ProMedicDNA

Joint Sensor

Jane Doe
DEMO_DS

ProGenom
www.progenom.com

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

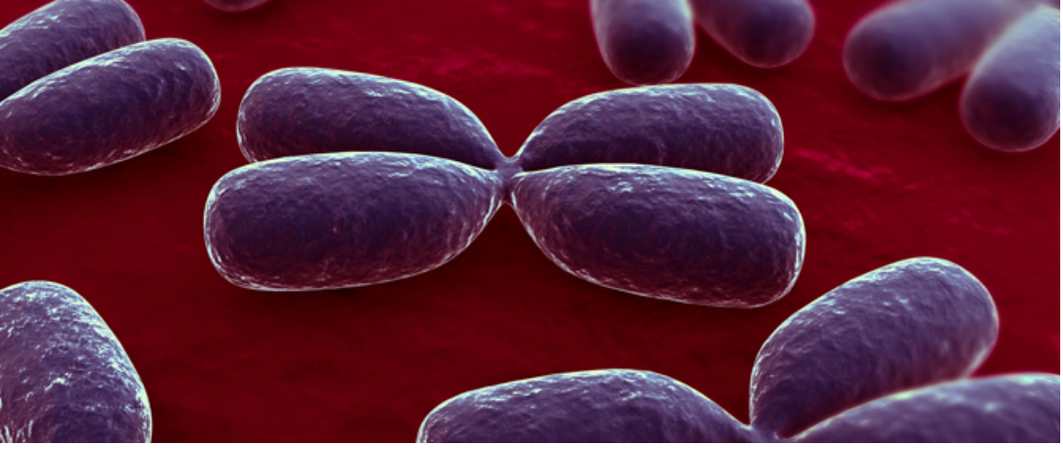
Florian Schneebauer, MSc.
Laboratory Manager

Joint Sensor

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

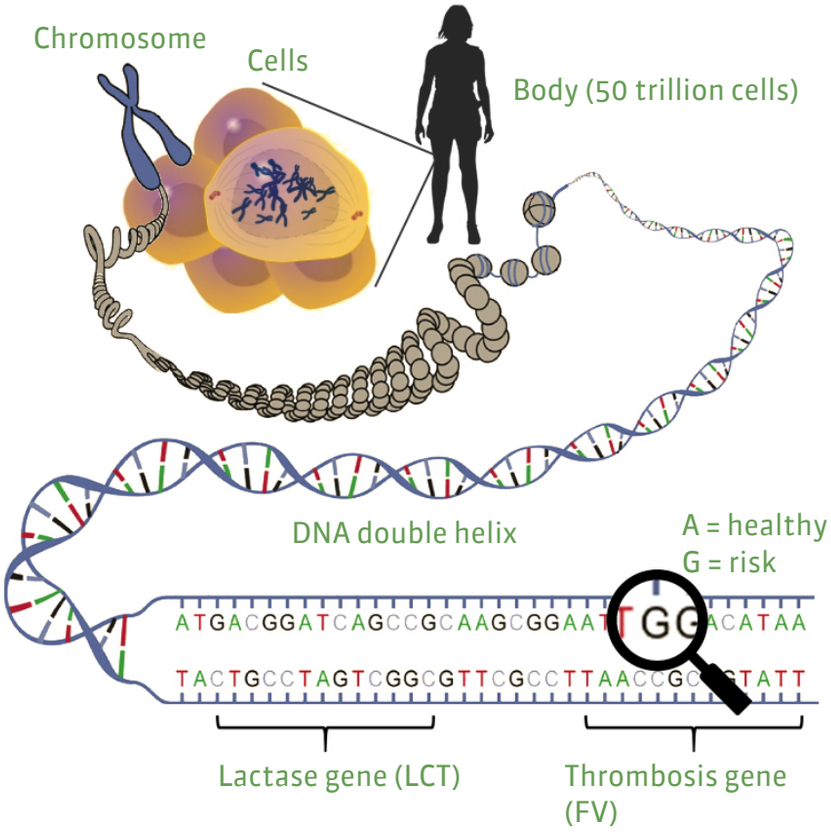
Order number:
DEMO_DS

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.

