

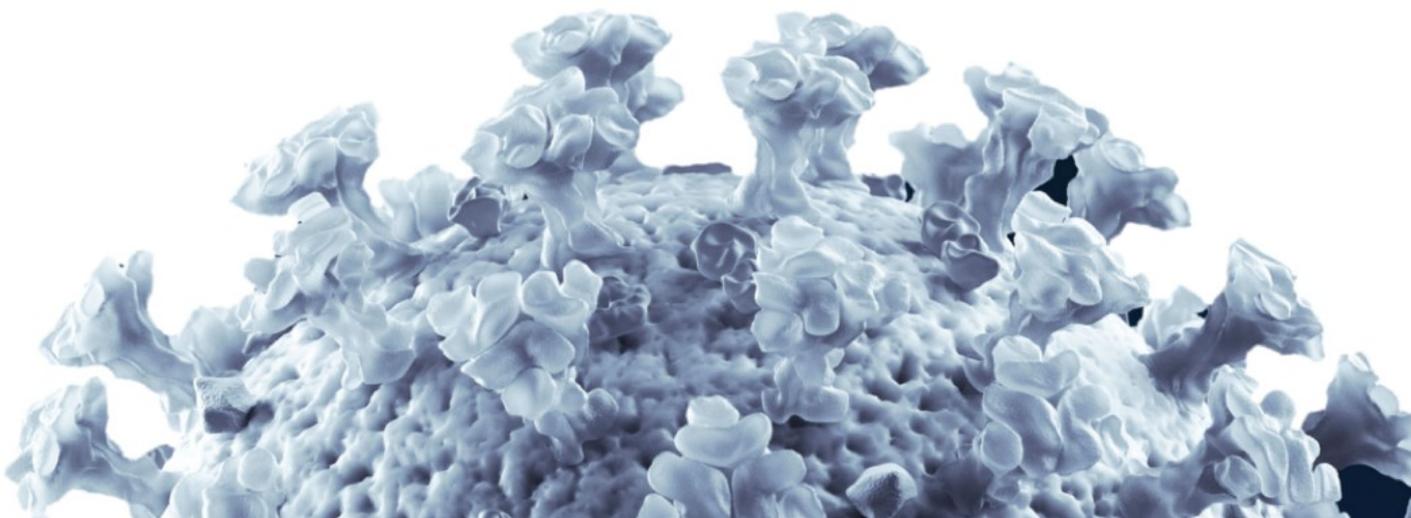
GENOMETM
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COVID-19 RISK
&
IMMUNITY REPORT

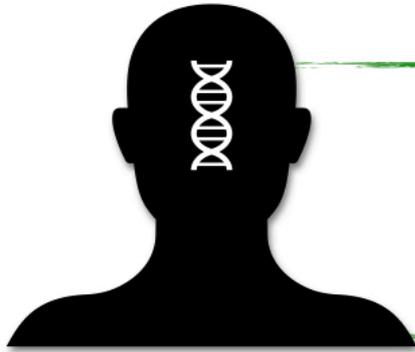
Note: This is DNA-Based Risk assessment only. Not confirmatory/diagnostic testing for COVID-19.

Chris P Bacon



PERSONALISED COVID-19 RISK AND IMMUNITY REPORT

Assessing your genomic risk for susceptibility to COVID-19 as well identifying the strengths and weaknesses of your immune system based on your DNA



MMG004381

Chris P Bacon

Male

03 April 2020

ABOUT THIS REPORT

This report is a **DNA-based assessment of certain factors** which affect your **overall immunity** and **risk for coronavirus infection**. Genetic factors play a role in regulating antiviral processes in your body and thereby, overall immunity.

- Susceptibility to coronavirus infection
- Immune system which modulates your body's fight against, and recovery from, infection
- Health risks which could potentially contribute to severe outcomes during COVID-19 infection
- Likelihood for adverse reaction to certain antiviral drugs
- Nutritional status and dietary needs

Disclaimer: The genetic analysis in the report is based on Single Nucleotide Polymorphisms (SNPs), whose association with different health conditions has been proven by molecular studies and published literature. This report is not diagnostic in nature and cannot be used as confirmation of positive/negative results for COVID-19 or any clinical condition. The results in this report are purely for the purpose of preventive health, via genetic screening only. Having a risk for any of the conditions in the report does not mean you will, or that you will not, be infected with COVID-19.

