24Genetics

Daniela, this is your pharmagenomics report

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1. Introduction

In this report you will find some of your genetic predispositions related to medications.

As is common in our studies, on the first pages you will find a summary, with icons, of each of the values analysed, which we present in greater detail in the ensuing pages.

We study your genetic predispositions with regards to certain medications. Depending on the drug, your genetics can affect the level of toxicity, effectiveness, the dose needed, and more.

This report should never be used without a doctor's supervision. Any decisions about medications must be taken in consultation with a doctor, considering all factors. This report is not valid for clinical use, so other diagnostic DNA tests may be needed.

The results of this report are personal, and not applicable to studies of other members of your family.

These reports, as well as the scientific research in the field of Genetics, may vary over time. New mutations are constantly being discovered, such that in the future we will better understand the ones we are analysing today. At 24Genetics we make a great effort to periodically apply verified scientific discoveries to our reports.

We remind you should consult with a doctor before making any health-related changes. At 24Genetics we encourage all our clients to contract a genetic counselling service to ensure a better understanding of this genetic report.

1.1. Frequently Asked Questions

Should I make drastic changes to my health management based on the data in this test?

No. Any changes you make to your health management should be reviewed and approved by an expert geneticist or medical specialist. If you have any questions about the genetic test, consult with a healthcare expert in genetic diagnosis.

Does it all depend on my genes?

Not at all. Your body responds to many different factors. Our genes are certainly an important parameter. Lifestyle, exercise, diet, and many other circumstances also affect the body. Knowing yourself well will enable you to treat your body in the most appropriate way. And this is what these genetic reports are all about: more information.

What is this report based on?

This test is based on different genetic studies that have been internationally verfied and accepted by the scientific community. There are scientific databases where studies are published when there exists a certain level of consensus. Our genetic tests are carried out by applying these studies to our clients' genotypes. In each section you will see some of the publications on which it is based. There are sections where more studies are used than the ones listed.

2. Summary

Pharmacogenomics: Cardiology

- Pravastatin
- Warfarin
- Hydrochlorothiazide
- Simvastatin
- Phenprocoumon

Caption:

- We have not found anything in your genetics that indicates a predisposition to an abnormal effect of this drug. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have an abnormal effect on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have harmful effects on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype, you have a greater predisposition to respond positively to this drug. Other non-analyzed and non-genetic genetic factors may play a role.

Pharmacogenomics: Neurology

- Amitriptyline
- Citalopram
- Escitalopram
- Aripiprazole
- Haloperidol
- Paliperidone
- Ziprasidone
- Quetiapine
- Bupropion
- Clomipramine
- Carbamazepine
- Clozapine
- Olanzapine
- Risperidone
- Amisulpride

Caption:

- We have not found anything in your genetics that indicates a predisposition to an abnormal effect of this drug. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have an abnormal effect on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have harmful effects on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype, you have a greater predisposition to respond positively to this drug. Other non-analyzed and non-genetic genetic factors may play a role.

Pharmacogenomics: Pain

- Meperidine
- Pentazocine
- Alfentanil
- Fentanyl
- Tramadol
- Morphine
- Aspirin
- Buprenorphine
- Naltrexone

Caption:

- We have not found anything in your genetics that indicates a predisposition to an abnormal effect of this drug. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have an abnormal effect on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have harmful effects on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype, you have a greater predisposition to respond positively to this drug. Other non-analyzed and non-genetic genetic factors may play a role.

Pharmacogenomics: Onco

- Methotrexate
- Fluorouracil, capecitabine, pyrimidine analogues, tegafur and Neoplasms
- Irinotecan
- Tamoxifen
- Vincristine
- Cisplatin
- Mercaptopurine

Caption:

- We have not found anything in your genetics that indicates a predisposition to an abnormal effect of this drug. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have an abnormal effect on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have harmful effects on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype, you have a greater predisposition to respond positively to this drug. Other non-analyzed and non-genetic genetic factors may play a role.

