

Original Research Article

Volume 9 Issue 3

July-Sept 2020

COVID-19: STRUCTURE, PATHOPHYSIOLOGY & TREATMENT

Santosh Kumar Dubey and Dr Rishabh Choubey

Someshwar Cosmic Energy Research Center

ABSTRACT

Covid 19 is a pathogenic combination of less to severely lethal viruses and bacteria. This is composite virus which contains RNA of 4 different viruses and bacteria. 95% genetic material of this virus is fixed and remaining 5% is variable which depends on bacteria and viruses present in patient's body. Covid 19 can only accumulate genomic RNA from similar virus or bacteria.

INTRODUCTION

Covid 19 is a tailor-made virus which is developed due to scientific errors, some special organisms are present on our planet which contain special type of cells. Because of man-made or natural accidents these cells come in contact with viral genome they will create a new virus. This new virus can contain mixture of genetic material present in the special cells.

Pathogenicity of newly formed virus primarily depends on the assembled genomic parts from the beginning. This pathogenicity would not alter greatly up to many generations.

Virus Structure

Covid19 is a positive sense single stranded RNA virus which is a composite of following virus and bacterial RNA.

Virus Composition

Virus or Bacteria	Percentage of Covid-19	Pathogenicity in
Human Immuno Deficiency Virus	25 %	Human
Bovine Respiratory Syncytial Virus	23 %	Young Cattles
Mycobacterium tuberculosis	20 %	Human
Haemophilous influenzae	27 %	Human

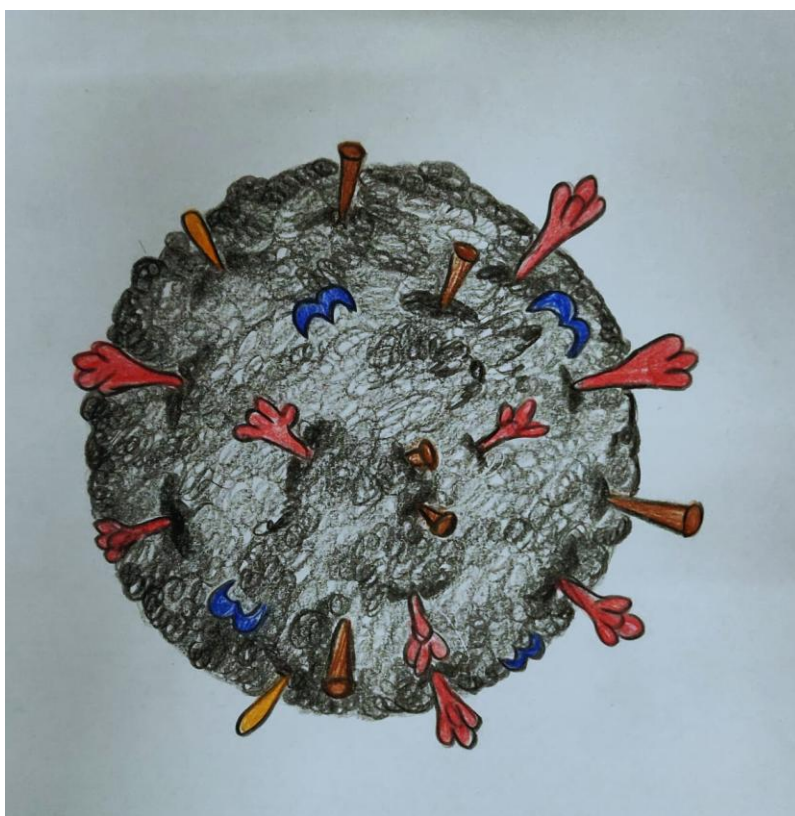
Composition of Viral Capsid

S. No.	Amino Acid	Percentage
1.	Valine	10%
2.	Leucine	8%
3.	Isoleucine	17%
4.	Phenylalanine	8%
5.	Serine	8%
6.	Tyrosine	6%
7.	Cysteine	4%
8.	Aspartic Acid	5%
9.	Glutamine	8%
10.	Arginine	4%
Total		78%

- ❖ Viral capsid contains 78% protein and 22% lipids.