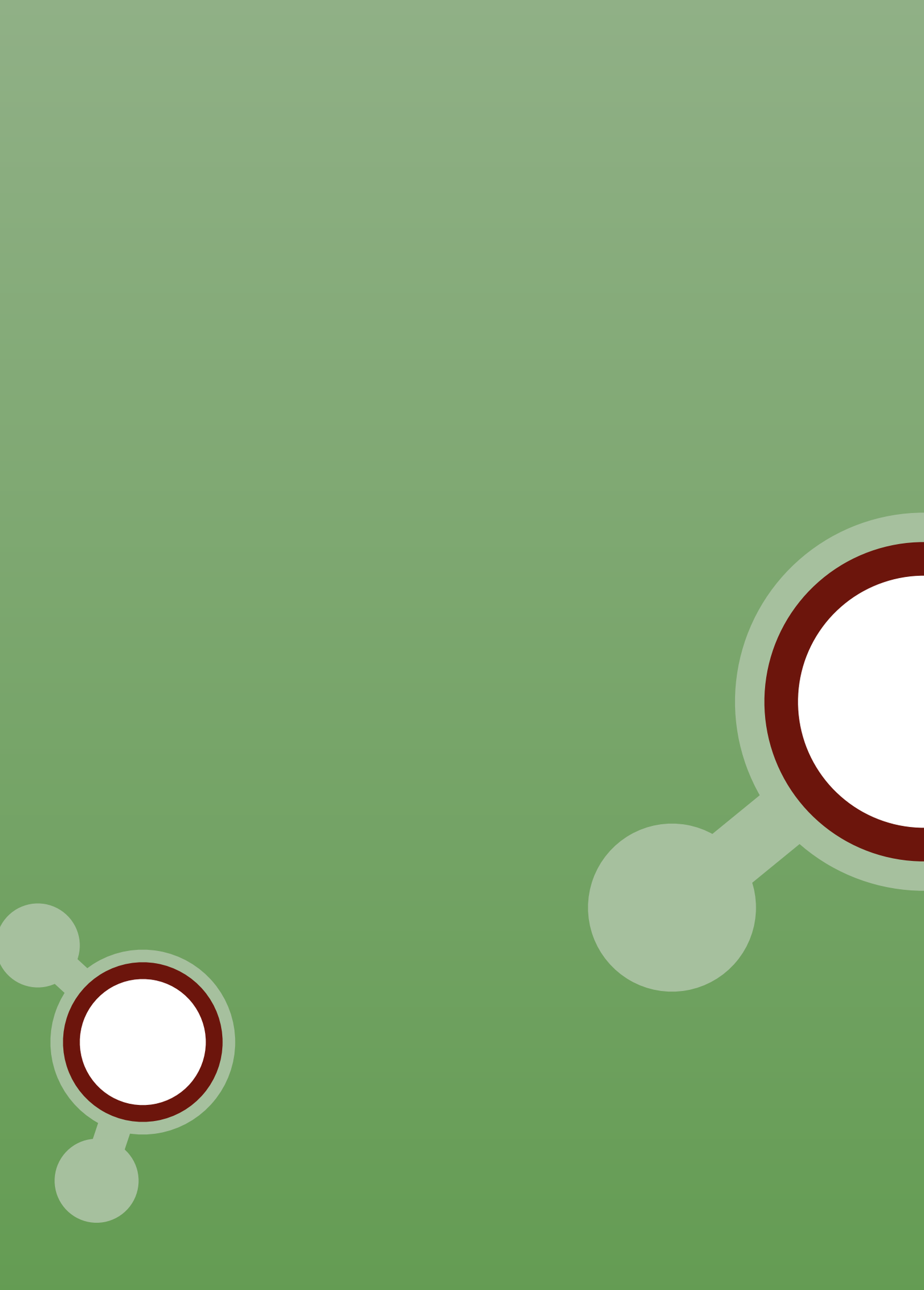
External influences can affect individual genes and disrupt their function, but the majority of our defective genes are inherited from our parents. Each embryo receives half of its genes from the father and half from the mother, resulting in a new human being with some characteristics of each parent. 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.

Joint Sensor



PHARMACO GENETICS
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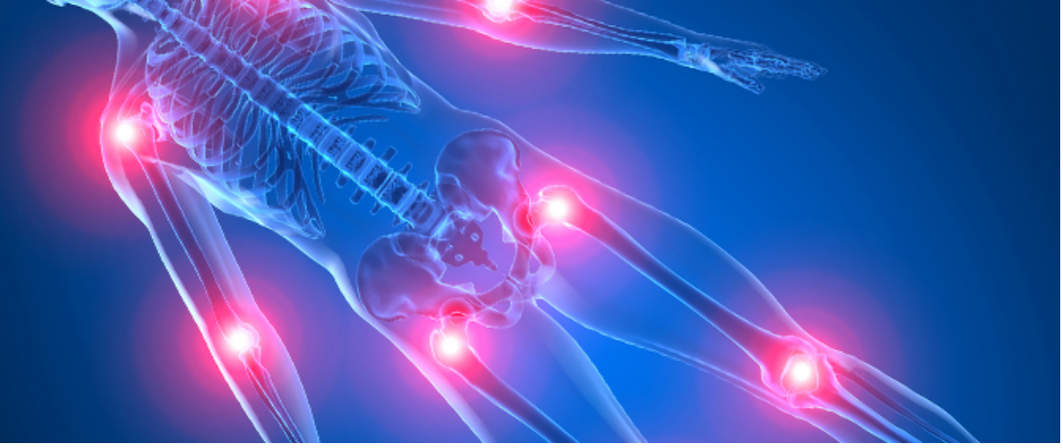
SCIENCE

ADDITIONAL INFORMATION

Joint Sensor

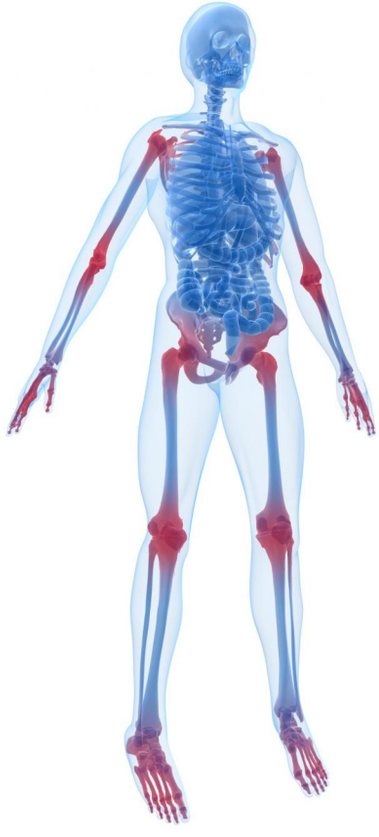
Rheumatoid arthritis: prevention and efficiency