Mapmygenome recommends that you follow safe hygiene practices as recommended by the WHO and the CDC. If you experience symptoms, please contact your healthcare provider or local authorities.

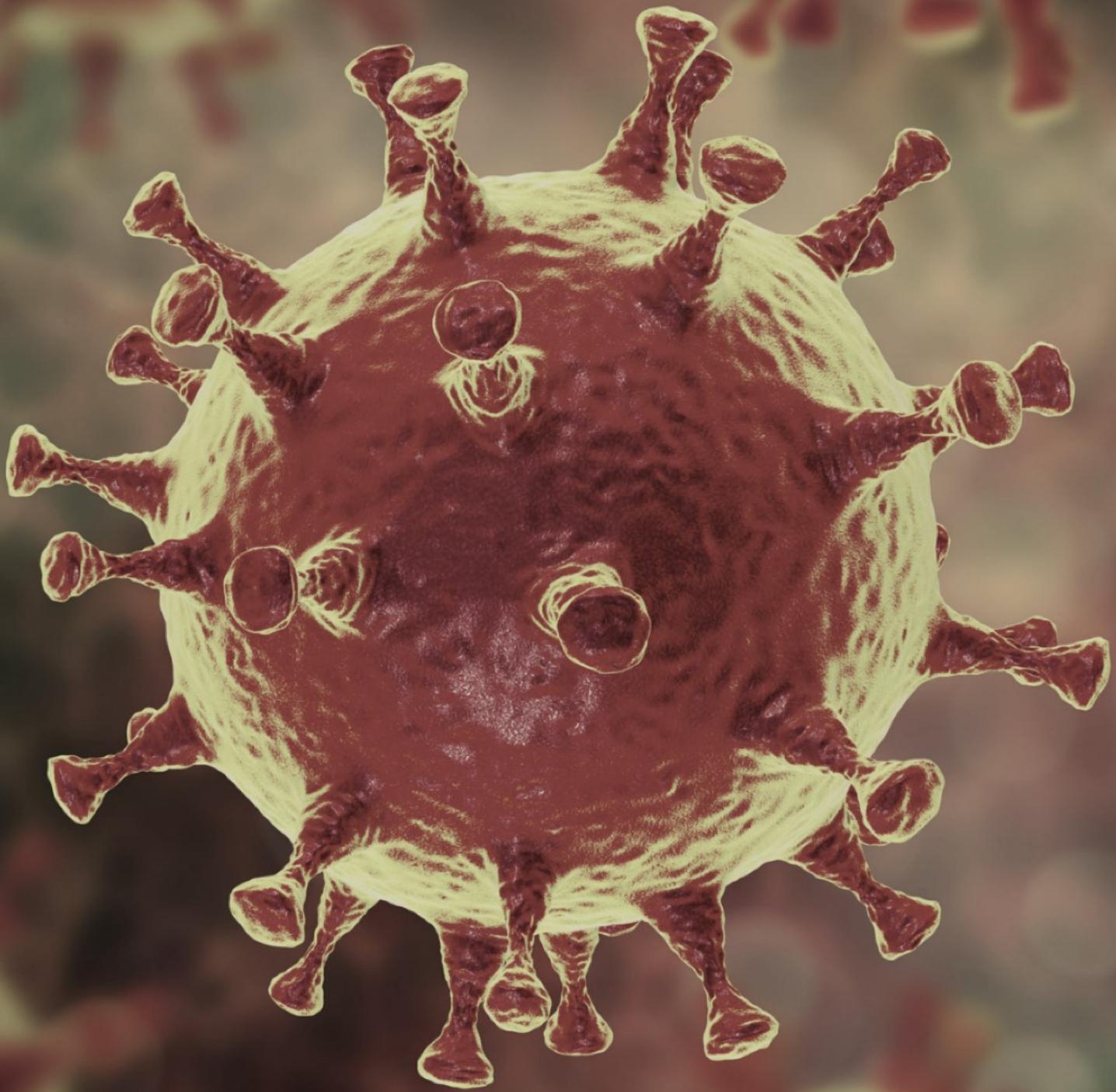
Snapshot of Your Results

Condition	Inference	Interpretation
SARS-COV SUSCEPTIBILITY	Baseline genetic risk	Baseline genetic risk for coronavirus infection
COVID-19 SEVERITY (ACE2)	Medium genetic risk	Slightly increased genetic risk for cardiovascular complications and COVID-19 severity.
CYTOKINE STORM	High genetic risk	High genetic risk for immune/cytokine storm
NICOTINE DEPENDENCE	Baseline genetic risk	You do not have an elevated genetic risk for nicotine addiction.
HYPERTENSION	High genetic risk	You have an elevated genetic risk for hypertension (high blood pressure).
TYPE 2 DIABETES	Baseline genetic risk	You do not have an elevated genetic risk for insulin resistance which is also linked with Type 2 Diabetes.
CORONARY HEART DISEASE	Baseline genetic risk	You do not have an elevated genetic risk for coronary heart disease.
LUPUS	Baseline genetic risk	You do not have an elevated genetic risk for lupus.
PSORIASIS	Baseline genetic risk	You do not have an elevated genetic risk for psoriasis.
ASTHMA	Medium genetic risk	You have a slightly increased genetic risk for asthma.

Condition	Inference	Interpretation
ZINC LEVELS	High	Standard dietary intake recommended. Good sources of zinc include dairy, meat (beef, lamb, pork), nuts (almonds, peanuts, cashews), grains (wheat, oats, quinoa, rice, bajra, barley, jowar, ragi, etc), legumes/pulses (lentils, beans, moong, rajma, chickpeas), pumpkin seeds, flaxseeds, sesame seeds and walnuts.
VITAMIN C LEVELS	Normal	Standard intake recommended. Coloured peppers (red/yellow/green), guava, papaya, broccoli and kiwi fruit are good dietary sources of Vitamin C.
VITAMIN D LEVELS	Slightly reduced	Increased dietary intake recommended. The best sources of Vitamin D are cod liver oil, fatty fish (such as salmon and mackerel), egg yolk and milk. Vitamin-D fortified foods such as fortified soy and rice can also be consumed. Early-morning sun exposure is also recommended for Vitamin D synthesis in the body (through the skin).

Drug Name	Testing for Efficacy	Testing for Toxicity	Interpretation