Pharmacogenomics: Other

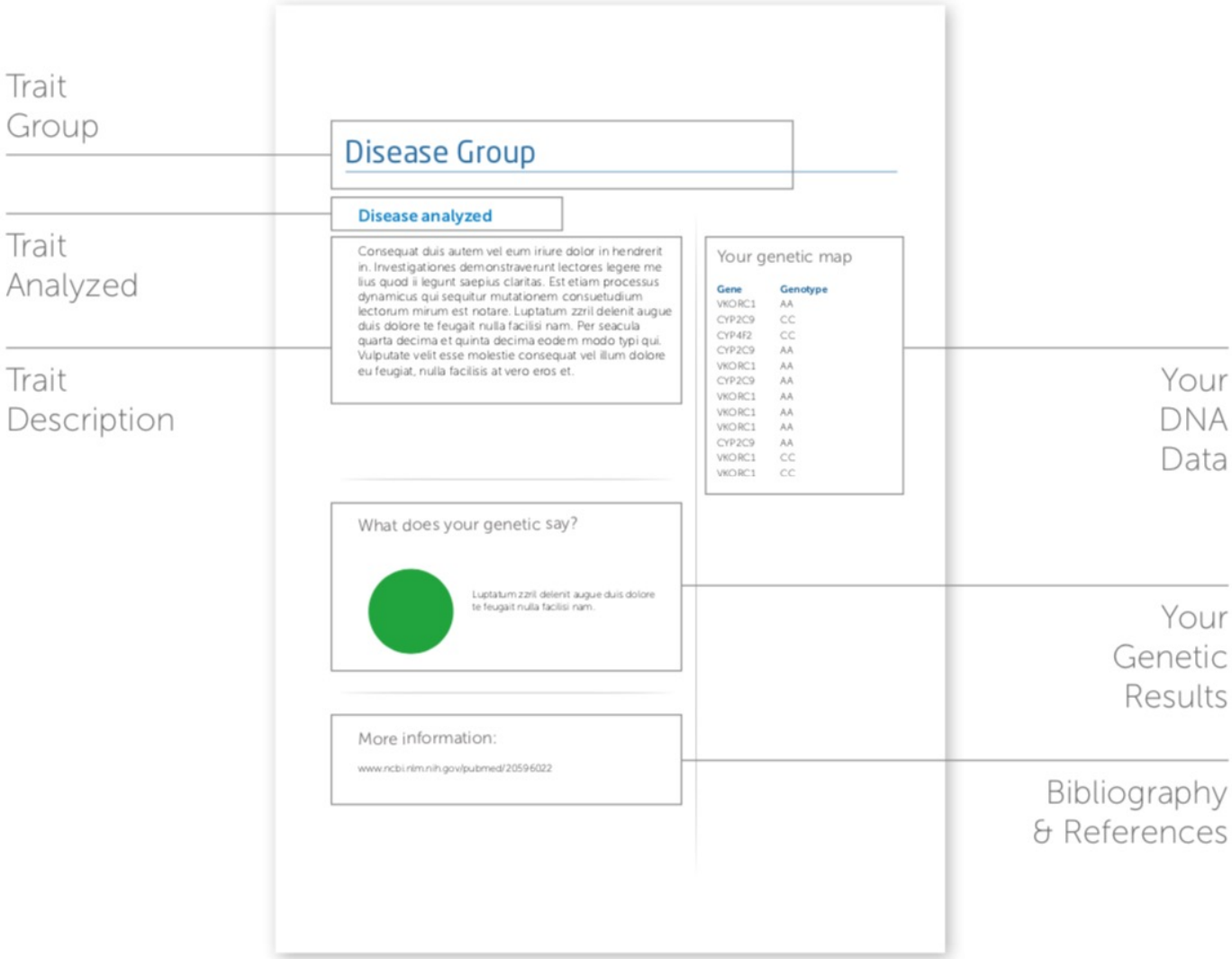
- Peginterferon Alpha-2b
- Tacrolimus
- Ribavirin
- Viagra (Sildenfail)

Caption:

- We have not found anything in your genetics that indicates a predisposition to an abnormal effect of this drug. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have an abnormal effect on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype you are more predisposed to have harmful effects on you. Other non-analyzed and non-genetic genetic factors may play a role.
- According to your genotype, you have a greater predisposition to respond positively to this drug. Other non-analyzed and non-genetic genetic factors may play a role.

