ProMedicDNA

Lung Health Sensor

Jane Doe
DEMO_DS

ProGenom
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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

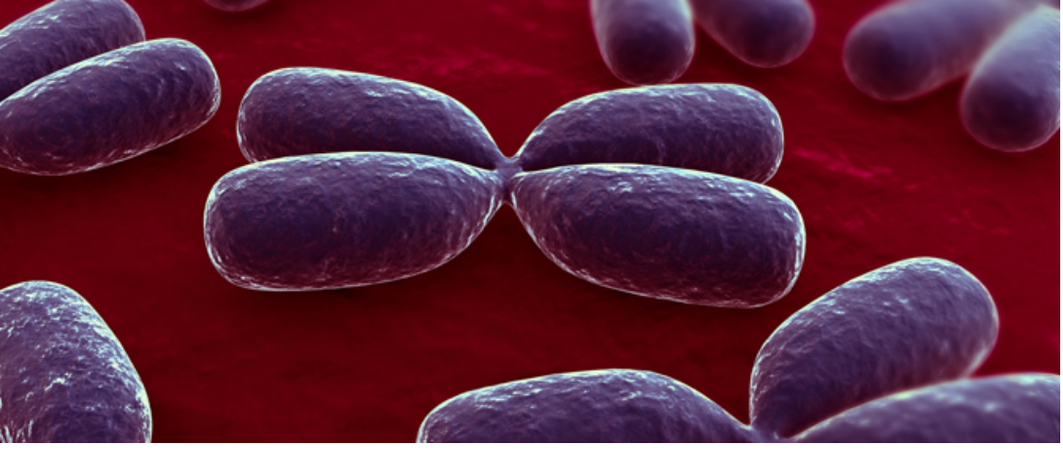
Florian Schneebauer, MSc.
Laboratory Manager

Lung Health Sensor

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

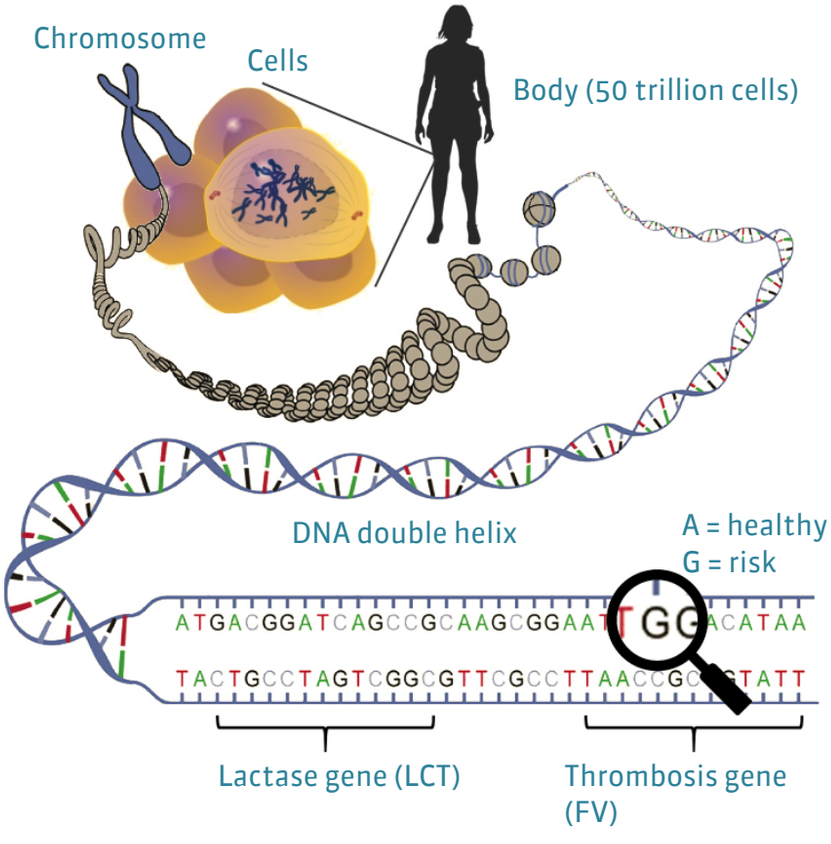
Order number:
DEMO_DS

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.

