulty in breathing or shortness of breathing, chest pain, and loss of speech or movement.

Below the general symptoms are body aches, Nasal congestion, sore throat (pharyngitis), Phlegm accumulation, Diarrhea, conjunctivitis, Headache, Fatigue, Muscular aches (myalgia), loss of taste or smell, rashes on the skin, or discoloration of fingers or toes. [16]

Diagnosis

Viral Testing: The standard test for current infection with SARS-CoV-2 uses RNA testing is completed by collecting samples as a nasopharyngeal swab. This test uses real-time rRT-PCR which detects the presence of viral RNA fragments. [1]

Several laboratories and companies are developing serological tests kit, to detect antibodies produced by the body in response to infection. [1]

Imaging: For SARS COV-2 the Characteristic imaging features include CT and X-ray of the chest. The importance of such a scan is essential for those people who are symptomatic and includes asymmetric peripheral ground-glass opacities without pleural effusions.

To identifying COVID-19, due to the mixing of adenovirus infections, it is important to confirm imaging without confirmation by rRT-PCR has greater importance. [1]

A large study in China compared chest CT results to PCR and demonstrated that though imaging is less specific for the infection, it is faster and more sensitive. [1]

Immunity: Immunity may be defined as to express resistance against any foreign body as the microbial

organism or other harmful agents. Immunity is the property to be held on immune i.e., a state of stabilization over a particular disease especially through preventing the development of a pathogenic microorganism or by counteracting the effects of its products. [3]

Immunity is consisting of two types of components; specific, and nonspecific. In the first type of category immune system of any of the body develops pathogen-specific immunity to encounter the impact, while the second type of category develops hurdle over the pathogens, without matter of their antigen. [4]

Types of Immunity

Two different types are there-

A. Innate Immunity
B. Acquired Immunity

Innate Immunity: It is the inborn capacity of the body to resist pathogens. This type of immunity represents the first line of defense against any type of pathogen. The invading organisms as enters in the body, innate immunity eliminate it before developing any disease there. Hence it is also known as natural or non specific immunity.[5]

Acquired Immunity: This is the most powerful immune mechanism, where resistance developed against any invading microorganism like Viruses, Bacteria, etc. known as acquired immunity or specific immunity. There are two sub-types- [6]

a) Cellular Immunity
b) Humoral Immunity

Cellular Immunity: This type of immunity develops by T- cells known as the antigen-specific cells, produced in the bone marrow and also found in the bloodstream and the lymphoid tissue. [6]

T-cells encounter antigens, presented over the surface of the antigen-presenting cells (APCs) incorporation with the major histocompatibility complexes. Thus T-cells proliferate and differentiate into armed effector cells to induce apoptosis. This way the cytotoxic T-cells, destroy the infected cells in a manner to stimulate plasma B cells by producing two main types of antibodies IgG and IgM. [6]

Humoral Immunity: Humoral immunity is the immunity generated by circulating antibodies. It is a component of adaptive immunity, which generates specific immune responses to a particular foreign material. [6]

All the invading pathogens tend to multiply in the extracellular space, so this space is important to destroy the pathogens. The extracellular spaces of these bodies are protected by Humoral immunity.
So the Humoral immunity is the part of adaptive immunity and generated by the antibodies against particular foreign bodies. [7]

Those antibodies destroy pathogens in the following three ways. First, they bind to the specific molecules on the surface of the pathogens for neutralizing the pathogens. This neutralizing prevents the entering of the pathogens to the cells. It is also important to prevent the liberation of bacterial toxins. Phagocytosis is the process where undesired cells are caught by the antibodies, (macrophages and other cells perform this action), and this process is called opsonization. [7]

As the antibodies bind with the pathogens, the complement system activates to recruit phagocytic cells. [7]

Pathogenesis of Immunity: Lysosomal enzymes and reactive oxygen species are developed by the macrophages to eliminate the pathogens from the affected area.

Now cytokines are produced by these macrophages. These librated cytokines work over the leukocytes, by making their bundles, to make infection free area.