Receptors of Virus

- ❖ There are 4 types of receptors whose number varies from 28 to 30.



Receptors	No. of Receptors in one virus	Combines With	Amino Acid	Lipids
Type-I receptor	7	Natural Killer cell	Valine-12% Isoleucine-22% Tyrosine-18% Glutamin-24%	24%
Type-II receptor	6	T-Lymphocyte & B-Lymphocyte	Leucine-27% Isoleucine-24% Serine-19% Aspartic acid-26%	4%
Type-III receptor	6	Nose & Alveoli	Leucine-28% Tyrosine-17% Cystein-24% Glutamin-18%	13%

Type-IV receptor	4	Pharynx & Trachea	Isoleucine-20% Serine-22% Arginine-23% Aspartic acid-20%	15%
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Internal Structure

The virus is composed of Single stranded positive sense RNA which is the combination of

- RNA of Human Immuno Deficiency Virus
- RNA of Bovine Respiratory Syncytial Virus
- RNA of Mycobacterium tuberculosis
- RNA of Haemophilous influenzae

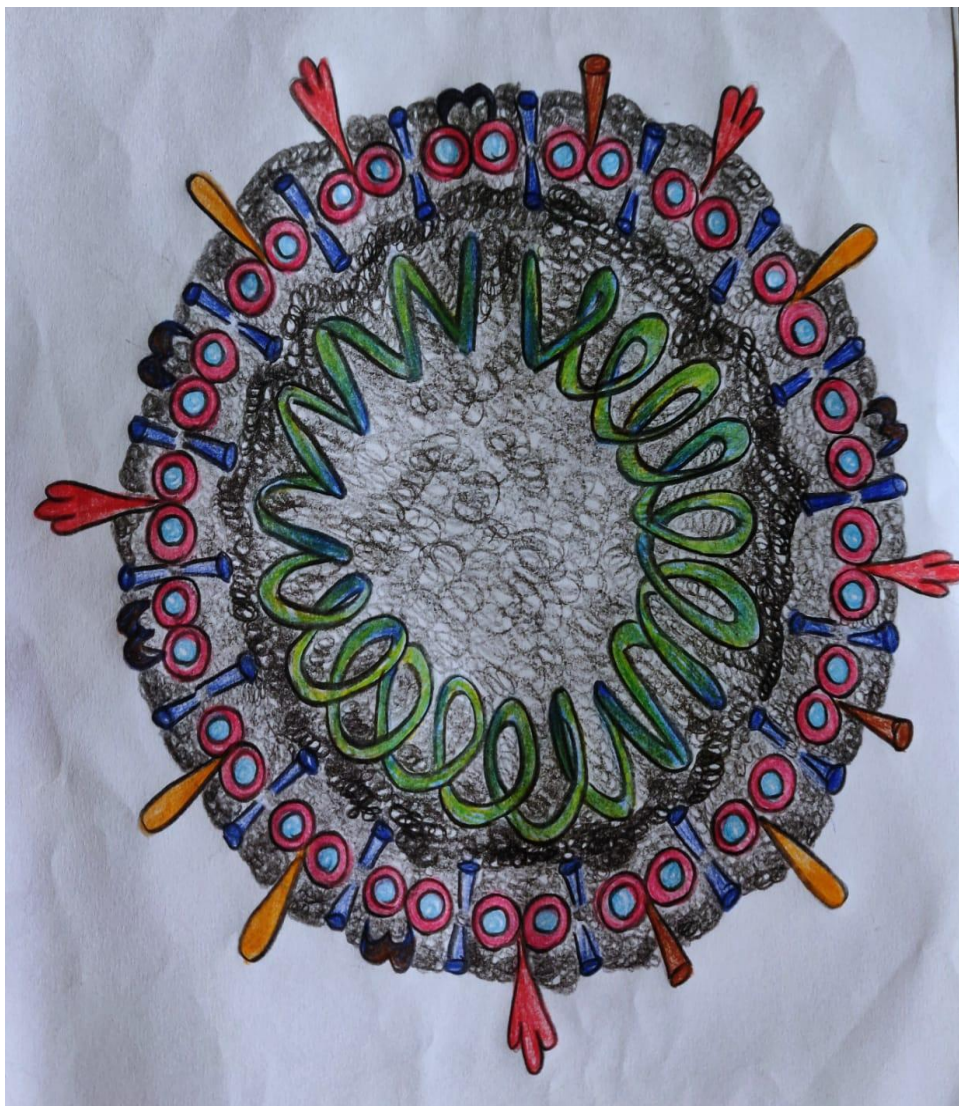
This virus also contains following enzymes