Lung Health Sensor

PHARMACO GENETICS
Not ordered

ONCOLOGY

CARDIOVASCULAR SYSTEM
Not ordered

NEUROLOGY
Not ordered

METABOLISM
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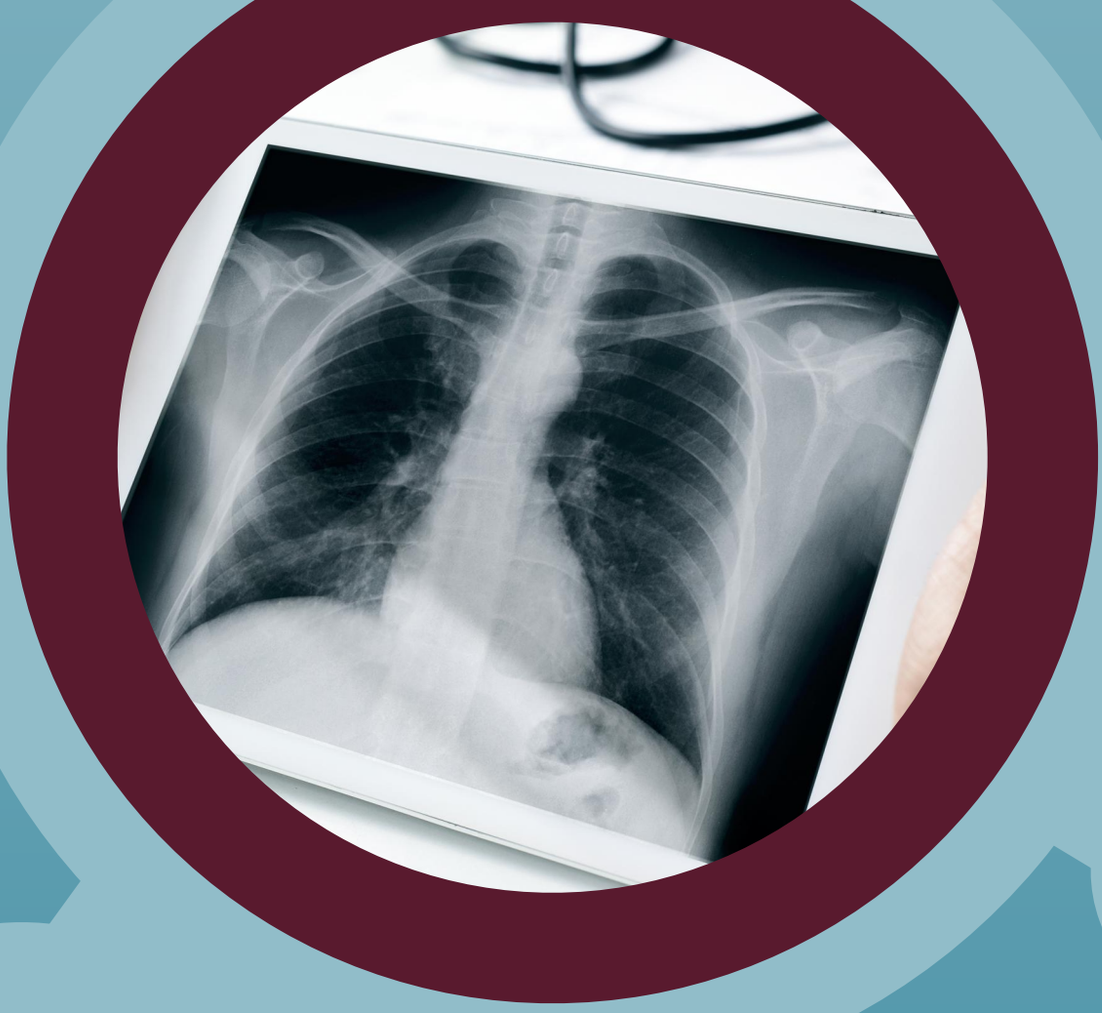
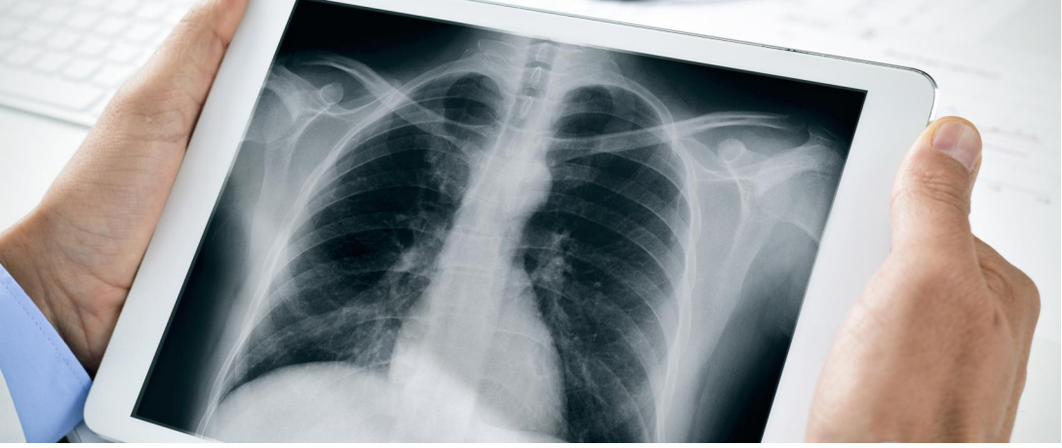
SCIENCE