The innate response to viruses includes the synthesis and release of interferon and activation of natural killer cells that recognize and destroys the virus-infected cells. [17]

This innate response activates neutrophils, against the pathogens. Now pathogens ingested by the macrophages and the movement of monocytes to the inflamed tissue are started from the macrophages.

Thus, they engulf, and process the antigen and to produce a bunch of specialized cells of the acquired immune response. Eosinophils protect against parasitic infections by releasing the content of their granules. [17]

Ayurvedic Pathogenesis of Immunity

The Kaal Avadhi of Vrishanu after taking entry in a healthy body, gets Vibhajit in the Rakta Dhatu, initially, it develops the Swas Roga and thereafter it includes the Vrikka Roga too.

As it is well known that no definite cure is available for Rogi (Atur). The Preventive solutions are introduced as the treatment plan for the pandemic by Ayush ministry, Unani, Ayurveda, and Siddha medicines can be used to prevent affected one from getting affected by the coronavirus.

The Ayurveda Medicines advisory suggests intake to cure against the Corona disease of anti-malarial and antiviral ayurvedic preparation (AYUSH 64), and other Ayurvedic drugs (Ashwagandha, Yashtimadhu, Guduchi and Pippali), use of sesame oil for Nasya, and Tulsi, ginger, Guduchi (Tinospora cordifolia) and turmeric in diet.[2]

Besides it's the other Ayurvedic measures are very used full against the corona disease. These are Pavitra hand sanitizers, Amruta antibiotic tablets, Rakshogna Dhupan as a disinfectant, Gandoopam- Gargling liquid, and Nimba Sasha, the nasal drops. [2]

Figure 2

Figure 3

Figure 4

Figure 5

Figure 2, 3, 4, 5: (up to down) Ashwagandha, Yashtimadhu, Guduchi And Pippali

In Ayurveda pathogenesis (Samprapti) depends on the status of these three Doshas- Vata, Pitta, and Kapha in any diseased body. If any Doshas fluctuates then it is assumed that there is a disease. In any state, these three Doshas how fluctuates is the sign for a particular disease. [18] marrow and are matured in the thymus. After they enter the bloodstream, T cells occur can be found in the blood as well as in lymphoid tissue. The antigens should be presented on the surface of the antigen-presenting cells (APCs) along with the major histocompatibility complexes (MHC). Once T cells encounter an antigen, they proliferate and differentiate into armed effector cells. The cytotoxic T cells destroy the infected cells by inducing apoptosis. T helper cells stimulate plasma B cells to produce antibodi

Cell mediated immunity is the immunity mediated by antigen-specific T cells. T cells are produced in the bone marrow and are matured in the thymus. After they enter the bloodstream, T cells occur can be found in the blood as well as in lymphoid tissue. The antigens should be presented on the surface of the antigen-presenting cells (APCs) along with the major histocompatibility complexes (MHC). Once T cells encounter an antigen, they proliferate and differentiate into armed effector cells. The cytotoxic T cells destroy the infected cells by inducing apoptosis. T helper cells stimulate plasma B cells to produce antibodies

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Pathogenesis of Immunity: Macrophages produce lysosomal enzymes and reactive oxygen species to eliminate the ingested pathogens. These cells produce cytokines that attract other leukocytes to the site of infection to protect the body. The innate response to viruses includes the synthesis and release of interferons and activation of natural killer cells that recognizes and destroys the virus-infected cells. The innate immunity against bacterial consist of the activation of neutrophils that ingest pathogens and the movement of monocytes to the inflamed tissue where it becomes in macrophages. They can engulf, and process the antigen and then present it to a group of specialized cells of the acquired immune response. Eosinophils protect against parasitic infections by releasing the content of their granules.https://www.ncbi.nlm.nih.gov/books/NBK539801/According to Ayurveda, the pathogenesis of immunity is as follows-

Dosha: initially Kapha dosha increases and causes the imbalance of Vata and Pitta. [18]

Dushya: it depends on the status of Rasa dhatu (blood plasma), which leads to febrile conditions. [18]