3. Genetic Results

3.1. How to understand your report?



3.2. Your genetic results

Pharmacogenomics: Cardiology

Pravastatin

Pravastatin is a cholesterol-lowering agent that belongs to a class of medications known as statins. It was derived from microbial transformation of mevastatin, the first statin discovered. It is a ring-opened dihydroxyacid with a 6'-hydroxyl group that does not require in vivo activation. Pravastatin is one of the lower potency statins. However, its increased hydrophilicity is thought to confer advantages, such as minimal penetration through lipophilic membranes of peripheral cells, increased selectivity for hepatic tissues, and a reduction in side effects compared with lovastatin and simvastatin.

Your genetic map

Gene	SNP	Genotype
HMGCR	rs17244841	AA

What do your genetics tell us?

Patients with the AA genotype who are treated with statins may be more likely to respond as compared to patients with the AT or TT genotype. Other genetic and clinical factors may also influence a patient's response when treated with statins.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/15199031

Pharmacogenomics: Cardiology

Simvastatin

Simvastatin is a lipid-lowering agent that is derived synthetically from the fermentation of Aspergillus terreus. It is a potent, competitive inhibitor of 3-hydroxy-3-methylglutaryl coenzyme A reductase (hydroxymethylglutaryl COA reductases), which is the rate-limiting enzyme in cholesterol biosynthesis. It may also interfere with steroid hormone production. Due to the induction of hepatic LDL receptors, it increases the breakdown of LDL cholesterol.

Your genetic map

Gene	SNP	Genotype
SLCO1B1	rs4149056	TT

What do your genetics tell us?

Patients with the TT genotype may be at a lower risk of simvastatin-related myopathy as compared to patients with the CT or CC genotype. Other genetic and clinical factors may also affect a patient's risk for toxicity.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/28482130

Pharmacogenomics: Cardiology

Warfarin

Warfarin is an anticoagulant drug normally used to prevent blood clot formation, as well as migration. Although originally marketed as a pesticide (d-Con, Rodex, among others), Warfarin has since become the most frequently prescribed oral anticoagulant in North America. Warfarin has several properties that should be noted when used medicinally, including its ability to cross the placental barrier during pregnancy, which can result in fetal bleeding, spontaneous abortion, preterm birth, stillbirth, and neonatal death. Additional adverse effects, such as necrosis, purple toe syndrome, osteoporosis, valve and artery calcification, and drug interactions, have also been documented with warfarin use. Warfarin does not actually affect blood viscosity. Rather, it inhibits Vitamin-k dependent synthesis of biologically active forms of various clotting factors, in addition to several regulatory factors.

Your genetic map

Gene	SNP	Genotype
VKORC1	rs9923231	CC

What do your genetics tell us?

Patients with the CC genotype may require an increased dose of warfarin as compared to patients with the TC or TT genotype. Other genetic and clinical factors may also influence a patient's warfarin dose requirement.

More information:

https://www.ncbi.nlm.nih.gov/gtr/conditions/CN078029

Pharmacogenomics: Cardiology

Phenprocoumon

Phenprocoumon (marketed under the brand names Marcoumar, Marcumar and Falithrom) is a long-acting oral anticoagulant drug, a derivative of coumarin. It is a Vitamin K antagonist that inhibits coagulation by blocking th esynthesis of coagulation factors II, VII, IX and X.

Your genetic map

Gene	SNP	Genotype
VKORC1	rs9923231	CC

What do your genetics tell us?

Patients with the CC genotype who are treated with acenocoumarol or phenprocoumon may require a higher dose as compared to patients with the TC or TT genotypes. Other genetic and clinical factors may also affect a patient's acenocoumarol or phenprocoumon maintenance dose requirement.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23423913

Pharmacogenomics: Cardiology

Hydrochlorothiazide

Hydrochlorothiazide (HCTZ or HCT) is a diuretic medication often used to treat high blood pressure and swelling due to fluid build-up. Other uses include diabetes insipidus, renal tubular acidosis, and to decrease the risk of kidney stones in those with high calcium levels in the urine. For high blood pressure it is often recommended as a first-line treatment.