ADDITIONAL INFORMATION



Lung Health Sensor

Effective prevention and treatment of lung cancer



Lung cancer

Lung cancer, commonly referred to as bronchogenic carcinoma, is a disease of the lung tissue cells. Newly occurring mutations in a cell cause uncontrolled growth that results in a tumour. There are various environmental influences that may damage the DNA of lung cells, such smoking tobacco or regular inhalation of soot, fine dust and exhaust fumes. However, certain genes can usually detect and neutralize these toxins before they are able to do much harm. However, in some people, the genes responsible for such detox-functions are hindered by genetic variations. If people with impaired detoxification systems are exposed to these risk factors, they can develop cancer.

Risk factors

The most significant risk factor is tobacco smoking (for both genetically predisposed individuals and for those with optimally functioning detoxification genes). Smoking is responsible for around 85% of all lung cancer cases. In addition to active smoking, passive smoking accounts for about 3-5% of lung cancer cases. After smoking as a big risk factor, the radioactive gas radon, that can arise from the ground and collect in mines or old cellars, is the other significant risk factor for the development of lung cancer. Thus, adequate ventilation of basements is an effective method of prevention.

Other occupational risk factors include the inhalation of exhaust fumes, particulate matter from construction, mining or metalworking industries. In particular, dust consisting of quartz, arsenic, chromium and nickel compounds, as well as asbestos are particularly problematic.

Early detection is crucial

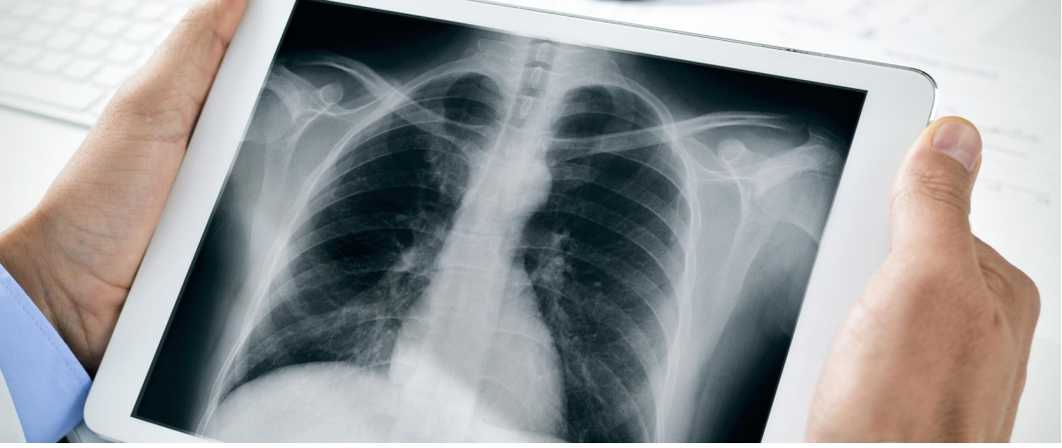
Usually, lung cancer only has noticeable symptoms at a very late stage. At this point, the cancer is often not treatable. People with the highest chance of survival are those who, either by accident or specific preventive screening, recognize and treat the cancer during its asymptomatic stage. For example, a screening study showed that the 5-year survival rate of symptomatic sufferers is only 14%. In contrast, the 5-year survival rate of individuals, in whom the disease was identified in the adenoma-symptomatic stage by means of screening is approximately 80%.

