





COVER LETTER

Dear Ms. Doe,

Your sample for the analysis arrived on in the laboratory and was evaluated according to the highest laboratory quality standards. The results were evaluated and released by two independent geneticists and molecular biologists. After obtaining the results, your personal report was compiled. We hereby convey the results to you in the format of your choice.

We would like to thank you for your trust and hope that you are satisfied with our service. We are always open to questions and suggestions. Please do not hesitate to contact us. We value your feedback. This is the only way we can continuously improve our services.

We hope the analysis meets your expectations.

Kind regards,

Dr. Daniel Wallerstorfer BSc.
Laboratory Director

Florian Schneebauer, MSc.
Laboratory Manager

HIV Resistance Sensor

Personal analysis results for:
Jane Doe | Date of birth: 01/01/1990

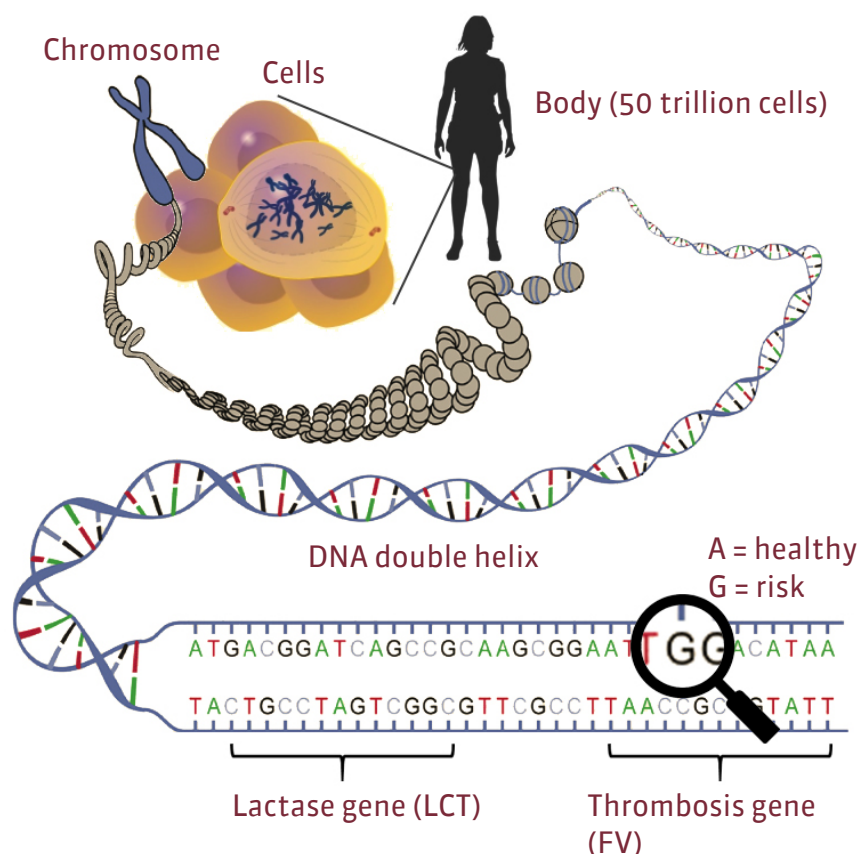
Order number:
DEMO_DS

This report contains personal medical information that is highly confidential. Data protection must be ensured.



How genes influence our health

The human body consists of about 50 trillion individual cells. Most of these cells have a nucleus, which contains 46 chromosomes. A chromosome consists of a very closely wound thread, the DNA "double helix."



DNA, the genetic code, is the blueprint of the human body. This genetic code consists of approximately 3.1 billion molecules, which are each represented by a letter. About 1% of this code makes up the genes. Each gene is an instruction for the body, usually with a single function. For example, some genes tell the body how to colour the iris and differences in these genes produce different eye colors. Every function of the body is controlled by one or more genes, including the way we break down food or medication.

Our genes are not completely error-free. The genes of each person are altered slightly by environmental effects. Most of these changes have no effect but a small number have a harmful effect. An even tinier number can produce a beneficial effect. Parents pass these changes, including defects, to their children. Thus most of our genetic defects are inherited from our parents.

In addition, our genes evolved to help us live in a completely different world, and some of our genetic traits can interact with our modern environment to create negative effects on the body. For example, the genetic predisposition to store dietary fat quickly and lose it slowly is beneficial for people who go through times when food is scarce: they have a better chance of surviving because their bodies use fat efficiently and store it for later. However, in the modern world, this trait is harmful because it programs the body to gain weight quickly and lose weight

slowly. Genes increase our risk of heart attacks, trigger asthma and allergies, cause lactose intolerance, and many other disorders.

Genetic traits can affect our health. While some genetic defects cause disease in all cases, most genetic traits just increase our risk of developing a disease. For example, a person may have genes that increase their risk for diabetes. However, not everyone at risk for diabetes actually develops the disease. Furthermore, even people with a high risk of diabetes can lower their risk with the right diet and exercise plan. Other genetic traits only cause illness when they are triggered by a specific environmental feature. For example, lactose intolerance is a genetic condition that causes a person who drinks milk to have digestive issues. A lactose-intolerant person who never drinks milk will not have any symptoms.