Your genetic map

Gene	SNP	Genotype
YEATS4	rs7297610	CC

What do your genetics tell us?

Patients with the CC genotype and hypertension who are treated with hydrochlorothiazide may exhibit an increased response as compared to patients with the TC or TT genotype. Other genetic and clinical factors may also affect a patient's response to hydrochlorothiazide.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/22350108

Pharmacogenomics: Neurology

Amitriptyline

Amitriptyline hydrochloride is a dibenzocycloheptene-derivative tricyclic antidepressant (TCA). TCAs are structurally similar to phenothiazines. They contain a tricyclic ring system with an alkyl amine substituent on the central ring. In non-depressed individuals, amitriptyline does not affect mood or arousal, but may cause sedation. In depressed individuals, amitriptyline exerts a positive effect on mood. TCAs are potent inhibitors of serotonin and norepinephrine reuptake. Tertiary amine TCAs, such as amitriptyline, are more potent inhibitors of serotonin reuptake than secondary amine TCAs, such as nortriptyline. TCAs also down-regulate cerebral cortical β-adrenergic receptors and sensitise post-synaptic serotonergic receptors with chronic use. The antidepressant effects of TCAs are thought to be due to an overall increase in serotonergic neurotransmission. TCAs also block the histamine-H1 receptor, α1-adrenergic receptors, and muscarinic receptors, which accounts for their sedative, hypotensive and anticholinergic effects (e.g. blurred vision, dry mouth, constipation, urinary retention), respectively.

Your genetic map

Gene	SNP	Genotype
CYP2C19	rs4244285	GG

What do your genetics tell us?

Patients with the GG genotype who are treated with amitriptyline may exhibit increased metabolism of amitriptyline (decreased amitriptyline plasma concentrations and increased nortriptyline plasma concentrations) as compared to patients with the AA or AG genotype. Other genetic factors, including the other CYP2C19 alleles *17 rs12248560, and *3 rs4986893, along with clinical factors, may also have an influence.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/16024198

Pharmacogenomics: Neurology

Bupropion

A unicyclic, aminoketone antidepressant. The mechanism of its therapeutic actions is not well understood, but it does appear to block dopamine uptake. Hydrochloride is available as an aid to smoking cessation treatments.

Your genetic map

Gene	SNP	Genotype
ANKK1	rs1800497	GG

What do your genetics tell us?

Patients with the GG genotype who are treated with bupropion may be more likely to quit smoking as compared to patients with the AA or AG genotypes, although this has been contradicted in one study. Other genetic and clinical factors may also influence a patient's capacity to quit smoking.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/15492764

Pharmacogenomics: Neurology

Citalopram

Citalopram (brand names Celexa, Cipramil and others) is an antidepressant of the Selective Serotonin Reuptake Inhibitor (SSRI) class.

Your genetic map

Gene	SNP	Genotype
CYP2C19	rs12248560	CC

What do your genetics tell us?

Patients with the CC genotype may exhibit decreased metabolism of citalopram or escitalopram as compared to patients with the TT or TC genotype. Other genetic factors, including the other CYP2C19 alleles *2 rs4244285,*3 rs4986893, and clinical factors, may also affect a patient's citalopram or escitalopram metabolism.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/20531370

Pharmacogenomics: Neurology

Clomipramine

Clomipramine, sold under the brand name Anafranil, among others, is a Tricyclic Antidepressant (TCA).It is used for the treatment of obsessive–compulsive disorder, panic disorder, major depressive disorder, and chronic pain. It may decrease the risk of suicide in those over the age of 65.

Your genetic map

Gene	SNP	Genotype
CYP2C19	rs4244285	GG

What do your genetics tell us?

Patients with the GG genotype may exhibit increased metabolism of clomipramine as compared to patients with the AG or AA genotype. Other genetic and clinical factors may also influence a patient's clomipramine metabolism.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/16024198

Pharmacogenomics: Neurology

Escitalopram

Escitalopram, also known by the brand names Lexapro, and Cipralex, among others, is an antidepressant of the Selective Serotonin Reuptake Inhibitor (SSRI) class. It is approved by the U.S. Food and Drug Administration (FDA) for the treatment of adults and children over 12 years of age with Major Depressive Disorder (MDD) or Generalised Anxiety Disorder (GAD).