Symptoms at an advanced stage:

Symptoms of lung cancer usually occur relatively late and should immediately be examined by a specialist. Furthermore, symptoms are often very nonspecific and can be triggered by other diseases. Symptoms include:

- A cough that lasts longer than three weeks
- Coughing of blood

- Fatigue and reduced performance
- Weight loss
- Difficulty swallowing or hoarseness
- Bone pain
- Lymph node swelling in the neck region
- Permanent coughing up of mucus
- Fever with no obvious cause
- Constant shortness of breath
- Chest pain



Genes relevant to lung cancer

Several genetic variations have been identified that are known to have an impact on the development of lung cancer. When considering these genetic variations collectively, they can have a significant impact on the likelihood of developing the disease. The analysis of the relevant genetic variations allowed for the following conclusions:

Genetic traits

SYMBOL	rs NCBI	POLYMORPH	GENOTYPE
CYP1A1	rs4646903	C>T	T/T
CYP1A1	rs1048943	G>A	A/A
GSTM1	Null allele	INS>DEL	INS
GSTT1	Null allele	INS>DEL	DEL
GSTP1	rs1695	G>A	G/A

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

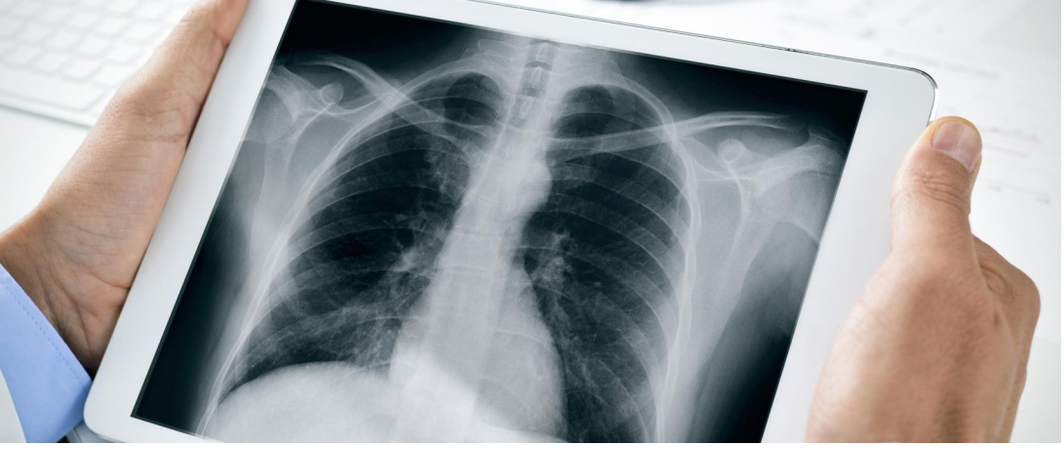
Summary of effects

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

- Your risk of suffering lung cancer is higher than the population average. 1.2-fold.

How high is your risk of developing lung cancer?

LOW AVERAGE RISK HIGHER



Prevention

Based on your genetic profile, you have an increased risk of developing lung cancer. In addition to an increased risk, despite a healthy lifestyle, the known risk factors for lung cancer (smoke, fine dust and gases) are significantly more harmful to you than average.

If you are a smoker, do not compare your risk to other smokers. Smoking harms you far more than most other people.