CHLOROQUINE		✓	Baseline genetic risk for chloroquine-induced toxicity (haemolytic anaemia).
ABACAVIR		✓	Baseline genetic risk for abacavir hypersensitivity.





YOUR DETAILED REPORT

SARS-CoV susceptibility

Genetic factors play a very important role in SARS-CoV pathogenesis and many genes (such as MBL, OAS1, IL1A, and IL18) have been tested for their association with the infection. Individuals with polymorphism in these genes, could have increased susceptibility for coronavirus infection.

Baseline Genetic Risk

Medium Genetic Risk

High Genetic Risk

Baseline genetic risk for coronavirus infection

COVID-19 severity (ACE2)

Having ACE2 gene variants could potentially increase risk for cardiovascular complications (eg., hypertension, heart disease) and diabetes. According to the CDC, COVID-19 outcomes are more severe (in some cases, fatal) in patients with existing health risks such as cardiovascular complications.

Baseline Genetic Risk

Medium Genetic Risk

High Genetic Risk

Slightly increased genetic risk for cardiovascular complications and COVID-19 severity.

Cytokine storm

An immune reaction storm or a 'cytokine storm' is basically a severe immune reaction that can worsen outcomes (in some cases, cause fatality) in patients who are infected with certain strains of virus. Variations in genes of the immune system (such as the interleukin family, tumour necrosis factor, etc) increase the likelihood of cytokine storm and thereby, worsen outcomes and recovery rates in patients.

Baseline Genetic Risk

Medium Genetic Risk

High Genetic Risk

High genetic risk for immune/cytokine storm

Nicotine dependence

The addictive nature of nicotine makes smoking a recurrent habit in both men and women. Nicotine Dependence is measured by parameters such as CPD (cigarettes per day) and TTF (Time To First cigarette), and is the primary determinant of smoking behavior. Nicotine exerts a pleasurable effect, as it crosses the Blood-Brain Barrier (BBB) within minutes of having a cigarette. As the feeling is short-lived, more cigarettes are lit and addiction quickly develops.

Baseline Genetic Risk

Medium Genetic Risk

High Genetic Risk

You do not have an elevated genetic risk for nicotine addiction.