Your genetic map

Gene	SNP	Genotype
CYP2C19	rs12248560	CC

What do your genetics tell us?

Patients with the CC genotype may exhibit decreased metabolism of citalopram or escitalopram as compared to patients with the TT or TC genotype. Other genetic factors, including the other CYP2C19 alleles *2 rs4244285,*3 rs4986893, and clinical factors, may also affect a patient's citalopram or escitalopram metabolism.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/17625515

Pharmacogenomics: Neurology

Carbamazepine

Carbamazepine (CBZ), sold under the brand name Tegretol, among others, is a medication used primarily in the treatment of epilepsy and neuropathic pain. It is not effective for absence seizures or myoclonic seizures. It is used for schizophrenia, along with other medications, and as a second-line agent in bipolar disorder.

Your genetic map

Gene	SNP	Genotype
EPHX1	rs2234922	AA

What do your genetics tell us?

Patients with the AA genotype may require a decreased dose of carbamazepine as compared to patients with the AG or GG genotype, although this is contradicted in one study. Other genetic and clinical factors may also influence carbamazepine dose.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23252947

Pharmacogenomics: Neurology

Aripiprazole

Aripiprazole, sold under the brand name Abilify, among others, is an atypical antipsychotic. It is recommended and primarily used in the treatment of schizophrenia and bipolar disorder. Other uses include as an add-on treatment in major depressive disorders, tic disorders, and irritability associated with autism.

Your genetic map

Gene	SNP	Genotype
MC4R	rs489693	AC

What do your genetics tell us?

Patients with schizophrenia, schizoaffective disorder, or autism spectrum disorder and genotype AC may be more likely to experience weight gain and hypertriglyceridemia when taking amisulpride, aripiprazole, clozapine, olanzapine, haloperidol, paliperidone, quetiapine, ziprasidone, or risperidone as compared to patients with the AA genotypes, although this is contradicted in one study. Other clinical and genetic factors may also have effects.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/22566560

Pharmacogenomics: Neurology

Clozapine

Clozapine, sold under the brand name Clozaril, among others, is an atypical antipsychotic medication. It is mainly used for schizophrenia when it does not improve following the use of other antipsychotic medications. In those with schizophrenia and schizoaffective disorder it may decrease the rate of suicidal behaviour.

Your genetic map

Gene	SNP	Genotype
ANKK1	rs1800497	GG

What do your genetics tell us?

Patients with the GG genotype may be at a decreased but not non-existent risk of side effects, including hyperprolactinemia and weight gain, but increased risk of tardive dyskinesia, during treatment with antipsychotic drugs as compared to patients with the AA or AG genotype. Other genetic and clinical factors may also influence a patient's risk of side effects.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/20714340

Pharmacogenomics: Neurology

Haloperidol

Haloperidol, marketed under the brand name Haldol, among others, is a typical antipsychotic medication. Haloperidol is used in the treatment of schizophrenia, tics related to Tourette syndrome, mania in bipolar disorder, nausea and vomiting, delirium, acute psychosis, and hallucinations caused by alcohol withdrawal.

Your genetic map

Gene	SNP	Genotype
MC4R	rs489693	AC

What do your genetics tell us?

Patients with schizophrenia, schizoaffective disorder, or autism spectrum disorder and genotype AC may be more likely to experience weight gain and hypertriglyceridemia when taking amisulpride, aripiprazole, clozapine, olanzapine, haloperidol, paliperidone, quetiapine, ziprasidone, or risperidone as compared to patients with the AA genotypes, although this is contradicted in one study. Other clinical and genetic factors may also have effects.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/22566560

Pharmacogenomics: Neurology

Olanzapine

Olanzapine (originally branded as Zyprexa) is an antipsychotic medication used to treat schizophrenia and bipolar disorder. It is usually classed with the atypical antipsychotics, the newer generation of these medications. It appears to be slightly more effective in treating schizophrenia (especially the negative symptoms) and to entail a lower risk of causing movement disorders than typical antipsychotics.

Your genetic map

Gene	SNP	Genotype
ANKK1	rs1800497	GG

What do your genetics tell us?