Thanks to the latest technologies, it is now possible to test specific genes to determine if you have genetic traits that are linked to various diseases. Based on the results of the analysis, we can develop a prevention program that significantly reduces your personal disease risk and helps you stay healthy.

A healthy lifestyle will decrease your risk of many diseases whether or not you have specific information about your genetic traits. However, we provide you with additional information that may point out other changes to your lifestyle that are not part of the standard medical advice. There are many examples, but one of the traits we test for is a gene that increases your body's ability to absorb iron. If you have this trait, you must not take iron supplements as the iron would accumulate and cause a life-threatening disease called haemochromatosis.

Experts estimate that every person carries about 2,000 genetic defects, which may affect their health, and in some cases, cause illnesses. A variety of factors can cause changes in our genes (also called mutations). In a few cases, these mutations can benefit us. However, the vast majority either have no effect or have a negative impact on our health. The best-known cause of mutations is radioactivity. Radioactive rays and particles actually impact the DNA in our cells and physically alter our genes. They mostly go unnoticed or cause deadly diseases, such as cancer, or congenital abnormality in newborns. Mutations are also caused by substances in burned food. The substances enter the cells and damage our genes, which can lead to colon cancer, among other forms of cancer. UV radiation from the sun can also damage our genes and cause diseases, such as skin cancer.

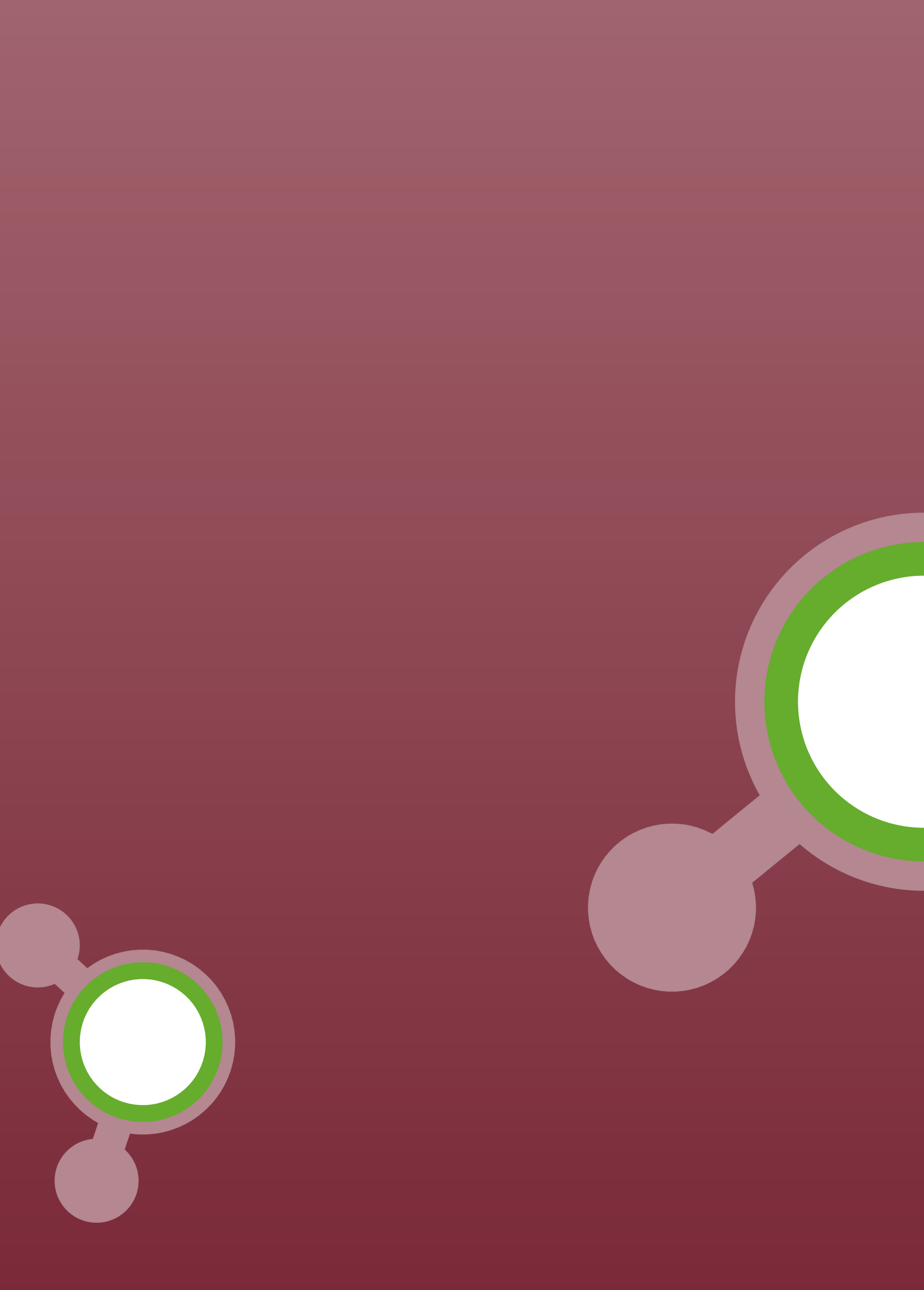
External influences can affect individual genes and disrupt their function, but the majority of our defective genes are inherited from our parents. Each embryo receives half of its genes from the father and half from the mother, resulting in a new human being with some characteristics of each parent. Whether a genetic defect is passed on, is determined randomly, and it may be that some of the children carry the defective gene and others do not.