1. Reverse Transcriptase
2. Restriction Endonuclease
3. Integrase

- Presence of Reverse Transcriptase suggests it derives from retro virus.
- Presence of restriction endonuclease suggests it is also derived from bacteria because restriction endonuclease is the natural defense mechanism of the bacteria.
- **Presence of above these enzymes suggests Covid-19 is a combination of bacteria as well as viruses.**

Life Cycle of Virus

72% parts of Covid19's genome is composed of organisms (bacteria & virus) which affect human population and 23% of its genome is derived from the virus which infect respiratory tract of some animals.



Covid-19 contains RNA of following organisms:

Mycobacterium tuberculosis,

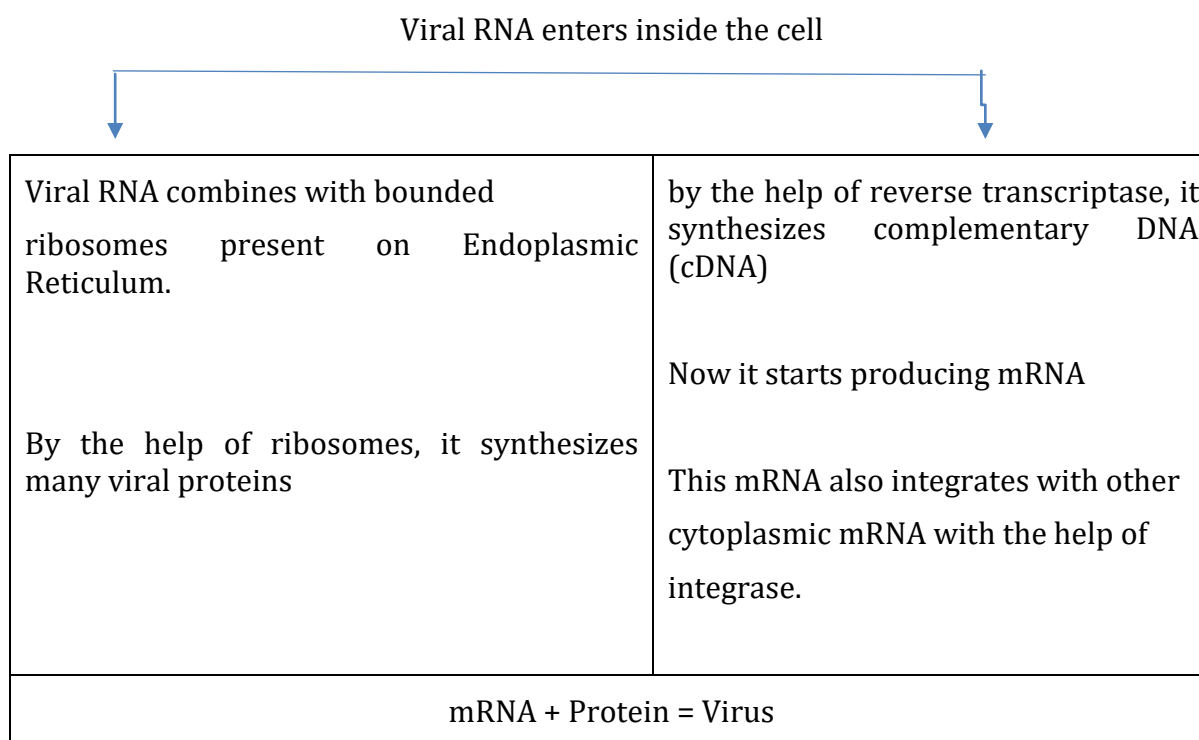
Haemophilus influenzae,

Human Immuno Deficiency Virus,

Bovine Respiratory Syncytial Virus

These pathogens primarily affect respiratory tract. As a result, Covid-19's main site of action is respiratory tract. Covid-19 drastically affects immune system of a person due to presence of some parts of HIV genome. Covid-19 is highly contagious with high copy

number due to presence of contagious organism's RNA. When virus enters it combines with ACE-II receptors present in respiratory tract.