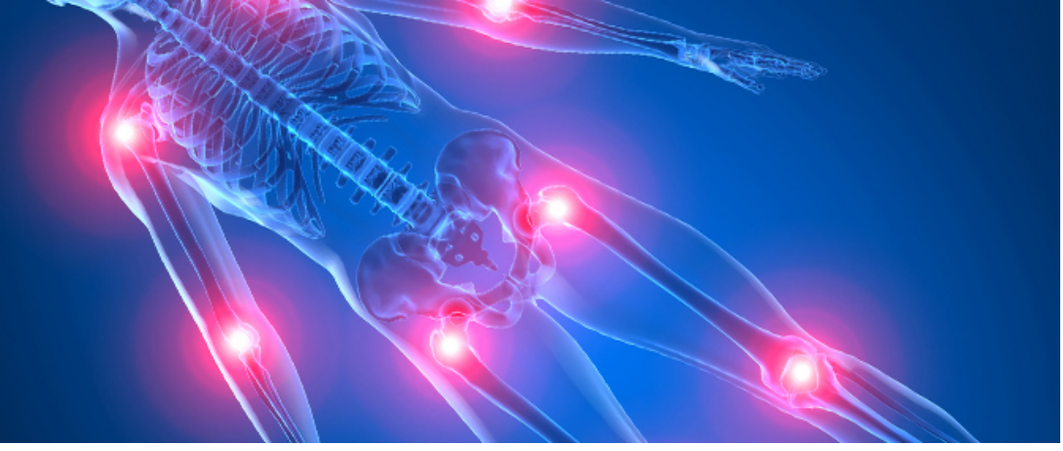
Inflammatory joint diseases

An incorrectly programmed immune system can cause a number of joint diseases. Sometimes the immune system falsely identifies healthy parts of joints as bacterial infections and attacks them by sending immune system cells into the joints where they cause inflammation.

This process can lead to conditions such as arthritis or ankylosing spondylitis (AS), which in advanced stages causes the spine to fuse. This severe disease is estimated to affect 1.6 million people in Germany alone, many of whom are unaware of their condition because the initial symptoms are mild.



The onset of rheumatoid arthritis can take place at an early age. The immune system of affected individuals attacks and destroys joint cartilage due to a (often genetically determined) programming error. In severe cases, the cartilage may be destroyed completely, causing the bones of the joint to rub against one another. This rubbing shortens the bones of the joint, causing them to slowly stop functioning. Patient mobility is increasingly impaired, their joints deform and fuse together. In severe cases, patients can expect increasing disability and eventually incapacitated. Rheumatoid arthritis cannot be cured, but the earlier it is diagnosed and treated, the better its progress can be delayed.



Genes associated with joint diseases

The scientific community has linked several genes and polymorphisms to the risk of various inflammatory diseases. An analysis of these polymorphisms allows us to determine your genetic risk for these diseases as well as some other genetic traits linked to this disease.

Genetic traits			
SYMBOL	**rs NCBI**	**POLYMORPH**	**GENOTYPE**
TNF-α	rs1800629	A>G	A/A
IL1A	rs1800587	C>T	C/C

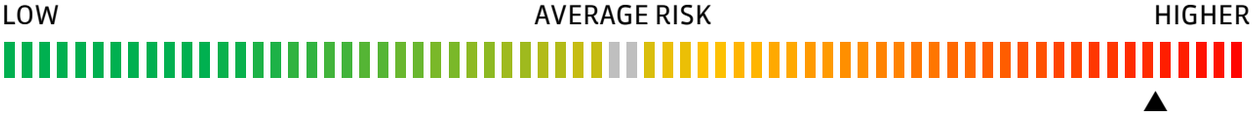
LEGEND: rsNCBI = description of examined genetic variation, POLYMORPHISM = form of the genetic variation, GENOTYPE = personal analysis result

Summary of effects

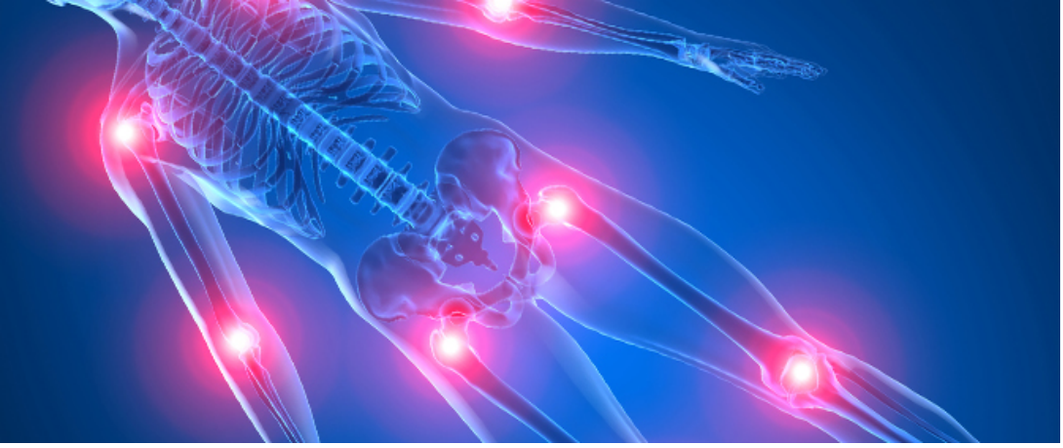
Here you can see a summary of the influence your genetic variations have on your health:

- Based on your genes you have a 4.9 -times higher risk of rheumatoid arthritis
- You do not have an elevated risk of degenerative disc disease

Your risk of rheumatoid arthritis



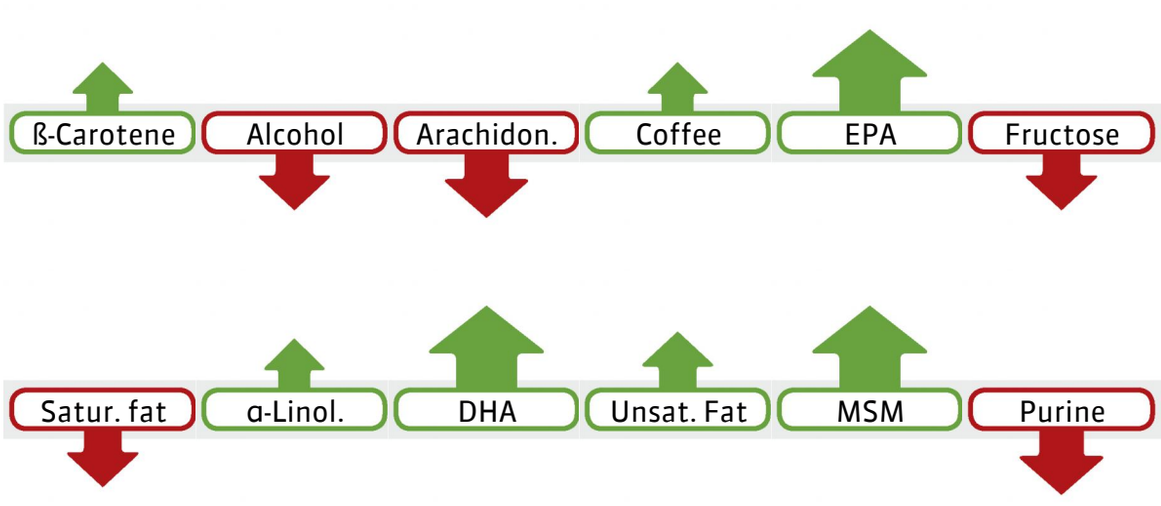
Your risk of degenerative disc disease



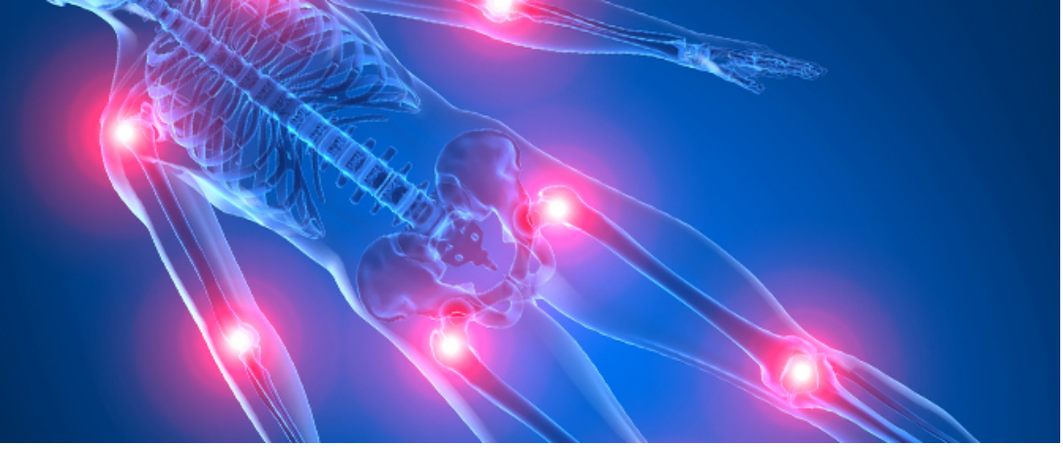
Nutritional Genes - Joints

Your nutrition is very important. Based on your genes and their associated strengths and weaknesses you should increase or decrease certain foods and nutrients. These recommendations are calculated based on your genetic profile.

Your personalized recommendations based on this section:



Legend: GREEN ARROWS > this nutrient or substance is classed as healthy for your genetic profile. Try to increase the intake of this substance. RED ARROWS > this substance is classed as unhealthy for your genetic profile. Try to reduce your intake of the substance. NO ARROWS > There is no effect of the nutrient on the genetics of this section. PLEASE NOTE! This interpretation only considers your genetic profile of this section.



Prevention

Precautionary measures are now very important for you to stay healthy. The genetic trait that you carry does not have any symptoms, but it significantly increases the risk that you will develop certain diseases of the joints. Your action program consists of three major parts:

Exercise

Although the disease can stiffen the joints, it is important to keep using them. The less you move, the faster your joints will stiffen. Exercise regularly and ensure that all the joints are evenly loaded. Suitable exercises are: daily walking, swimming, cycling and gymnastics. Make sure, however, that you warm-up before increasing the effort. The sooner you start with daily exercises, the better for your joints.