Each person is the unique product of generations of accumulation and combination of different genetic traits. Some of those traits have negative effects on our health. With the latest technology, it is now finally possible to examine genes and determine personal health risks and strengths. In many cases, taking advantage of this knowledge, and following some precautionary measures, the diseases may be prevented. This is the next step in preventive medicine and a new generation of health care.

Action index

Discuss risks marked in orange or red with your doctor. All other results do not require any further attention assuming there are no current medical conditions.







PHARMACO GENETICS

Not ordered

ONCOLOGY

Not ordered

CARDIOVASCULAR SYSTEM

Not ordered

NEUROLOGY

Not ordered

METABOLISM

Not ordered

MOVEMENT

Not ordered

DIGESTION

Not ordered

OPHTHALMOLOGY

Not ordered

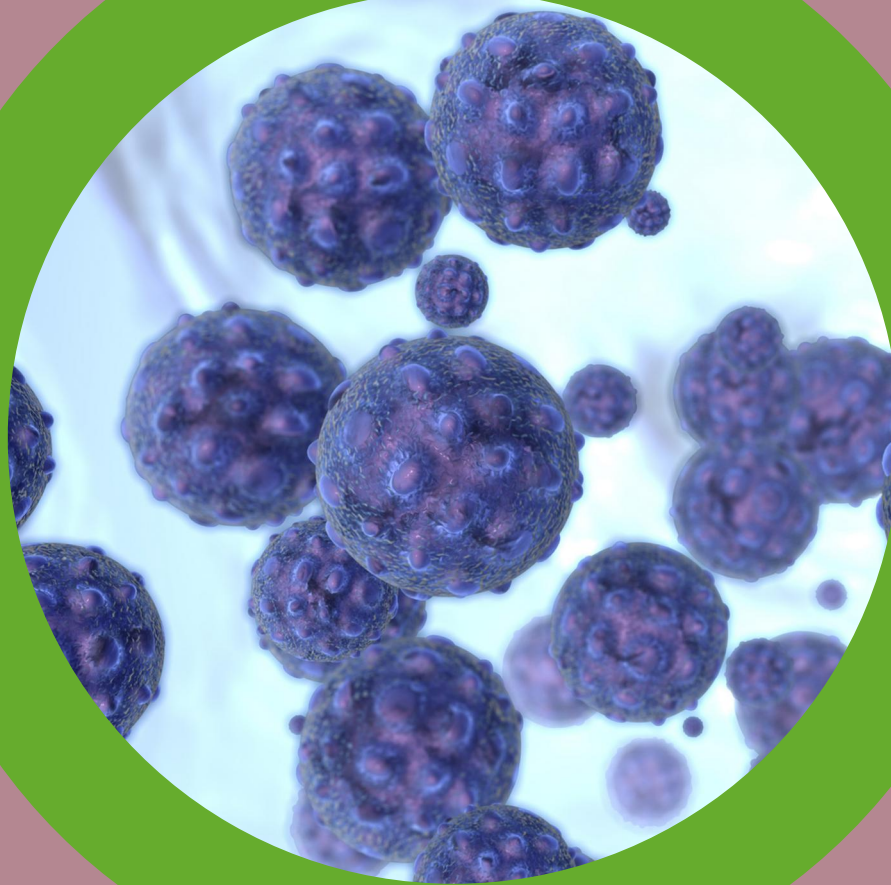
ODONTOLOGY

Not ordered

OTHERS

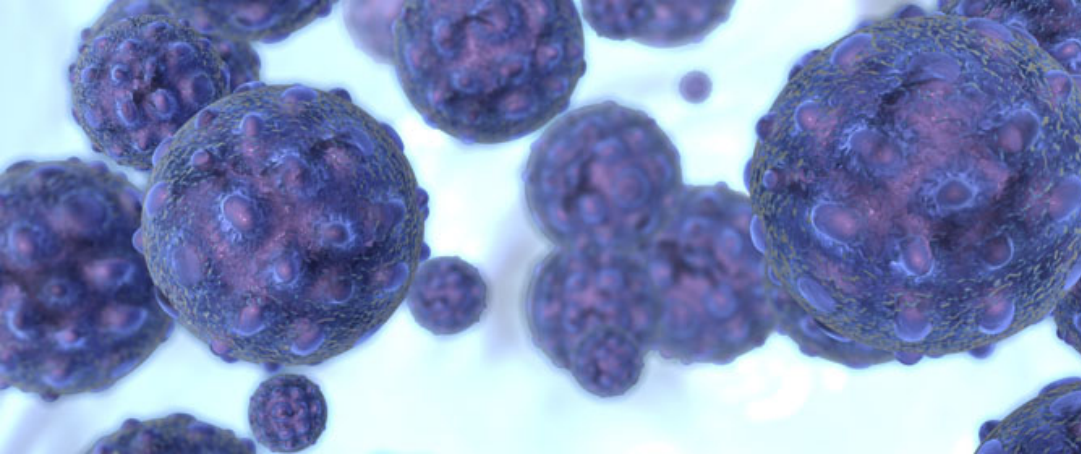
SCIENCE

ADDITIONAL INFORMATION



HIV Resistance Sensor

Risk of infection and optimized therapy



HIV - Human Immunodeficiency Virus

The human immunodeficiency virus, also called HIV virus, has become widespread since the 1980s and has infected about 34 million people so far. The infection is usually present for decades or years without noticeable symptoms, until eventually the immune system is weakened to a point where other infections invade the body and eventually cause death.

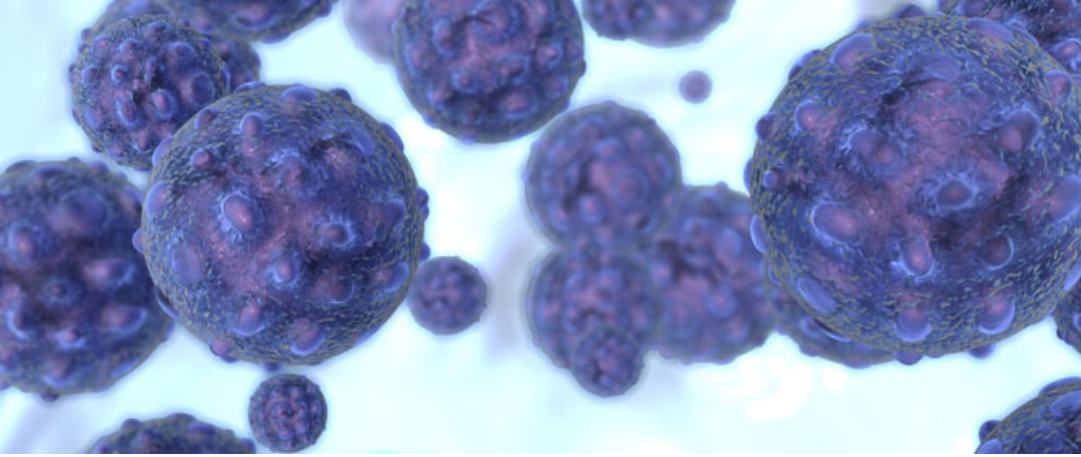
A virus can be described as a self-replicating machine. It usually consists of just a few genes, which are surrounded by a protein capsule. The surface of this capsule has the property of binding to special elements-which are called receptors- of certain cells of the body, and then transfer its genes into the interior of the cell. There, depending on the type of virus, it replicates its genes and sometimes incorporates them into the genome of the cells.

The infected cell cannot differentiate between its own genes and the viral genes, and so it activates them all. Viral genes have different functions. Some of the genes produce the building blocks of the protein capsule, while others copy and carry the viral genes into the new empty capsules. The new viruses then leave the cell and infect new cells, where the same process repeats.