Hypertension

Blood pressure is the force exerted by blood against the walls of the blood vessels. Hypertension is defined as chronically high blood pressure that is persistently at or above 140/90 mmHg. This can cause significant damage to the blood vessels and other organs of the body.

Baseline Genetic Risk

Medium Genetic Risk

High Genetic Risk

You have an elevated genetic risk for hypertension (high blood pressure).

Type 2 Diabetes

Type 2 diabetes (T2D, also known as non insulin dependent diabetes mellitus) is a metabolic disorder characterized by high levels of sugar (glucose) in blood. T2D is caused by decreased insulin production or insulin resistance (reduced response to insulin). In individuals with insulin resistance, the body gradually fails to respond to insulin, which results in elevated blood sugar levels.

Baseline Genetic Risk

Medium Genetic Risk

High Genetic Risk

Average Population Risk

1 in 5

Your Genetic Risk

0.57x

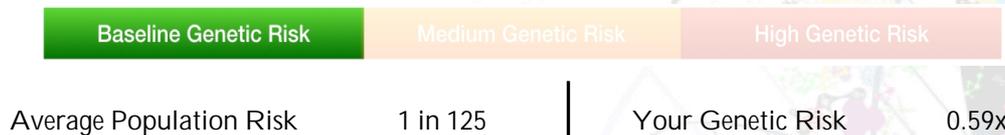
Gene	Chromosome	Risk Allele	Your Genotype
TCF7L2	10	C	TT
TCF7L2	10	T	CC
FTO	16	A	AC

Gene	Chromosome	Risk Allele	Your Genotype
CDKAL1	6	G	AA
CDKN2B	9	T	TT
KCNQ1	11	C	CC
PPARG	3	G	CC
HHEX	10	C	TT
SLC30A8	8	C	TC
IGF2BP2	3	T	TG
IGF2BP2	3	C	AC
KCNJ11	11	T	CC
FTO	16	A	AT
FTO	16	T	TG

Your Variant Score: 8 out of 14

Coronary Heart Disease

Coronary heart disease or coronary artery disease (CAD) happens when the supply of blood and oxygen to the heart is reduced, due to narrowing of the blood vessels (coronary arteries) which innervate the heart. This is caused by a waxy substance called plaque, which builds up in the arteries of the heart. Plaque may contain fatty acids, minerals (calcium) and blood cells (macrophages). The most common symptoms of CHD are chest pain or discomfort, shortness of breath, rapid heart rate and lightheadedness.

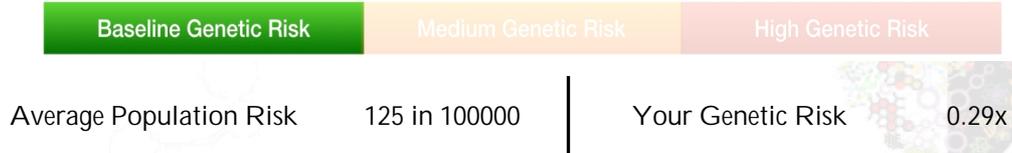


Gene	Chromosome	Risk Allele	Your Genotype
9p21 (CDKN2A/2B)	9	A	AG
PSRC1	1	A	AA
MTHFD1L	6	A	GG
CDH13	16	G	TG
LPA	6	C	TT

Your Variant Score: 3 out of 5

Lupus

Systemic Lupus Erythematosus, often abbreviated as SLE or lupus, is a systemic autoimmune disease that can affect any part of the body. Lupus most often harms the heart, joints, skin, lungs, blood vessels, liver, kidneys, and nervous system.



Gene	Chromosome	Risk Allele	Your Genotype
IRF5	7	C	TT
KIAA1542	11	T	TC
STAT4	2	T	GG
HLA-DQ	6	T	CC
ITGAM	16	T	CC
MSH5	6	A	GG
STAT4	2	A	GG
TNFAIP3	6	G	CC

Your Variant Score: 1 out of 8

Psoriasis

Psoriasis is a chronic inflammatory disease that affects the skin and joints. In this condition, the immune system sends signals to skin cells that grow too quickly, forming thick, white, silvery or red patches of skin. The skin renewal process normally takes about 4 weeks, but in psoriasis, new skin cells move rapidly to the surface of the skin in days, rather than weeks. The body does not shed these excess skin cells, which build up on the surface of the skin forming patches called plaques. These plaques vary in size and often form on the knees, elbows, scalp, hands, feet, and/or lower back.