Nutrition

Inflammation produces chemical messengers called cytokines which cause pain, swelling and inflammation of the joints in rheumatoid arthritis. The raw material for these messengers (arachidonic acid) is found in animal fat, such as meat, sausages and dairy products. Therefore, it is advisable to consume meat only once per week and meet your protein requirements by eating fish and vegetable protein. Regular consumption of fish will decrease the symptoms of painful and swollen joints. As an alternative, fish and fish oil capsules can be used as dietary supplements. Studies have shown that fish oil can reduce the number of swollen joints. Test the levels of omega-3 in your blood to see if your diet is effective, and eat foods that contain anti-inflammatory substances.

- Fish (oil)
- Evening primrose oil
- Soy
- Wheat and rapeseed oil
- Black currant

Avoid pro-inflammatory foods that contain large quantities of arachidonic acid. Do not consume more than 300 mg of arachidonic acid daily. Check your consumption based on the list below and adjust your diet if necessary.

- Lard 1700 mg/100g
- Pork liver 870 mg/100 g
- Egg yolk 300 mg/100 g
- Tuna 280 mg/100 g
- Pork 120 mg/100 g
- Beef 70 mg/100g
- Egg (total) 70 mg/100 g
- Veal 53 mg/100g
- Chicken 42 mg/100g
- Camembert 34 mg/100g

- Cow's milk (1.5%) 2 mg/100 g
- Potatoes, fruits, vegetables 0 mg/100g
- Nuts, soy products 0 mg/100g
- Vegetable oils 0 mg/100g

This table shows that only food from animal sources contains this fatty acid. An optimal diet will be vegetarian or with restrictions on meat consumption. A typical vegetarian diet of around 200-400g/day contains only approximately 50 mg of arachidonic acid. In addition, a sulfur-rich diet is recommended for you because organic sulfur (methylsulfonylmethane) is anti-inflammatory. As an alternative, organic sulfur can also be taken as dietary supplements (MSM capsules) or applied in the form of ointments.

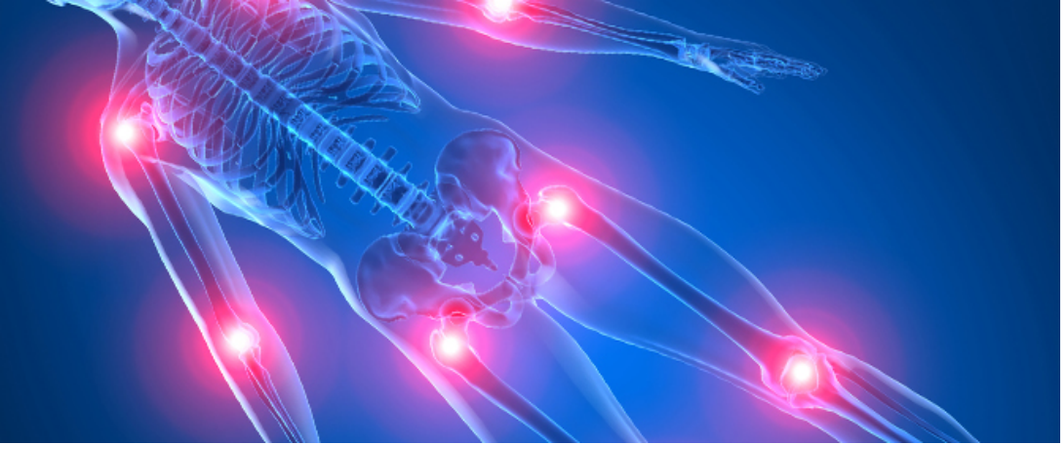
Early detection

The main objective of the preventative measures is to detect the disease as early as possible by paying attention to early symptoms. This will allow for timely medical treatment. Since you are genetically predisposed to the disease, you should note the following warning symptoms:

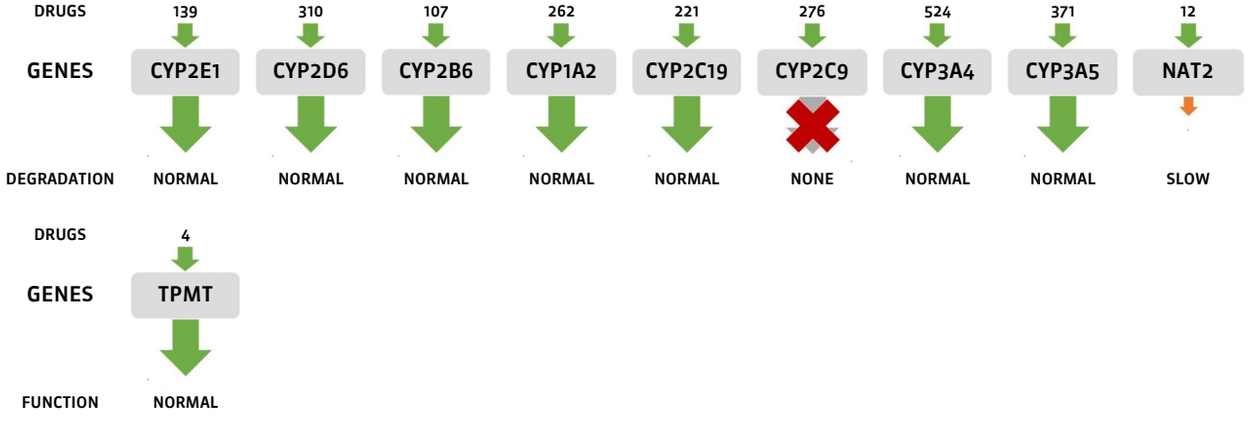
- Morning stiffness in hand and finger joints,
- circulatory disorders of individual fingers,
- back pain

A definitive diagnosis is difficult, especially in the early stages, because there are no unique symptoms of the disease. Furthermore, rheumatoid arthritis presents different manifestations, depending on the patient, which makes it even more difficult to diagnose. Therefore, you should consult an experienced physician as soon as the first symptoms appear to enable him to make the correct diagnosis and initiate treatment. Describe your symptoms as accurately as possible, as this is particularly important for the correct diagnosis.