Each form of virus infects only certain cells because each virus needs specific receptors. For HIV, these are the cells of the immune system. The receptors which are required by HIV viruses are CD4 and CCR5. For each of the receptors, a human gene reveals to the cell how to build the receptors. About 20% of the population has a genetic variation in a CR5 gene (CCR5delta32) and therefore produces only about half of the CCR5 receptors. This leads to a lower surface for the virus and considerably reduces the risk of infection. About 1% of the population has this mutation in both CCR5 genes, and is therefore very highly resistant to HIV.

CCR5 receptors are essential for HIV infection and a drug that blocks the CCR5 receptors has already been developed (maraviroc). Other medicines for HIV try to block the replication of the viral genes or interfere in the cycle of the virus in other ways. Without medical treatment, the HIV infection is usually fatal within several years. With drug therapy, however, HIV infection is similar to a chronic disease, and the majority of infected people have a normal life expectancy of over 70 years. Therefore, an effective therapy is of great importance.

Due to genetic differences in the genes that convert drugs in the body, it is possible that certain drugs are either not activated or their efficacy is low, resulting in either over- or under-dosing. Therefore, a genetic analysis of the conversion capability of HIV-related drugs is extremely important for the optimal therapy.



Relevant genes for HIV

An analysis of HIV-related genes determines the risk of HIV infection, estimates the progression of the disease and helps in the optimization of drug therapy. Since there are many other sexually transmitted diseases besides HIV, having a degree of HIV resistance should not to be perceived as freedom to engage in unprotected sexual intercourse. Regardless of the genetic predisposition to HIV, the use of condoms in risky sexual intercourse is recommended.