Nutrition

Certain lifestyle choices can drastically reduce the risk of lung cancer and other types of cancers. A diet rich in antioxidants (vitamin C, vitamin E, selenium, zinc, alpha lipoic acid) can help neutralize toxic free radicals and reduce the risk of cancer. Thus, make sure you eat plenty of colourful fruits and vegetables.

A diet rich in minerals such as calcium, zinc and selenium is especially advisable for individuals with limited heavy metal detoxification.

A vitamin D deficiency is another risk factor for the development of various types of cancer. Therefore, spend a safe amount of time exposed to sunlight and eat a lot of Vitamin D3 (contained in fish, dairy and some dietary supplements).

Avoid pollutants

Firstly, tobacco smoke is a toxic pollutant and should therefore be avoided at all costs. This applies to direct smoke from a cigarette, cigar or pipe, but also passive smoking. Even if you have been smoking for decades, stopping now will significantly reduce your risk over time.

If you are exposed to fine dust particles due to professional reasons, it is essential to ensure adequate respiratory protection. This applies to exhaust fumes, fine dust from the construction industry, smoke and dust from metalworking, as well as other types of fine dust.

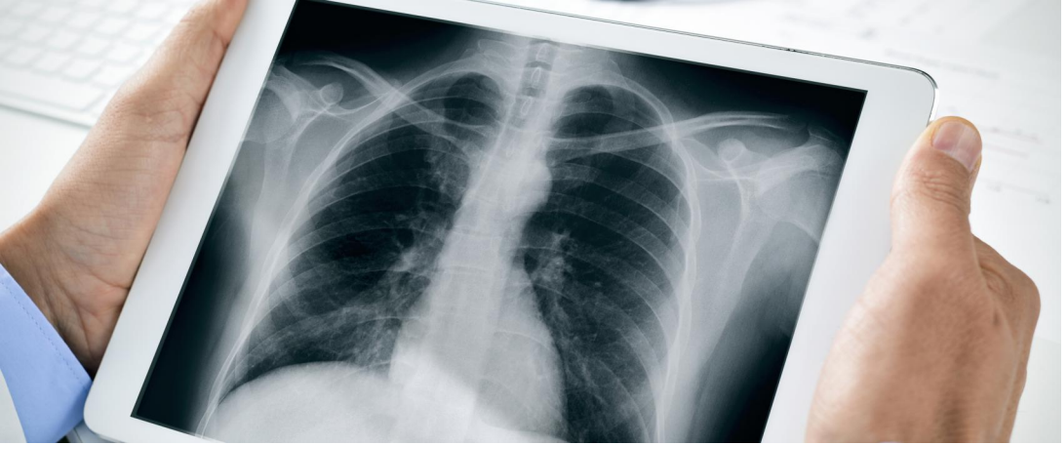
Since radioactive radon gas can accumulate in old cellars and poorly ventilated buildings, make sure that your basement is well ventilated.

Early detection

Although early detection is the most important factor in the treatment of lung cancer, a routine lung examination is not available in many countries. The lungs are only examined with X-ray, MRI or CT and the cancer is only detected after initial symptoms and complaints. By this time, however, only about 12% of all cases can be treated successfully. The best chance of

successful treatment exists for individuals who identify their lung cancer during unrelated x-ray examinations. In such cases, about 88% of those affected will get healthy again.

Currently, European countries do not offer routine lung cancer screenings. Thus, the only option at this time is screening by medical specialists as a private service. Regular lung examinations with CT are recommended for persons who have a genetic predisposition, as well as those who are or were heavy smokers. If the result is negative (i.e. no cancer was detected), it is recommended to repeat this examination every five years.