Patients with the GG genotype may be at a decreased but not non-existent risk of side effects, including hyperprolactinemia and weight gain, but increased risk of tardive dyskinesia, during treatment with antipsychotic drugs as compared to patients with the AA or AG genotype. Other genetic and clinical factors may also influence a patient's risk of side effects.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23859574

Pharmacogenomics: Neurology

Paliperidone

Paliperidone, sold under the brand name Invega, among others, is a dopamine antagonist and 5-HT2A antagonist in the atypical antipsychotic class of medications. Invega is an extended release formulation of paliperidone that uses an extended release system to allow for once-daily dosing.

Your genetic map

Gene	SNP	Genotype
MC4R	rs489693	AC

What do your genetics tell us?

Patients with schizophrenia, schizoaffective disorder, or autism spectrum disorder and genotype AC may be more likely to experience weight gain and hypertriglyceridemia when taking amisulpride, aripiprazole, clozapine, olanzapine, haloperidol, paliperidone, quetiapine, ziprasidone, or risperidone as compared to patients with the AA genotypes, although this is contradicted in one study. Other clinical and genetic factors may also have effects.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23920449

Pharmacogenomics: Neurology

Risperidone

Risperidone, sold under the brand name Risperdal, among others, is an antipsychotic medication. It is mainly used to treat schizophrenia, bipolar disorder, and irritability in people with autism. It is taken either orally, or via injection into a muscle.

Your genetic map

Gene	SNP	Genotype
DRD2	rs1799978	TT

What do your genetics tell us?

Patients with the TT genotype and schizophrenia who are treated with risperidone may be more likely to see an improvement in their symptoms as compared to patients with the CC genotype. Other genetic and clinical factors may also influence a patient's response to risperidone.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/18855532

Pharmacogenomics: Neurology

Ziprasidone

Ziprasidone, sold under the brand name Geodon, among others, is an atypical antipsychotic used for the treatment of schizophrenia as well as acute mania and mixed states associated with bipolar disorder.

Your genetic map

Gene	SNP	Genotype
MC4R	rs489693	AC

What do your genetics tell us?

Patients with schizophrenia, schizoaffective disorder, or autism spectrum disorder and genotype AC may be more likely to experience weight gain and hypertriglyceridemia when taking amisulpride, aripiprazole, clozapine, olanzapine, haloperidol, paliperidone, quetiapine, ziprasidone, or risperidone as compared to patients with the AA genotypes, although this is contradicted in one study. Other clinical and genetic factors may also have effects.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/22566560

Pharmacogenomics: Neurology

Amisulpride

Amisulpride, sold under the brand name Solian, among others, is an antipsychotic medication used to treat schizophrenia. It is usually classed with the newer generation of antipsychotic medications, known as "atypical antipsychotics".

Your genetic map

Gene	SNP	Genotype
MC4R	rs489693	AC

What do your genetics tell us?

Patients with schizophrenia, schizoaffective disorder, or autism spectrum disorder and genotype AC may be more likely to experience weight gain and hypertriglyceridemia when taking amisulpride, aripiprazole, clozapine, olanzapine, haloperidol, paliperidone, quetiapine, ziprasidone, or risperidone as compared to patients with the AA genotypes, although this is contradicted in one study. Other clinical and genetic factors may also have effects.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/22566560

Pharmacogenomics: Neurology

Quetiapine

Quetiapine, marketed as Seroquel, among others, is an atypical antipsychotic used for the treatment of schizophrenia, bipolar disorder, and major depressive disorder.

Your genetic map

Gene	SNP	Genotype
MC4R	rs489693	AC

What do your genetics tell us?

Patients with schizophrenia, schizoaffective disorder, or autism spectrum disorder and genotype AC may be more likely to experience weight gain and hypertriglyceridemia when taking amisulpride, aripiprazole, clozapine, olanzapine, haloperidol, paliperidone, quetiapine, ziprasidone, or risperidone as compared to patients with the AA genotypes, although this is contradicted in one study. Other clinical and genetic factors may also have effects.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/22566560

Pharmacogenomics: Pain

Meperidine

A narcotic analgesic that can be used for the relief of most types of moderate to severe pain, including postoperative pain and the pain of labour. Prolonged use may lead to dependence on the morphine type; withdrawal symptoms appear more rapidly than with morphine and are of shorter duration.