Genetic traits

SYMBOL	rs NCBI	POLYMORPH	GENOTYPE
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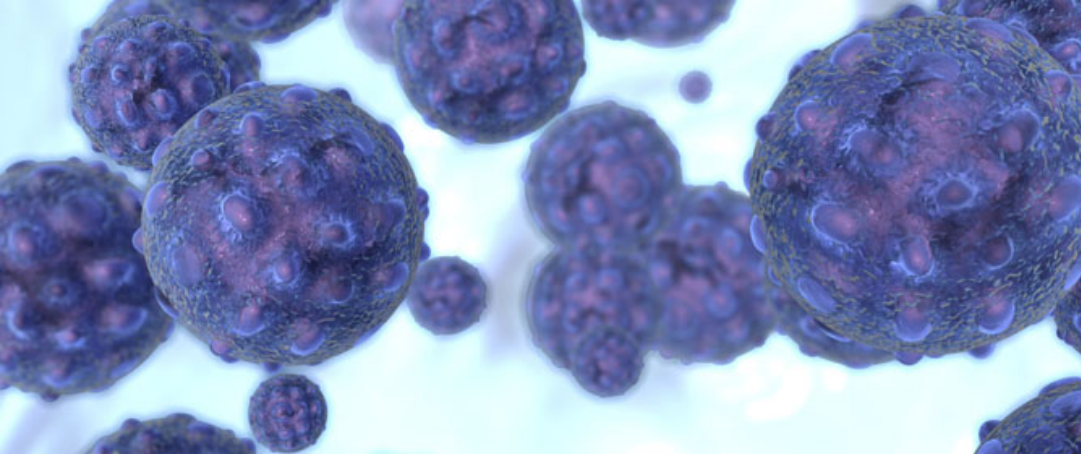
LEGEND: rsNCBI = description of examined genetic variation, POLYMORPHISM = form of the genetic variation, GENOTYPE = personal analysis result

Summary of effects

Based on your genetic profile your cells produce CCR5 receptors needed by the virus. Your infection risk in case of contact is the same as for the general population.

Risk of HIV infection in case of contact

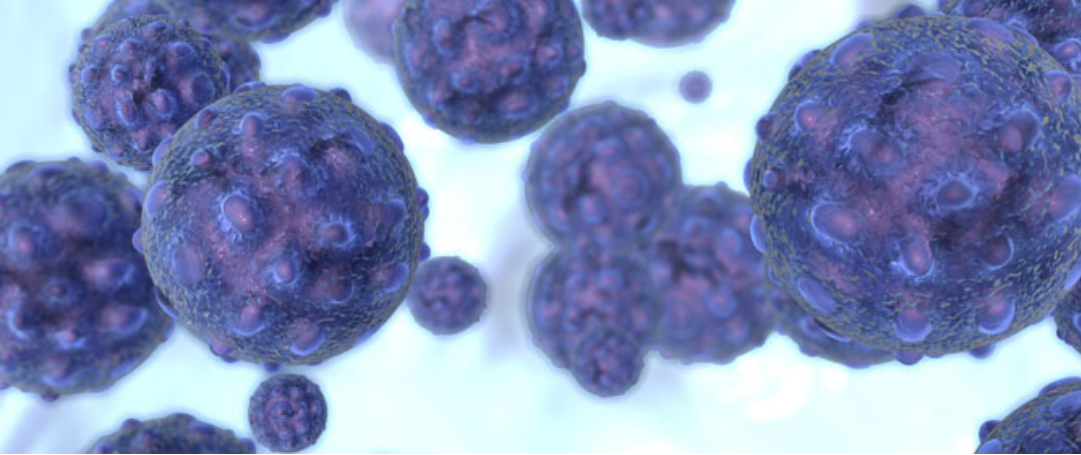
Please note: HIV infection can never be completely excluded even with a favourable genetic CCR5 variant. Some HIV strains do not use the CCR5 receptor, but another called CXCR4. Absolute immunity is therefore not possible.



Prevention

An analysis of HIV-related genes determines the risk of HIV infection, estimates the progression of the disease and helps in the optimization of drug therapy. Since there are many other sexually transmitted diseases besides HIV, having a degree of HIV resistance should not to be perceived as freedom to engage in unprotected sexual intercourse. Regardless of the genetic predisposition to HIV, the use of condoms in risky sexual intercourse is recommended.

Based on your genetic profile your cells produce CCR5 receptors needed by the virus. Your infection risk in case of contact is the same as for the general population.