And these new viruses are ready to infect other healthy cells.

Pathophysiology

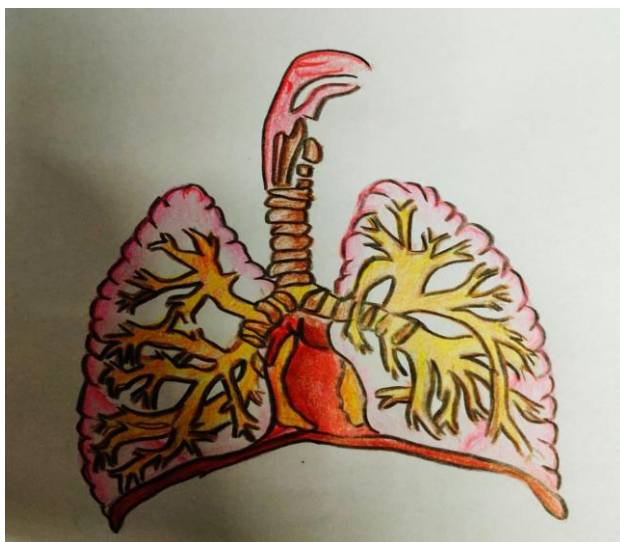
Virus can enter inside human body through

- Nasal Passage
- Oral Passage

1. Entry through Nasal Passage

When Covid-19 enters through nasal passage it is inactive up to 3 days, by fourth day it reaches to internal nares and nasal cavity where its receptor number III combines with nasal receptors. Then viral RNA enters inside the cell where it multiplies itself and produces new viruses. By the 5th – 6th day patient develops mild itching and loss of olfaction. From fourth day of infection it starts moving towards

pharynx and it will take approximately 10 days (from the day of infection) to reach trachea.



2. Entry through Oral Passage

If virus enters through oral passage within 3 days it multiplies itself in pharyngeal mucosa. By 4th to 5th day patient develops sore throat, mild itching and loss of taste. It takes approximately 5 to 6 days from day of infection to reach trachea.

- If virus enters through nasal passage loss of olfaction is the first symptom.
- If virus enters through oral passage loss of taste is the first symptom.
- If both symptoms appear simultaneously that means virus enters through both the passages.
- From the oral passage virus tries to enter inside Gastrointestinal tract but then it is destroyed by hydrochloric acid of stomach.

Within 10 days from nasal passage and 5 - 6 days from oral passage virus reached to trachea.



Fourth receptor of virus combines with ACE-II receptors of trachea. Lipid present in viral receptors fuses with cell membrane which facilitates its direct entry inside the cell.



Now positive sense single stranded RNA enters inside the cell.



Viral mRNA combines with ribosomes of endoplasmic reticulum and translates many viral proteins.



Viral mRNA also synthesise cDNA by the help of reverse transcriptase.



Now this cDNA starts transcribing mRNA by the help of RNA dependent RNA polymerase.



This mRNA integrates with other cellular RNA by the help of integrase.



New RNA contains 95% original viral RNA and 5% cellular or bacterial RNA (bacterial RNA obtained from the bacteria which is present inside the cell)



Now viral RNA and protein combines to form new viruses with 5% new genetic material.



This shows in every viral division new virus is partly different from original virus.



Due to presence of Bovine Respiratory Syncytial Virus. Virus starts damaging cilia and potassium channel of trachea.



So, cilia fail to clear mucus, which produces dry cough within 3 to 5 days. Now viral infected cell releases cytokinin (Interleukin 2,4,5,6) which attracts natural killer cells, T-Killer cells & B-Lymphocytes.



And virus enters inside natural killer cells and T-Killer cells & multiply itself inside these cells.



Virus significantly reduces the number of natural killer cells & T-Killer cells leading to immuno suppression.



Damaged cells secrete prostaglandins which induces fever.