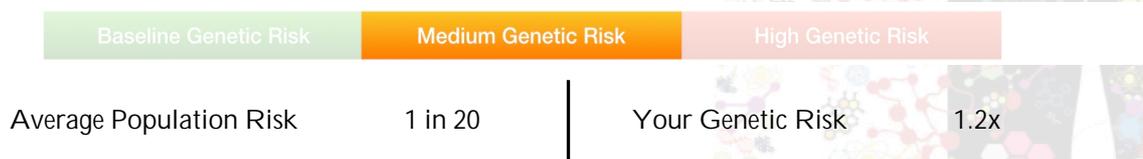
Gene	Chromosome	Risk Allele	Your Genotype
HLA-C	6	T	TC
HLA-C	6	T	TC
IL13	5	G	AG
IL23A	12	A	AA
IL23R	1	G	AG

Gene	Chromosome	Risk Allele	Your Genotype
HCP5	6	G	TT
IL12B	5	C	TT
TNFAIP3	6	G	TT
HLA-C	6	A	GG

Your Variant Score: 5 out of 9

Asthma

Asthma is a chronic respiratory disorder affecting the airways of the lungs. It is characterized by recurrent attacks of breathlessness. The inner lining of the airways swell because of inflammation, narrowing down the passage of airflow for lungs. As a result, the lungs are deprived of, or receive less oxygen.



Gene	Chromosome	Risk Allele	Your Genotype
HLA-DQ	6	C	TC
IL18R1	2	G	GG
SMAD3	15	G	GG
IL2RB	22	G	AA
PDE4D	5	G	AA
IL13	5	T	TC
PRKG1	10	A	GG
RAD50	5	G	AA
GSDMB-ORMDL3	17	T	TT
IL33	9	C	AA
GSDMB	17	G	GG

Your Variant Score: 6 out of 11

Zinc levels

Zinc is an essential mineral which plays a protective role against the common cold, pneumonia. Some studies report that older individuals are at risk for zinc deficiency and thereby, at risk for infection. Genetic variations in the zinc transporter family of genes (SLC39A14) affect blood levels of zinc.

Standard dietary intake recommended. Good sources of zinc include dairy, meat (beef, lamb, pork), nuts (almonds, peanuts, cashews), grains (wheat, oats, quinoa, rice, bajra, barley, jowar, ragi, etc), legumes/pulses (lentils, beans, moong, rajma, chickpeas), pumpkin seeds, flaxseeds, sesame seeds and walnuts.

Vitamin C levels

Vitamin C (ascorbic acid) is a major requirement for the following (in the human body) for cellular repair and tissue maintenance. It is a vital nutrient for regulating immune response due to its antioxidant activity. Consumption of vitamin C also boosts iron absorption.

Standard intake recommended. Coloured peppers (red/yellow/green), guava, papaya, broccoli and kiwi fruit are good dietary sources of Vitamin C.

Vitamin D levels

Vitamin D is very important for the maintenance of bone health. Regulation of calcium and phosphate levels in the bone matrix (mineralization) is one of the major functions of the active form of Vit D- 25-hydroxyvitamin D. Biological testing for Vitamin D is done by measurement of serum concentrations of (25(OH)D).

Increased dietary intake recommended. The best sources of Vitamin D are cod liver oil, fatty fish (such as salmon and mackerel), egg yolk and milk. Vitamin-D fortified foods such as fortified soy and rice can also be consumed. Early-morning sun exposure is also recommended for Vitamin D synthesis in the body (through the skin).

Chloroquine

Based on reports from medical experts in Korea, China and more recently, the Indian Council of Medical Research (ICMR), chloroquine (or hydroxychloroquine) can be used for SARS-CoV-2 patients. Individuals with G6PD mutations are more likely to suffer from severe adverse effects such as breakdown of red blood cells resulting in anaemia.

The USFDA (United States Food and Drug Administration) recommends genetic testing prior to administering these drugs, to reduce adverse effects.

Gene	Your Genotype	Inference
G6PD	CC_TT_GG_GG	Baseline genetic risk for chloroquine-induced toxicity (haemolytic anaemia).