Drug compatibility






DRUGS	139	310	107	262	221	276	524	371	12
GENES	CYP2E1	CYP2D6	CYP2B6	CYP1A2	CYP2C19	CYP2C9	CYP3A4	CYP3A5	NAT2
DEGRADATION	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NONE	NORMAL	NORMAL	SLOW
DRUGS									
GENES									
FUNCTION									

Effect on relevant medication

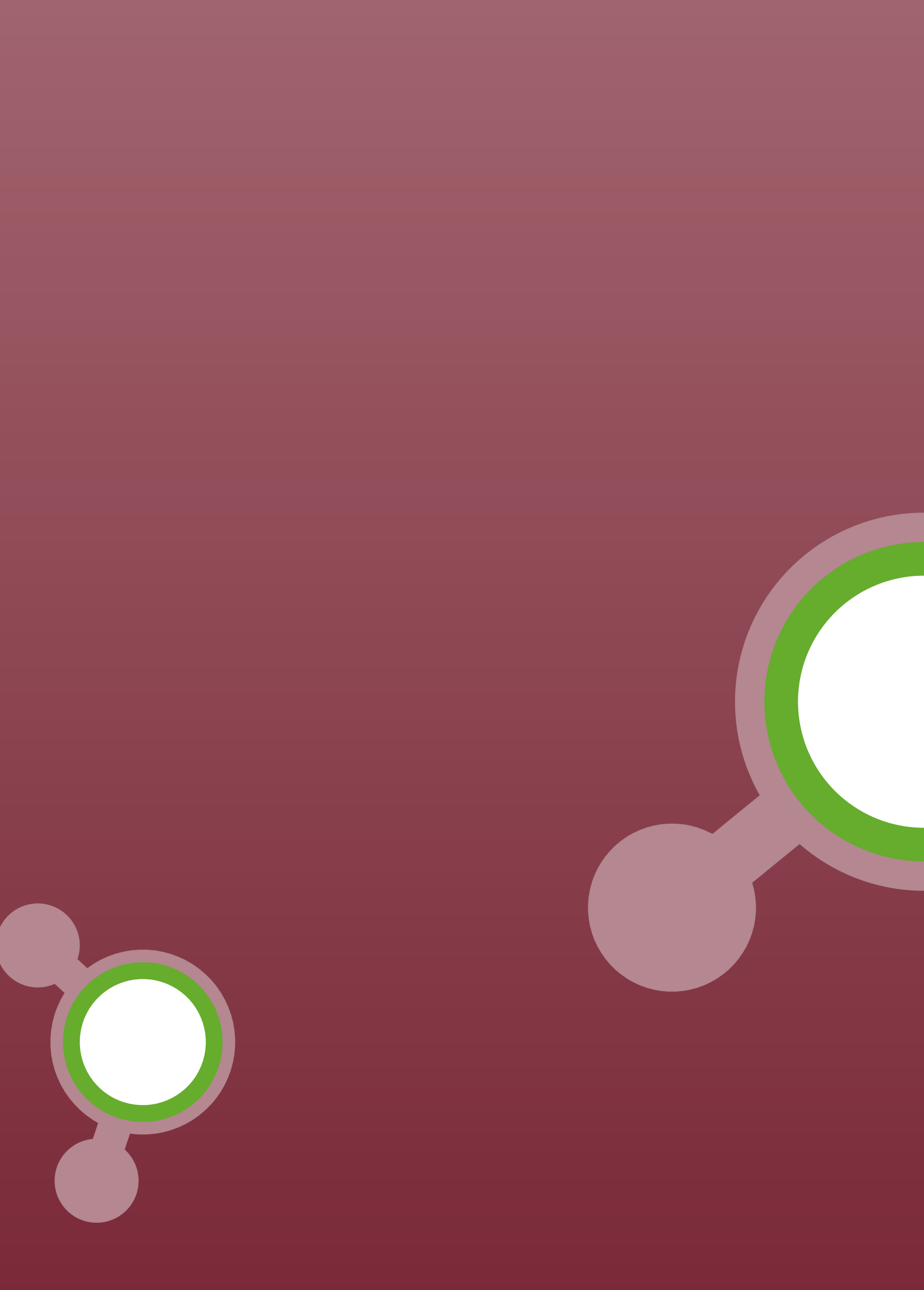
	Effect	Breakdown	Dose		Effect	Breakdown	Dose		Effect	Breakdown	Dose
Abacavir	✓	✓	✗	Atazanavir	✓	↑	✗	Caspofungin	✓	✓	✓
Clarithromycin	✓	↑	↑	Darunavir	✓	↑	↑	Delavirdine	✓	↑	↑
Efavirenz	✓	↑	↑	Etravirine	✓	✓	✓	Fosamprenavir	✓	↑	↑
Hydroxychloroquine	✓	✓	✓	Indinavir	✓	↑	↑	Isoniazid	✓	✗	✗
Itraconazole	✓	↑	↑	Lopinavir	✓	↑	↑	Lopinavir	✓	↑	↑
Maraviroc	✓	✓	✓	Nelfinavir	✓	↑	↑	Nevirapine	✓	↑	↑
Proguanil	✓	✓	✓	Pyrazinamide	✓	✓	✓	Raltegravir	✓	✓	✓
Rifampicin	✓	↓	↓	Rilpivirine	✓	✓	✓	Ritonavir	✓	↑	↑
Saquinavir	✓	↑	↑	Sulfadiazine	✓	✗	✗	Sulfapyridine	✓	✓	✓
Telithromycin	✓	↑	↑	Tipranavir	✓	↑	↑	Voriconazole	✓	✗	✓

Please note: The right choice and dose of medication is always the responsibility of the doctor. Never make your own decision on whether to stop taking a medication or changing its dose!