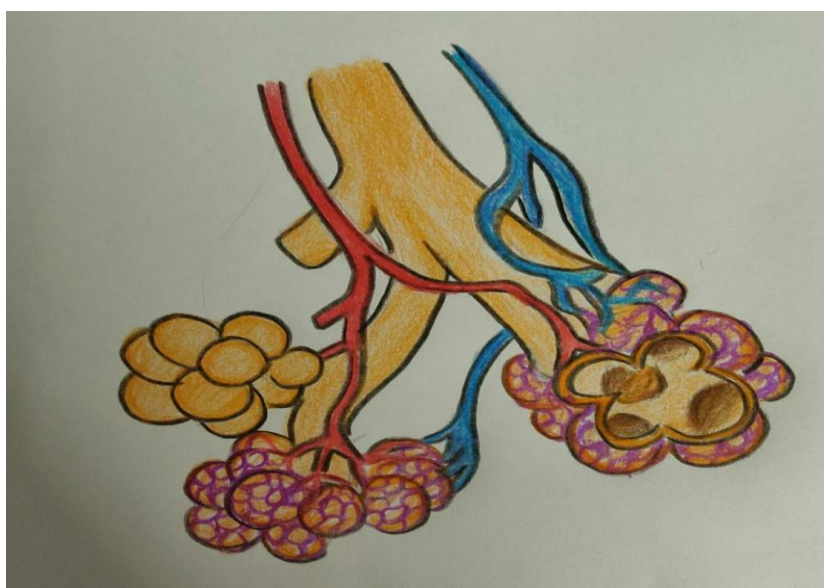


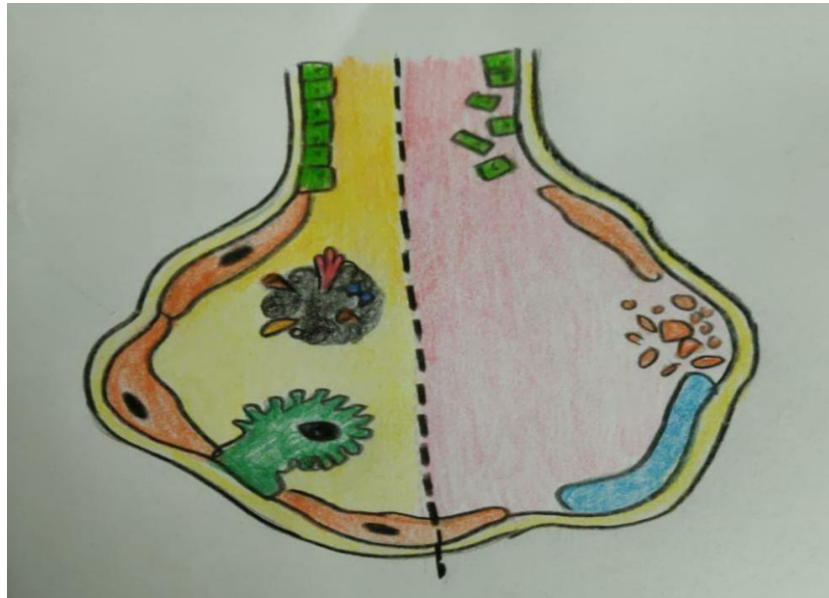
The gradation of fever depends upon the amount of cell damage and prostaglandins.



Virus take different time in different persons to reach alveoli.

Person	Time to reach Alveoli
Healthy	22 to 25 days
Cardiac patient	20 to 23 days
Patient with respiratory disorders	15 to 18 days
Aged Patients	16 to 21 days
Diabetic Patients	16 to 20 days





After reaching the alveoli virus by the help of its third receptor combines with pneumocytes.



Virus infected cell secretes cytokinin which attracts NK cell & B Lymphocyte. Perforin secreted by Natural killer cell and antibodies produced by B Lymphocyte starts damaging type-II pneumocyte.



Due to destruction of type-II pneumocytes there is drastic reduction in the amount of surfactant. This induces labored breathing (Dyspnea).



After destruction of type-II pneumocytes, virus and perforin destroy type-I pneumocytes which decreases oxygen perfusion to blood.



As a result, oxygen saturation decreases in blood.



In advance stage of Covid-19, leakage of intra-alveolar fluid takes place (this fluid builds up because of damaged cilia failed to clear mucus). This is the main cause of death in Covid 19 patients.