Abacavir

According to some studies, repurposing antiretrovirals could help physicians achieve better outcomes in patients. Known for its use as an anti-HIV drug, abacavir can potentially be used for COVID-19 treatment.

However, individuals who carry certain genetic variations are at risk for severe drug-induced adverse effects. The USFDA (United States Food and Drug Administration) recommends genetic testing prior to administering these drugs, to reduce adverse effects.

Gene	Your Genotype	Inference
HLA-B*5701	TT	Baseline genetic risk for abacavir hypersensitivity.



ACTION PLAN
PREDICT. PREVENT. PERSONALISED.



If you have medium/high genetic risk for coronavirus infection (or severe outcomes during infection)

- **Make safe hygiene your priority.** Keep your surroundings clean and disinfect high-touch surfaces like doorknobs, your phone, daily utilities, etc.
- **Avoid touching** your face with your hands.
- **Wash your hands** with soap and water regularly, throughout the day.
- Invest in a good **alcohol-based sanitizer (at least 70% alcohol)**. You can use this when soap/water isn't available.
- **Avoid stepping out**, unless absolutely necessary. Social gatherings are a no-no.
- Replace handshakes, fist bumps, hugs etc., with a simple wave or a polite nod.
- **Avoid smoking.**
- Keep tabs on your respiratory health. **Prevent exposure to mould spores, exhaust fumes, pollution, irritants, allergens and pet dander** (common triggers for allergy, respiratory symptoms, etc).
- **Reach (or maintain) a healthy weight** with a combination of nutritious food and regular physical activity. This will keep your heart and lungs healthy.
- Exercise at a medium pace. **Avoid overly strenuous workouts** as this could temporarily affect your body's immune system.
- In times like these, it is hard to ignore news bulletins and constant updates about the pandemic. High stress can ruin a perfectly good immune system, and increase your risk for falling ill. **Engage in activities that you like (eg., a hobby) to keep your stress/anxiety levels minimum.**
- **Discuss the option of getting vaccinated** for influenza and pneumonia with your physician.



If you have medium/high genetic risk for Vitamin C deficiency

Boost your immune system with 4-5 servings of fresh fruit and vegetables, every day.

Increase your intake of **Vitamin C** - rich foods such as



Coloured peppers (red/yellow/green), guava, papaya, broccoli, kiwi, kale



Strawberries, lemon, lime, oranges, tangerines, tomatoes, white potatoes, and sweet potatoes



Other good sources include dark leafy greens, cantaloupe, mango, watermelon, brussels sprouts, cauliflower, cabbage, raspberries, blueberries, winter squash, and pineapples.



If you have medium/high genetic risk for Vitamin D deficiency



Regular exposure to early morning sunshine



The best dietary sources of Vitamin D are cod liver oil, **fatty fish** (such as halibut, salmon and mackerel), herring, sardine, egg yolk and dairy (milk, cheese)



Include healthy fats like nuts, fish, etc., in your meals for optimal absorption of Vitamin D, a fat-soluble vitamin



Vitamin-D fortified foods such as fortified soy milk, fortified cereal, fortified juice can also be consumed

- Other sources include portobello mushrooms, tofu, caviar, oysters, beef liver and pork.
- Get your Vitamin D levels checked before considering supplementation.



If you are predisposed to 'Regular' zinc levels



Meats such as beef, lamb and pork are also **good sources of zinc**.



Increase your intake of foods rich in zinc such as dairy, grains (wheat, oats, quinoa, rice, bajra, barley, jowar, ragi, etc), legumes/pulses (lentils, beans, moong, rajma, chickpeas), pumpkin seeds, flaxseeds, sesame seeds and walnuts.