Legend:

-  Effect: Normal. Degredation: Normal. Recommendation: Normal dosage.
-  Effect: Normal. Degradation: Slower. Recommendation: Reduce the dosage.
-  Effect: Normal. Degradation: None. Recommendation: Alternative drug.
-  Effect: Lower. Degradation: Normal. Recommendation: Normal dosage.
-  Effect: Lower. Breakdown: Lower. Recommendation: Reduce the dosage.
-  Effect: Stronger. Degradation: Stronger. Recommendation: Normal dosage.







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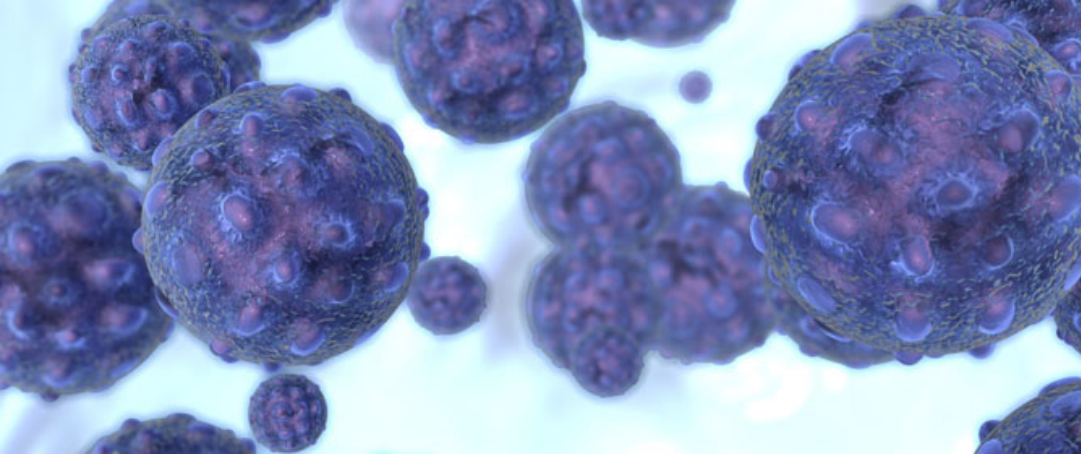
SCIENCE

ADDITIONAL INFORMATION



SCIENCE

This chapter shows the science behind the test.



HIV Resistance Sensor

CCR5 - chemokine (C-C motif) receptor 5 (gene/pseudogene) (rs333)

The chemokine receptor CCR5 is widespread in leukocytes and leucoplasts, and plays an important role in a variety of immunological processes. CCR5 is also an essential co-receptor in the sexual transmission of HIV, by allowing the settling of the HIV virus into cells. It has been shown that the so-called CCR5 Delta32 mutation has an effect on both HIV infection risk, as well as on the progression of the disease.

RES	Genotype	POP	Possible results
X	G/G	90%	Normal risk of HIV infection by viral contact
	G/DEL	9%	Lower risk of HIV (CCR5 HIV variant) infection by viral contact Slower progression of the disease
	DEL/DEL	1%	Virtually no risk of HIV infection by viral contact (CCR5 HIV variant) Normal risk of HIV infection by CCR5-independent HIV variants