Agni: due to an increase in Kapha Dosh mandagni develops. [18]

Ama: if the Samaroga affected by the KaphaRog it leads to indigestion and creates Amaawastha, in an infected person. [18]

Srotasmi: only two types of srotas are there for COVID affected- Pranavahasrota (respiratory passages), Rasavahasrotas (blood plasma). [18]

Srotodushtiprakar: Srotodushtiprakar of the disease is sanga which causes obstruction and atipravritti which causes excessive flow. [18]

Sthana: Kapha is present in the thorax region of the body. So the sthana is Udbhavasthana (upper region), Agantuja (external factor). [18]

Vyakta: Primarily it infects the upper body, mainly in which Kapha is present i.e., lungs, sinuses, stomach, heart, blood, joints.[18]

Mode of Transmission: [18]

Prasangat: physically close interaction

Gatrasamsparshat: physical contact with diseased individuals

Nishwasa: (via inhalation of infected respiratory droplets)

Sahabhojanat: (sharing food)

Sahashayya: (sleeping together)

Asana: (sitting close together)

Vastra: (sharing the same clothing)

Malya: (via handkerchief and towels)[18]

Prevention

Strategies for preventing transmission of disease- [1]

- Hand washing
- Surface cleaning
- Face masks and respiratory hygiene
- Social distancing
- Self-isolation

Management

A. General Measures:[19]

Use of **Shadanga Paniyam** in daily life. The contents of Shadanga Paniyam are-

- Musta
- Parpataka

- Ushira
- Chandana
- Udichya
- Nagara

Acharya Charak has also mentioned about it in Charak Chikitsa Chapter 3 –

मुस्तपर्पटकोशीरचन्दनोदीच्यनागरैः॥१४५॥

शृतशीतंजलंदद्यात्पिपासाज्वरशान्तये।१४६।[19]

It should be given when the water gets cooled after boiling. Or Beside this Shadanga Paniya Kwatha Churna is also available in the market which can be used by adding 5 grams of churna to the rolled boiled water of about 1.5 liters, let it cool down and then use it as normal drinking water. [2]

- It's very good to take fresh lemon juice as it excretes out the toxins from the body to makes it healthy.
- Taking herbal tea or Kadha (decoction) either once or twice a day is very purposeful in routine. The ingredients of this preparation are Tulsi, Daalchini, Kaalimirch, Shunthi, Munakka once or twice a day.
- Taking milk with Haldi either once or twice a day is also a well-known source of improving immunity.
- Chyavanprash 1 tablespoon daily can also be used for boosting the immunity.
- The importance of spices in Indian cooked food has greater importance for a long. Turmeric (Haldi), Cumin (Jeera), Coriander (Dhaniya), Garlic (Lehsun) is considered as its important ingredients. They act on the digestive system of the body.
- The use of Lavang (cloves) mixed with natural honey has an effective role in a person suffering from a sore throat or dry cough. This combination can also be used with the addition of Ajwain seeds for inhalation through steam.

Besides it some others important drinks should also be used, like-[21,22,23,24]

Lemon Tea – clears the sore throat.

Ginger Tea – relax the headaches caused by cold.

Lemon Honey Tea – tracheal passage becomes clear.

Mint Tea – Stops the runny nose.

Ayurvedic Herbs To Cure Covid: For maintaining immunity Detoxification is a very necessary part. Detoxification leads to remove the impurities from the body, which help to produce new healthy cells. Some Ayurvedic formulations are as follows-

- Consume fully boiled beetroot, radishes, cabbage, broccoli salad in addition to salt and pepper to eat. [21]
- 1-2 tea spoon of honey is mix in 1 cup of herbal tea which includes madhuyashti, basil, peppermint, and vasa. [21]
- Haridra is the golden spice and commonly known as Turmeric. Add this spice in your daily meal. Drink warm turmeric-pepper milk at night to avoid catching cold and sore throat.[21]
- Intake of decoction (Kashayam) prepared without Tulsi, Ginger, Pepper, and Turmeric in hot water. [21]
- An important combination to make the easiest recovery of fever and improve immunity is Guduchi herb and Sendhil Kodi is crushed in Nattu Marunthu Kadai till to make powder. Now Kashayam is prepared to use this powder. To use it, the 3 parts of water is boiled till the thickness reduces to 1 part. [21]
- Hot Milagu and Seeragam Rasam are also useful in your daily diet. [21]