The current treatment methods are effective for the majority of patients if the joint disease is detected early enough. Symptoms such as inflammation and pain can be controlled if detected early. However, patient commitment is crucial for the success of the treatment.



Drug compatibility



Effect on relevant medication

	Effect	Breakdown	Dose
Aceclofenac	✓	✗	✗
Anakinra	✓	✓	✓
Budesonide	✓	✓	✓
Cortisone	✓	↑	↑
Dexamethasone	✓	↑	↑
Diflunisal	✓	✓	✓
Fenoprofen	✓	✓	✓
Hydrocodone	✓	✓	✓
Hydroxychloroquine	✓	✓	✓
Indometacin	✓	↓	↓
Ketorolac	✓	✓	✓
Mefenamic Acid	✓	✗	✗
Methylprednisolone	✓	↑	↑
Nabumetone	✓	✓	✓

	Effect	Breakdown	Dose
Acetylsalicylic Acid	✓	✗	✗
Azathioprine	✓	✓	✓
Celecoxib	✓	✗	✗
Cyclophosphamide	✓	↑	↑
Diclofenac	✓	✗	✗
Etanercept	✓	✓	✓
Fentanyl	✓	↑	↑
Hydrocortisone	✓	↑	↑
Ibuprofen	✓	✗	✗
Infliximab	✓	✓	✓
Leflunomide	✓	✗	✗
Meloxicam	✓	✗	✗
Minocycline	✓	✓	✓
Naproxen	✓	✗	✗

	Effect	Breakdown	Dose
Adalimumab	✓	✓	✓
Betamethason	✓	✓	✓
Codeine	✓	✓	✓
Cycloserine	✓	✓	✓
Diclofenac	✓	✗	✗
Etodolac	✓	✗	✗
Flurbiprofen	✓	✗	✗
Hydromorphone	✓	↓	↓
Indometacin	✓	↓	↓
Ketoprofen	✓	✓	✓
Lornoxicam	✓	✗	✗
Methotrexate	✓	✓	✓
Morphine	✓	✓	✓
Naproxen	✓	✗	✗

	Effect	Breakdown	Dose
Oxaprozin	✓	✗	✗
Piroxicam	✓	✗	✗
Rituximab	✓	✓	✓
Sulindac	✓	✓	✓
Tolmetin	✓	✓	✓

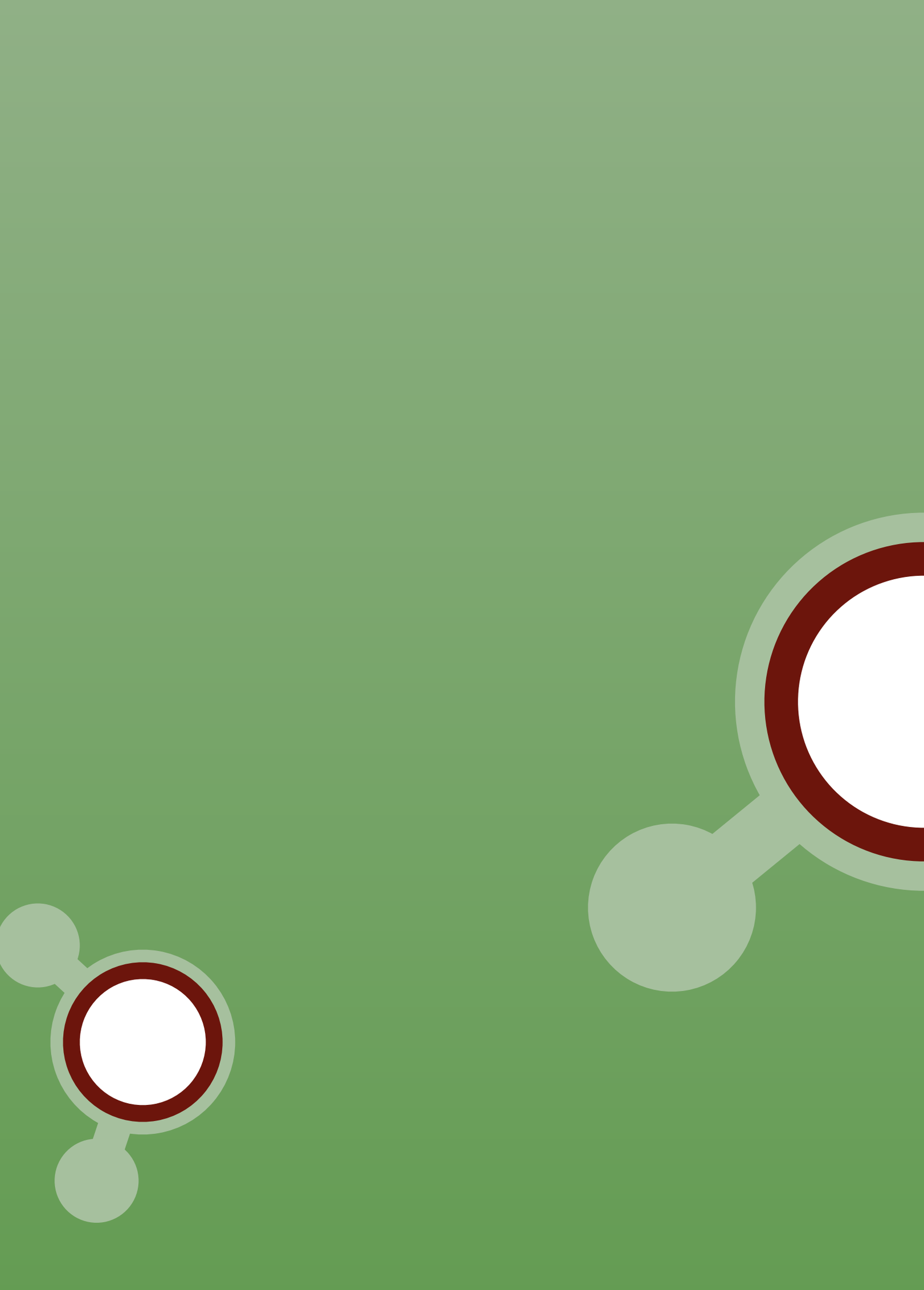
	Effect	Breakdown	Dose
Oxycodone	✓	↑	✓
Prednisolone	✓	↑	↑
Salsalate	✓	✓	✓
Suprofen	✓	✗	✗
Tramadol	✓	↑	✓