References

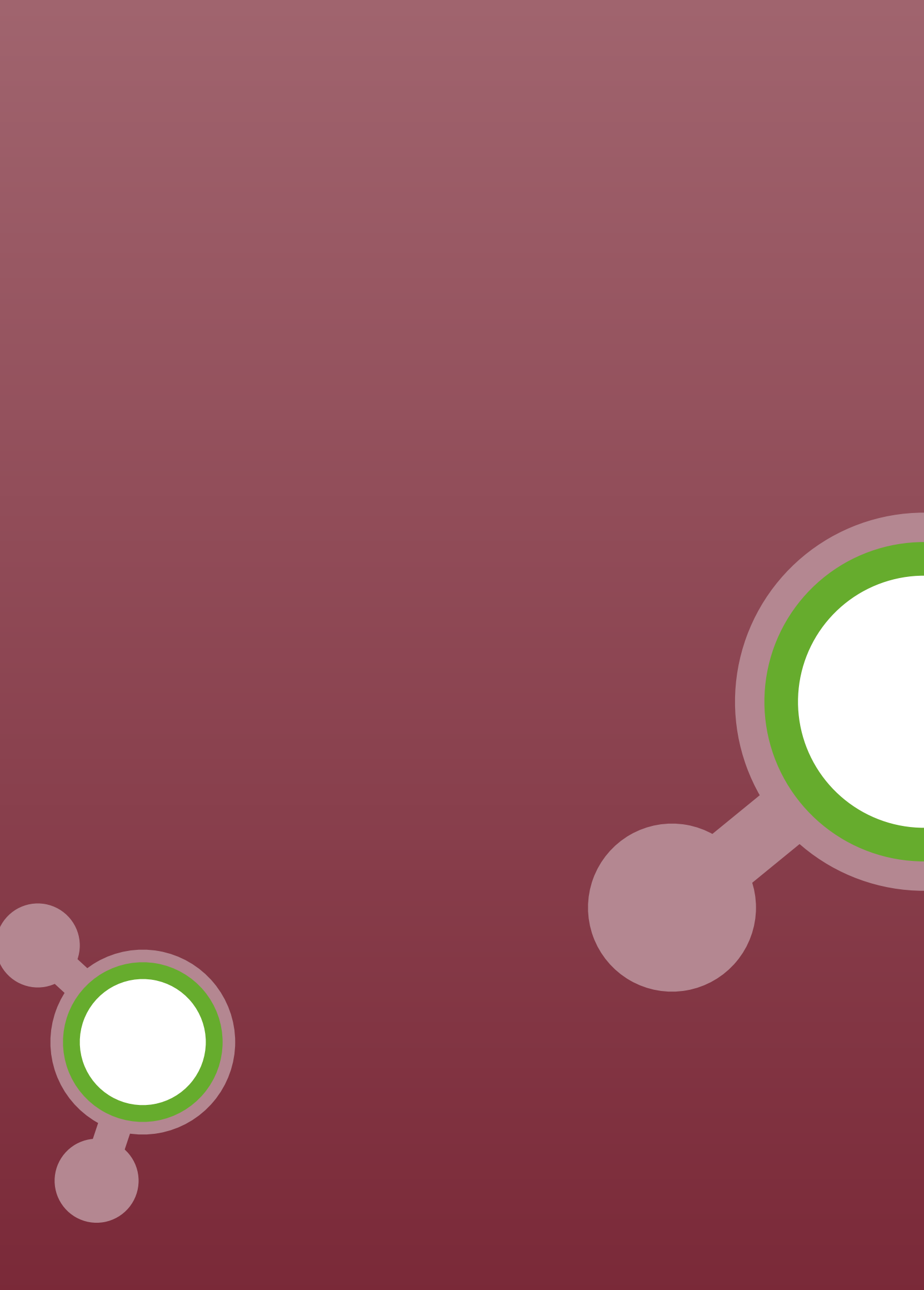
Huang et al. The role of a mutant CCR5 allele in HIV-1 transmission and disease progression. Nat Med. 1996 Nov;2(11):1240-3.

Fellay et al. NIAID Center for HIV/AIDS Vaccine Immunology (CHAVI). Common genetic variation and the control of HIV-1 in humans. PLoS Genet. 2009 Dec;5(12)

Hütter et al. Coregulation of HIV-1 dependency factors in individuals heterozygous to the CCR5-delta32 deletion. AIDS Res Ther. 2013 Nov 18;10(1):26.

Agrawal et al. CCR5Delta32 protein expression and stability are critical for resistance to human immunodeficiency virus type 1 in vivo. J Virol. 2007 Aug;81(15):8041-9

LEGEND: RES = your personal analysis result (marked with an X), GENOTYPE = different variations of the gene (called alleles),
 POP = percent of the general population that have this genetic result,
 POSSIBLE RESULTS = influence of the genetic variation.





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SCIENCE

ADDITIONAL INFORMATION



ADDITIONAL INFORMATION

In this chapter you will receive useful information



Certifications

Our laboratory is one of the most modern and automated laboratories in Europe and has numerous certifications and quality assurance systems that meet, and even exceed, international standards. The various areas of business are certified separately to the highest standards.

Laboratory diagnostics, manufacturing & sales

Quality management system in accordance with ISO 9001:2015



Licensed for medical genetics

Approved by the Federal Ministry of Health, Austria



Cosmetic/genetic diagnostics and cosmetics manufacturing

Good manufacturing practice (GMP) in accordance with ISO 22716:2007



Food supplement manufacturing

Management system for food safety in accordance with ISO 22000:2018





Customer Service

Questions or comments about our service?

Our customer service team is happy to help with any enquiries or problems. You can contact us in the following ways:

- Phone +41 (0) 41 525 100.1
- office.ch@progenom.com

Our team is looking forward to your call. Customer satisfaction is our first priority. If you are not fully satisfied with our service, please let us know. We will do our best to help find a satisfactory solution to your problem.

Contact | Impressum
ProGenom GmbH
Riedstrasse 1
6343 Rotkreuz
SWITZERLAND



Technical details

Order number

DEMO_DS

Date of birth

01/01/1990

Established analysis methods

qRT-PCR, DNA sequencing, fragment length analysis, CNV assay, GC-MS, Immunocap ISAC, Cytolisa

Report generated

19/03/2021 17:45:34

Product codes

M9HIV

Current version

V538

Ordering company

ProGenom GmbH
Riedstrasse 1
6343 Rotkreuz
SWITZERLAND

Analyzing company

DNA Plus - Zentrum für Humangenetik
Georg Wrede Strasse 13
83395 Freilassing
Deutschland

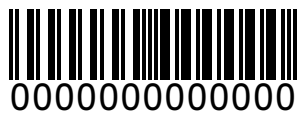
Laboratory Director

Dr. Daniel Wallerstorfer Bsc.

Laboratory Manager

Florian Schneebauer, MSc.

NOTES:





HIV Resistance Sensor
Jane Doe
DEMO_DS