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

Effect on relevant medication

	Effect	Breakdown	Dose
Afatinib	✓	✓	✓
Bevacizumab	✓	✓	✓
Codeine	✓	✓	✓
Domperidone	✓	✓	✓
Erlotinib	✓	↑	↑
Fentanyl	✓	↑	↑
Halothane	✓	✓	✓
Levacetylmethadol	✓	↑	↑
Methotrexate	✓	✓	✓
Oxycodone	✓	↑	✓
Paclitaxel	✓	✓	✓
Phenacetin	✓	✓	✓
Topotecan	✓	✓	✓
Zolmitriptan	✓	✓	✓

	Effect	Breakdown	Dose
Alfentanil	✓	↑	↑
Buprenorphine	✓	↑	↑
Docetaxel	✓	↑	↑
Doxorubicin	✓	↑	↑
Etoposide	✓	↑	↑
Gefitinib	✓	↑	↑
Hydrocodone	✓	✓	✓
Lidocain	✓	✓	✓
Methoxyflurane	✓	✓	✓
Paclitaxel	✓	✓	✓
Paracetamol	✓	✓	✓
Ropivacaine	✓	✓	✓
Tramadol	✓	↑	✓

	Effect	Breakdown	Dose
Aprepitant	✓	↑	↑
Carboplatin	✓	✓	✓
Dolasetron	✓	✓	✓
Enflurane	✓	✓	✓
Everolimus	✓	↑	↑
Gemcitabine	✓	✓	✓
Isoflurane	✓	✓	✓
Methadone	✓	↑	↑
Metoclopramide	✓	✓	✓
Paclitaxel	✓	✓	✓
Pemetrexed	✓	✓	✓
Sevoflurane	✓	✓	✓
Vinorelbine	✓	↑	↑

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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DIGESTION
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ODONTOLOGY
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OTHERS
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SCIENCE

ADDITIONAL INFORMATION

SCIENCE

This chapter shows the science behind the test.

Lung Health Sensor

CYP1A1 (Cytochrome P450 1A1) rs4646903

The haeme protein cytochrome P450-1A1 (CYP1A1) belongs to the group of phase I enzymes, and mediates the metabolism of environmental toxins and various xenobiotic substances. Defects in this gene can alter the enzymatic activity.

RES	Genotype	POP	Possible results
X	T/T	52%	No increased risk of lung cancer
	C/T	37%	Increased risk of lung cancer (OR: 1.3)
	C/C	11%	Increased risk of lung cancer (OR: 1.27)

References

Liu HX et al. Correlation between gene polymorphisms of CYP1A1, GSTP1, ERCC2, XRCC1, and XRCC3 and susceptibility to lung cancer. Genet Mol Res. 2016 Nov 3,15(4).

Peddireddy V et al. Association of CYP1A1, GSTM1 and GSTT1 gene polymorphisms with risk of non-small cell lung cancer in Andhra Pradesh region of South India. Eur J Med Res. 2016 Apr 18,21:17.

Islam MS et al. Epub 2012 Nov 21. Lung cancer risk in relation to nicotinic acetylcholine receptor, CYP2A6 and CYP1A1 genotypes in the Bangladeshi population. Clin Chim Acta. 2013 Feb 1,416:11-9.

Kiyohara C. et al. Genetic polymorphisms involved in carcinogen metabolism and DNA repair and lung cancer risk in a Japanese population. J Thorac Oncol. 2012 Jun,7(6):954-62.

Wright CM et al. Genetic association study of CYP1A1 polymorphisms identifies risk haplotypes in nonsmall cell lung cancer. Eur Respir J. 2010 Jan,35(1):152-9.

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Shi X et al. CYP1A1 and GSTM1 polymorphisms and lung cancer risk in Chinese populations: a meta-analysis. Lung Cancer. 2008 Feb,59(2):155-63.

GSTM1 - glutathione s-transferase mu1 (null allele)

The glutathione s-transferases are found in the liver and in lymphocytes. They are involved in the detoxification of endogenous and exogenous substances. A defective GSTM1 gene reduces the enzymatic activity of the protein, which leads to a limited cellular detoxification.

RES	Genotype	POP	Possible results
X	INS	56%	No increased risk of lung cancer
	DEL	44%	Increased risk of lung cancer (OR: 1.26)

References

Peddireddy V et al. Association of CYP1A1, GSTM1 and GSTT1 gene polymorphisms with risk of non-small cell lung cancer in Andhra Pradesh region of South India. Eur J Med Res. 2016 Apr 18,21:17.