	Effect	Breakdown	Dose
Paracetamol	✓	✓	✓
Prednisone	✓	↑	↑
Sulfasalazine	✓	✓	✓
Tenoxicam	✓	✗	✗

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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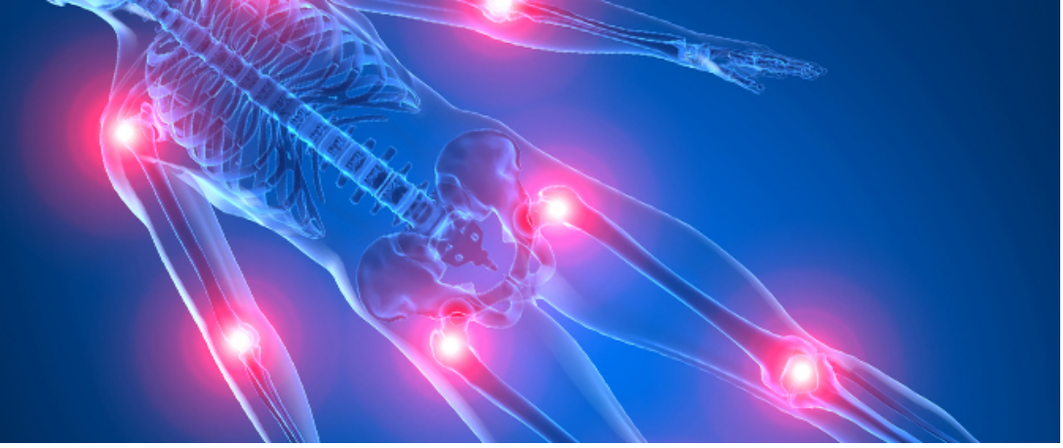
SCIENCE

ADDITIONAL INFORMATION

SCIENCE

This chapter shows the science behind the test.



Joint Sensor

TNF-α - tumor necrosis factor a (TNF superfamily, member 2) (rs1800629)

The tumour necrosis factor (TNF or TNF-α) is a cytokine in the human immune system that regulates the activity of immune cells. TNF regulates apoptosis, cell proliferation, cell differentiation and the secretion of various cytokines. The polymorphism rs1800629 leads to a highly increased TNFa expression, and thus to an increased inflammatory capacity.

RES	Genotype	POP	Possible results
	G/G	83%	No increased risk of rheumatoid arthritis
	G/A	17%	Increased risk for rheumatoid arthritis (OR: 2.9)
X	A/A	1%	Increased risk for rheumatoid arthritis (OR: 7.29)

References

Dayer et al. The pivotal role of interleukin-1 in the clinical manifestations of rheumatoid arthritis. Rheumatology 2003,42(Suppl. 2):ii3–ii10

Goldring et al. Pathogenesis of bone and cartilage destruction in rheumatoid arthritis. Rheumatology 2003,42(Suppl. 2):ii11–ii16

Oregón-Romero et al. Tumor necrosis factor alpha-308 and -238 polymorphisms in rheumatoid arthritis. Association with messenger RNA expression and sTNF-alpha. J Investig Med. 2008 Oct,56(7):937-43.

IL1A - interleukin 1 alpha (rs1800587)

The interleukin-1 gene cluster on chromosome 2 contains the genes for IL1A and IL1B. In the presence of these polymorphisms (rs1800587 and rs1143634) the T-allele increases the IL-1 synthesis, leading to an increase of the inflammatory capacity.