Hypoxia also induces necrosis of various tissues.



When this necrosis occurs in myocardium it leads to heart attack (myocardial infraction).

Causes of death in Covid-19 patients

1. Obstruction of bronchi by cell fragments and viruses leads to hypoxia & hypoxia induces various tissue damage in body.
2. Damage of type-II & type-I pneumocytes leads to leakage of surfactant in interalveolar space which decreases oxygen perfusion and induces severe respiratory distress.
3. Destruction of cilia by virus leads to fluid buildup in lungs because cilia failed to clear respiratory tract.

Differential Diagnosis of Common Flu & Covid-19

<u>Common Flu</u>	<u>Covid-19</u>
1. High fever, Headache, body ache	Mild to High fever with restlessness
2. High fever induces polydipsia but patient doesn't like taste of water.	Mild dry mouth (xerostomia)
3. Body ache with mild burning sensation.	Burning sensation around lungs
4. Tachypnea	Dyspnea
5. Sneezing	Dry Cough
6. Symptoms varies depending upon causative agent.	Covid-19 is a composite virus so composite symptom.

7. Fast progression	Slow progression
8. Cough with sputum with voice change.	Dry cough with voice change.

Common Symptoms of COVID-19

1. Loss of Olfaction
2. Loss of Taste
3. Itching Throat
4. Dry mouth
5. Irregular sleep
6. Restlessness
7. Fever
8. Dry cough
9. Pain and burning sensation around lungs

Signs of Covid-19

1. Decreased oxygen saturation.
2. Fever
3. Crepitus

Laboratory Findings

1. Decreased Lymphocytes
2. Increased Interleukins (2,4,5,6)
3. Increased C-reactive Protein
4. Increased Lactate Dehydrogenase
 - Weight of inactive virus is approximately 175.4385 micro grams. After production of fifty viruses one virus destroys itself, the destroyed virus and cells also accumulates in respiratory tract.
 - Weight of active virus inside human body varies between 370 micrograms to 380 micrograms.
 - Activity of virus outside host cell varies from 4 hr. 20 mins to 4 hr. 40 mins.

- Outside the human body weight of virus is described in the below mentioned table

Time	Weight (Milligrams)
Upto 1 min	370
Upto 15 min	350
Upto 30 min	250
Upto 1 hr.	230
Upto 1 hr 30 min.	220
Upto 2 hrs.	210
Upto 2 hr. 30 min.	205
Upto 3 hrs.	200
Upto 3 hr. 30 min.	196
Upto 4 hr.	181
Upto 4 hr. 20 min.	179
Upto 4 hr. 40 min.	178

- Life cycle of virus inside human body is approximately 70 days divided into four stages.

By the quantitative analysis of 1 to 1.5 centigrams pharyngeal swab one can count the number of viruses and correlate with different stages of disease progression.

Stages	Duration	No. of VIRUS per 1 to 1.5 centigram	Pathogenic Correlation
STAGE-I	0 -10 days	22 to 26	Virus reaches to Nasopharynx & Oropharynx
STAGE-II	5 days	48 to 52	Virus reaches to trachea
STAGE-III	35 days	52 to 57.5	Virus reaches to alveoli
STAGE-IV	20 days	55 to 0	Virus initiates self-destruction

Number of virus in daily assessment of pharyngeal swab of patients is given in the below mentioned table: -

S. No.	No. of Days	NO. OF VIRUS PRESENT	No. of VIRUS per 1 to 1.5 centigram
1.	DAY-1	0-0	STAGE-I
2.	DAY-2	0-2	--
3.	DAY-3	2-2	--
4.	DAY-4	3-4	--
5.	DAY-5	4-6	--
6.	DAY-6	6-8	--
7.	DAY-7	8-13	--
8.	DAY-8	13-18	--
9.	DAY-9	18-22	--
10.	DAY-10	22-26	--
11.	DAY-11	26-30	STAGE-II
12.	DAY-12	30-34	--
13.	DAY-13	34-41	--
14.	DAY-14	41-48	--
15.	DAY-15	48-52	--
16.	DAY-16	52-54	STAGE-III
17.	DAY-17	54-56	--
18.	DAY-18	56-56	--
19.	DAY-19	56-56	--
20.	DAY-20	56-57	--
21.	DAY-21	56-57	--
22.	DAY-22	57-57½	--
23.	DAY-23	56-57	--
24.	DAY-24	57-57	--