Li W et al. Combined effects of CYP1A1 MspI and GSTM1 genetic polymorphisms on risk of lung cancer: an updated meta-analysis. Tumour Biol. 2014 Sep,35(9):9281-90.

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Li W et al. Polymorphisms in GSTM1, CYP1A1, CYP2E1, and CYP2D6 are associated with susceptibility and chemotherapy response in non-small-cell lung cancer patients. Lung. 2012 Feb,190(1):91-8.

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Pliarchopoulou K et al. Correlation of CYP1A1, GSTP1 and GSTM1 gene polymorphisms and lung cancer risk among smokers. Oncol Lett. 2012 Jun,3(6):1301-1306.

GSTT1 - glutathione s-transferase theta 1 (null allele)

The glutathione s-transferases are found in the liver and in lymphocytes. They are involved in the detoxification of endogenous and exogenous substances. A defective GSTM1 gene reduces the enzymatic activity of the protein, which leads to a limited cellular detoxification.

RES	Genotype	POP	Possible results
	INS	74%	No increased risk of lung cancer
X	DEL	26%	Increased risk of lung cancer (OR: 2.4)

References

Peddireddy V et al. Association of CYP1A1, GSTM1 and GSTT1 gene polymorphisms with risk of non-small cell lung cancer in Andhra Pradesh region of South India. Eur J Med Res. 2016 Apr 18,21:17.

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GSTP1 - glutathione s-transferase pi 1 (rs1695)

The glutathione s-transferases are found in the liver and in lymphocytes. They are involved in the detoxification of endogenous and exogenous substances. The GSTP1 enzymes are involved in the metabolism of endogenous metabolites, and protect the cells against oxidative stress- similar to GSTM1 and GSTT1.

RES	Genotype	POP	Possible results
	A/A	43%	No increased risk of lung cancer
X	A/G	43%	Increased risk of lung cancer (OR: 1.38)
	C/C	14%	Increased risk of lung cancer (OR: 3.21)

References

Liu HX et al. Correlation between gene polymorphisms of CYP1A1, GSTP1, ERCC2, XRCC1, and XRCC3 and susceptibility to lung cancer. Genet Mol Res. 2016 Nov 3,15(4).

Kiyohara C. Et al. Genetic polymorphisms involved in carcinogen metabolism and DNA repair and lung cancer risk in a Japanese population. J Thorac Oncol. 2012 Jun,7(6):954-62.

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CYP1A1 (cytochrome P450 1A1) rs1048943

The haeme protein cytochrome P450-1A1 (CYP1A1) belongs to the group of phase I enzymes, and mediates the metabolism of environmental toxins and various xenobiotic substances. Defects in this gene can alter the enzymatic activity.

RES	Genotype	POP	Possible results
X	A/A	77%	No increased risk of lung cancer
	A/G	19%	Increased risk of lung cancer (OR: 1.22)
	G/G	4%	Increased risk of lung cancer (OR: 3.06)

References

Liu HX et al. Correlation between gene polymorphisms of CYP1A1, GSTP1, ERCC2, XRCC1, and XRCC3 and susceptibility to lung cancer. Genet Mol Res. 2016 Nov 3,15(4).

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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.

PHARMACO GENETICS
Not ordered

ONCOLOGY

CARDIOVASCULAR SYSTEM
Not ordered

NEUROLOGY
Not ordered

METABOLISM
Not ordered

MOVEMENT
Not ordered

DIGESTION
Not ordered

OPHTHALMOLOGY
Not ordered

ODONTOLOGY
Not ordered

OTHERS
Not ordered

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

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

qualityaustria
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
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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
M7LUN

Current version
V538

Ordering company
ProGenom GmbH
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6343 Rotkreuz
SWITZERLAND

Analyzing company
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83395 Freilassing
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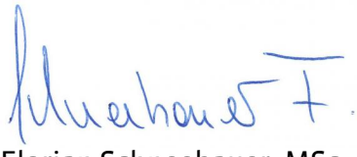
Laboratory Director

Dr. Daniel Wallerstorfer Bsc.

Laboratory Manager



Florian Schneebauer, MSc.

NOTES: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ProMedicDNA

Lung Health Sensor

Jane Doe
DEMO_DS

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