Indulge in some dark chocolate and nuts - almonds, peanuts or cashews



If you have medium/high genetic risk for certain medical conditions

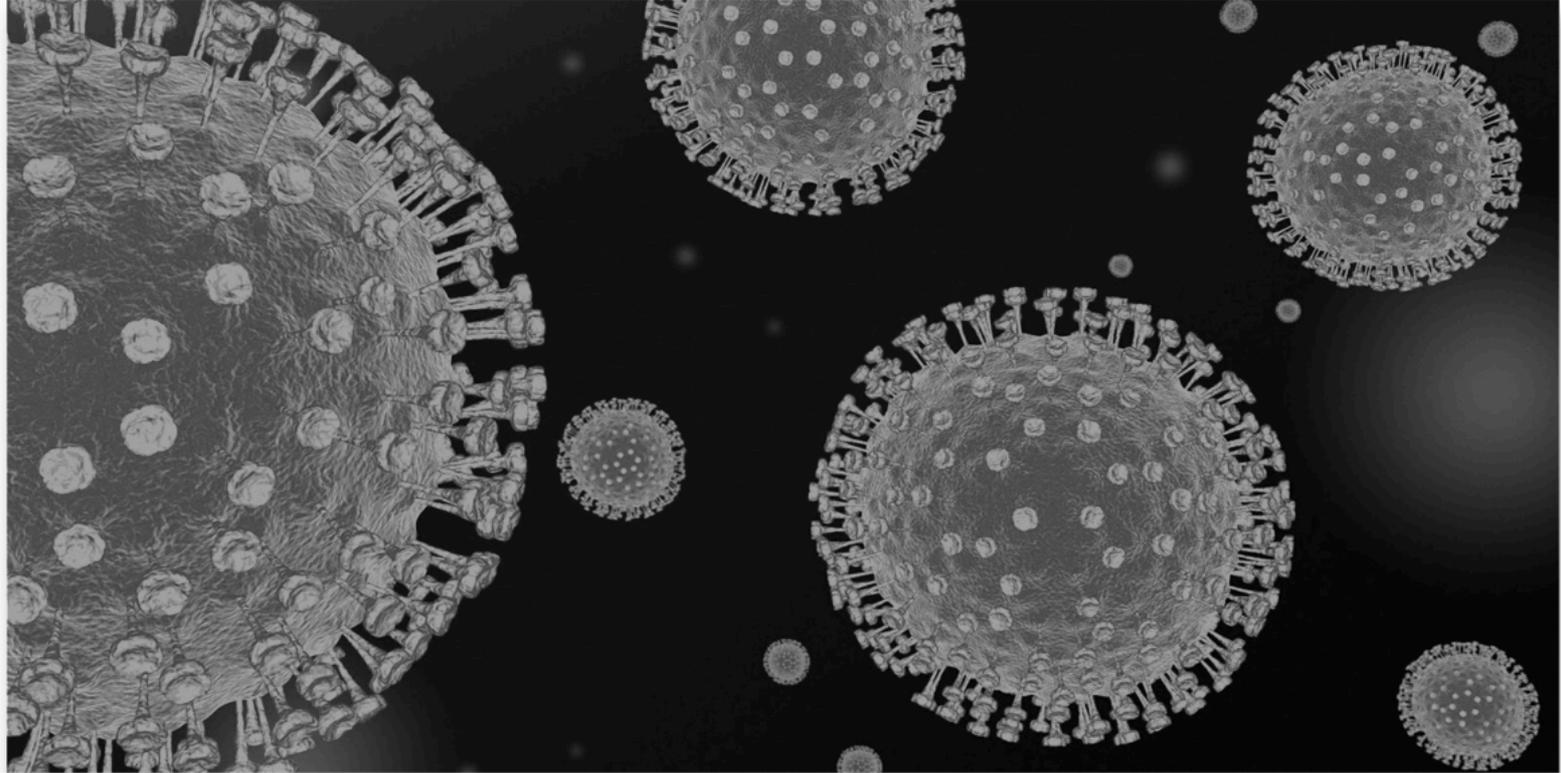
- If you are at risk for **cytokine storm**, hypertension, coronary heart disease or diabetes, **inform your physician**.
- Do not self-medicate..



If you are genetically susceptible to drug induced toxicity

- **Inform your physician** about your genetic results for chloroquine and abacavir.
- **Maintain a record** of your current list of medications, to **avoid drug-drug interactions, if any**.
- **Do not self-medicate**.

Mapmygenome recommends that you follow safe hygiene practices as recommended by the WHO and the CDC. If you experience symptoms, please contact your healthcare provider or local authorities.



Email: info@mapmygenome.in

Telephone: 1800-102-4595

Our Headquarters: Mapmygenome™
Royal Demeure, HUDA Techno Enclave,
Plot no. 12/2, Sector-1, Madhapur,
Hyderabad,
India - 500 081

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