25.	DAY-25	57-57	--
26.	DAY-26	57-57½	--
27.	DAY-27	57-57	--
28.	DAY-28	57-57	--
29.	DAY-29	57-57	--
30.	DAY-30	57-57	--
31.	DAY-31	57-57½	--
32.	DAY-32	57-57	--
33.	DAY-33	57-57	--
34.	DAY-34	57-57	--
35.	DAY-35	57-57	--
36.	DAY-36	57-57	--
37.	DAY-37	57-57	--
38.	DAY-38	57-57	--
39.	DAY-39	57-57	--
40.	DAY-40	57-57½	--
41.	DAY-41	57-57½	--
42.	DAY-42	57-57½	--
43.	DAY-43	57-57½	--
44.	DAY-44	57-57½	--
45.	DAY-45	57-57½	--
46.	DAY-46	57-57	--
47.	DAY-47	57-57	--
48.	DAY-48	57-57	--
49.	DAY-49	57-57	--
50.	DAY-50	57-57	--
51.	DAY-51	55-53	STAGE-IV
52.	DAY-52	55-53	--
53.	DAY-53	53-52½	--

54.	DAY-54	52-52½	--
55.	DAY-55	52½-48	--
56.	DAY-56	48-45	--
57.	DAY-57	45-40	--
58.	DAY-58	40-37	--
59.	DAY-59	37-34	--
60.	DAY-60	34-30	--
61.	DAY-61	30-28	--
62.	DAY-62	28-19	--
63.	DAY-63	19-16	--
64.	DAY-64	16-15	--
65.	DAY-65	15-5	--
66.	DAY-66	05-04	--
67.	DAY-67	04-02	--
68.	DAY-68	02-01	--
69.	DAY-69	01-0	--
70.	DAY-70	00-00	--

Treatment

Medicine	Dose	Mode of Action
1. SwasVimochan	1 BD * 7 Days	<ol style="list-style-type: none"> 1. Works on cell 2. It works on cellular receptor & prevent virus attachment with the cell.
2. SwasanRakshak	1 BD * 7 Days	<ol style="list-style-type: none"> 1. Works on both virus as well as cell. 2. It denatures the enzymes (Reverse Transcriptase& Restriction Endonuclease) which is present inside the virus. 3. It also destroys viral receptors. 4. Prevent virus multiplication inside the cell by denaturing RNA

		<p>polymerase.</p> <ol style="list-style-type: none"> 5. Prevent translation of viral protein. 6. Prevent entry of cDNA inside the nucleus. 7. Prevents Viral Attachment with NK & T- Cells so it inhibits the secretion of cytokynins(effective for 7 to 8 hours)
3. Swasamrit	2BD * 7 Days	<ol style="list-style-type: none"> 1. It works on all the receptors of virus so it prevents attachment with cell. 2. It prevents attachment of viral RNA from ribosome, which prevents virus multiplication inside cell. 3. It decreases quantity of cytokinin effective for 5 hours.
4. Immune Energy	1 TDS * 7 Days	<ol style="list-style-type: none"> 1. It disintegrates the lipid covering of the virus envelope. 2. It also destroys the enzymes (Restriction Endonuclease& Integrase) present inside the virus and also works on viral receptors. 3. Due to action of this medicine no new virus can enter inside the cell.

SUMMARY

Covid-19 shows it is a combination of viruses and bacterial parts. 95% of its genome is fixed remaining 5% is variable depending upon pathogenic organisms present in Covid patients.

All the symptoms and signs which are developed in Covid-19 patients is due to the presence of two viral parts and two bacterial parts. We have successfully developed the medicine after understanding its detailed structure and pathogenesis.

The above medicines have been developed from nature and we can provide them for drug trials with 100% cure. Though this virus was created accidentally mother earth owns all the cures for Covid-19 devastation.

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Email:someshwarcosmicenergy@gmail.com, godenergyresearchman@gmail.com