Therapeutic Treatment:[18]

- Sarve Abhyanga (full body external friction-type oil massage) with Dhavantaram taila, Dashmooladi taila, or karpooradi taila with added lavana (crushed

rock salt) Rukshasweda (dry heat), nadisweda (steam administered locally through tubes).

- The bolus of hot herbalized rice balls known as Pinda Sweda. This formulation is applied to the chest and back.
- The gentle vomiting is known as Vamana and in Ayurveda; it is carried out in a controlled manner by a specific combination of Madanaphala decoction, yastimadhu, and Vacha.
- The oil-based and decoction-based enemas are known as Anuvasana and Niruhabasti respectively. They are used for a laxative.
- Oil pulling therapy which is also known as kaval is used in daily life by taking 1 tablespoon coconut or sesame oil and put in the mouth and swish it for 2-3 mins in mouth and do not drink it and spit it off.
- Nasal application which is also called Pratimarsha Nasya can be used by applying coconut oil or ghee in both nostrils of the nose.

Yoga And Pranayama: [20]

Yoga and Pranayama are considered as the panacea for the infection, psychosomatic diseases, lifestyle disorders, and so many other physiological disorders. Now a day's whole world is gradually waking up towards the Yoga and Pranayama.

It is well known that exercising yoga, meditation and pranayama increases the level of immunity and lung strength. It is well known that the virus affects the human body for the same.

Pranayama: [20]

Prana is the energy of your body which can prevent us from various diseases. So the Pranayama means the exercise of increasing the life force in our body.

This property of life force can be enhanced by taking fruits, vegetarian food, proper body rest, and pranayama too. In the daily routine course some of the following pranayamas should be exercised to improve the lung's strength and immunity of the body.

- **Ujjayi Breathing:** This Yogic breath is a commonest among all pranayamas. The process of breathing is focused through the base of the throat, to indicate the lungs to increase the intake of oxygen.
- **Kapalbhati Pranayama:** This pranayama is the most popular for losing bodyweight. It also improves the oxygen level in the body, this way body immunity increases.
- **Nadi Shodhan Pranayama:** The simplest pranayama, also known as Alternate Nostril breathing technique. It is considered as to recharge the body and to keep the mind calms and leads it into meditation. Doing it for a couple of minutes responds to meditate the mind for 10-15 minutes.

Yoga: [20]

Few yoga asanas are used to fight not only against the coronavirus disease but also in general by boosting the immunity.

Yoga asanas have a property to maintain the physical fitness of the body and they don't have any direct relation for developing the flexibility or losing the body weight.

- Kati Chakrasana
- Trikonasana
- Dhanurasana
- Setu bandhasana
- Natarajasana

Sudarshan Kriya Yog (Sky):

For increasing the immunity in the current panic scenario by defeating the stress, Sudarshan Kriya yoga, the comprehensive yogic technique is the best solution.

Sudarshan Kriya is an elementary base of pranayama, yoga, and meditation in itself. It works on every level

of our body. This process improves the defense mechanism of our body which is the most important requirement for the immune system.

It has been quoted that the immunity level by doing 20 minutes daily exercise of this process, reached up to the maximum in fifteen days. Its impact goes on emotional, mental, and physical well-being in the most positive and meaningful way on the human body.

Conclusion

The treatment for the coronavirus still not is full enough, only the symptomatic treatment and the immunity of sufferers takes chance for survival. From the Vedic era, Ayurveda has its greater importance for making body susceptibility against any disease through improving immunity. The Herbs and other physical processes which are applied on the body never harm, although it might be possible to take time over the recovery. Thus on the treatment line for the coronavirus, Ayurveda has established a milestone.

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