RES	Genotype	POP	Possible results
	T/T	10%	Increased risk of rheumatoid arthritis (OR 1.36) Increased risk of degenerative disc disease (OR: 7.87)
	T/C	36%	Increased risk of rheumatoid arthritis (OR 1.17) Increased risk of degenerative disc disease (OR: 1.31)
X	C/C	54%	No increased risk of rheumatoid arthritis

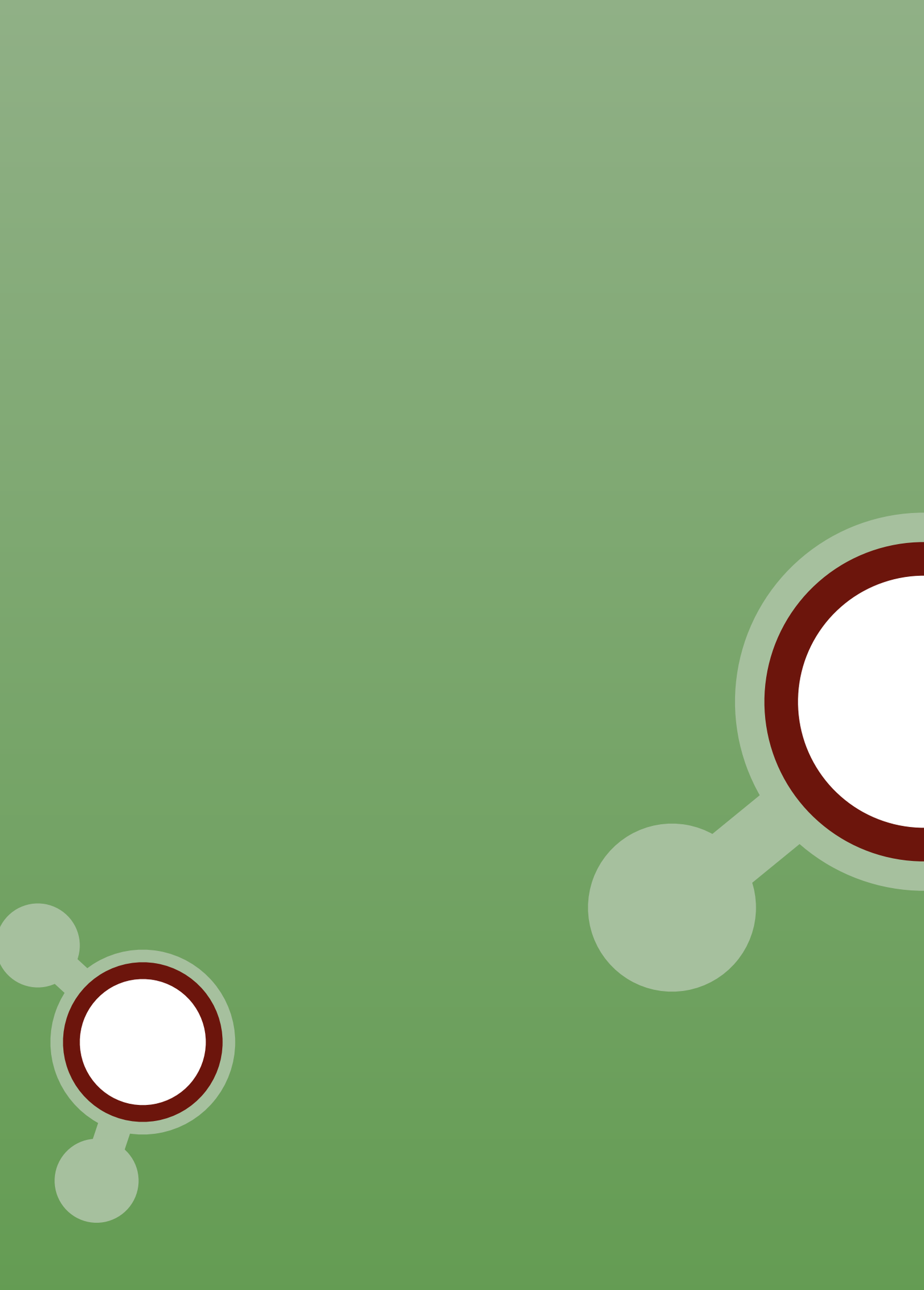
References

Virtanen et al. Occupational and genetic risk factors associated with intervertebral disc disease. Spine (Phila Pa 1976). 2007 May 1,32(10):1129-34.

Dayer et al. The pivotal role of interleukin-1 in the clinical manifestations of rheumatoid arthritis. Rheumatology 2003,42(Suppl. 2):ii3–ii10

Goldring et al. Pathogenesis of bone and cartilage destruction in rheumatoid arthritis. Rheumatology 2003,42(Suppl. 2):ii11–ii16

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

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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

qualityaustria
SYSTEM CERTIFIED
ISO 9001:2015 No.14365/0

Licensed for medical genetics

Approved by the Federal Ministry of Health, Austria

BUNDESMINISTERIUM FÜR GESUNDHEIT

Cosmetic/genetic diagnostics and cosmetics manufacturing

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

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SYSTEM CERTIFIED
EN ISO 22716:2007 No.00010/0

Food supplement manufacturing

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

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SYSTEM CERTIFIED
ISO 22000:2018 No.00521/0

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
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Product codes
M4JOI

Current version
V538

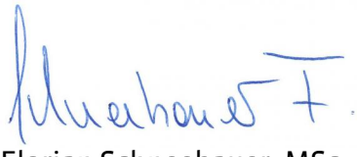
Ordering company
ProGenom GmbH
Riedstrasse 1
6343 Rotkreuz
SWITZERLAND

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: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Jane Doe
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