Your genetic map

Gene	SNP	Genotype
CREB1	rs2952768	TT

What do your genetics tell us?

Patients with the TT genotype may have decreased opioid analgesic requirements after surgery. Other genetic and clinical factors may also have an effect.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23183491

Pharmacogenomics: Pain

Morphine

The principal alkaloid in opium and the prototype opiate analgesic and narcotic. Morphine has widespread effects in the central nervous system and on smooth muscle. In January, 2017, morphine was approved for the treatment of chronic pain.

Your genetic map

Gene	SNP	Genotype
CREB1	rs2952768	TT

What do your genetics tell us?

Patients with the TT genotype may have decreased opioid analgesic requirements after surgery as compared to patients with the CC genotype. Other genetic and clinical factors may affect a patient's opioid dose requirement.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23183491

Pharmacogenomics: Pain

Pentazocine

The first mixed agonist-antagonist analgesic to be marketed. It is an agonist at the kappa and sigma opioid receptors, and has a weak antagonist action at the mu receptor

Your genetic map

Gene	SNP	Genotype
CREB1	rs2952768	TT

What do your genetics tell us?

Patients with the TT genotype may have decreased opioid analgesic requirements after surgery as compared to patients with the CC genotype. Other genetic and clinical factors may affect a patient's opioid dose requirement.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23183491

Pharmacogenomics: Pain

Aspirin

Aspirin, also known as acetylsalicylic acid (ASA), is a medication used to treat pain, fever, and inflammation. Specific inflammatory conditions for which aspirin is used include Kawasaki disease, pericarditis, and rheumatic fever. Aspirin is a non-steroidal anti-inflammatory drug (NSAID) and works similar to other NSAIDs, but also suppresses the normal functioning of platelets.

Your genetic map

Gene	SNP	Genotype
PTGS1	rs10306114	AA

What do your genetics tell us?

Patients with the AA genotype who are treated with aspirin may be at a decreased, though not absent, risk for non-response to aspirin as compared to patients with the AG or GG genotype. Other genetic and clinical factors may also influence a patient's response to aspirin.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/16493486

Pharmacogenomics: Pain

Alfentanil

Alfentanil (R-39209, brand name Alfenta, Rapifen in Australia) is a potent but short-acting synthetic opioid analgesic drug, used for anaesthesia in surgery.

Your genetic map

Gene	SNP	Genotype
OPRM1	rs1799971	AA

What do your genetics tell us?

Individuals with the AA genotype may experience increased opioid efficacy for pain, and with opioid-related drugs to treat addiction, and may require a decreased dose of opioids as compared to individuals with AG and GG genotypes. However, this has been contradicted in some studies. In some studies the AA and AG genotypes were found to experience increased efficacy, and to require a decreased dose as compared to the GG genotype. Other factors may also have an effect.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/19605407

Pharmacogenomics: Pain

Buprenorphine

Buprenorphine, sold under the brand name Subutex, among others, is an opioid used to treat moderate acute pain and moderate chronic pain.

Your genetic map

Gene	SNP	Genotype
CREB1	rs2952768	TT

What do your genetics tell us?

Patients with the TT genotype may have decreased opioid analgesic requirements after surgery as compared to patients with the CC genotype. Other genetic and clinical factors may affect a patient's opioid dose requirement.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23183491

Pharmacogenomics: Pain

Fentanyl

Fentanyl, also known as fentanil, is an opioid pain medication with a rapid onset and short duration of action

Your genetic map

Gene	SNP	Genotype
CREB1	rs2952768	TT

What do your genetics tell us?

Patients with the TT genotype may have decreased opioid analgesic requirements after surgery as compared to patients with the CC genotype. Other genetic and clinical factors may affect a patient's opioid dose requirement.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/23183491

Pharmacogenomics: Pain

Naltrexone

Naltrexone is a medication primarily used in the management of alcoholism and opioid dependence. Naltrexone is a pure opioid antagonist and works by blocking the activity of opioids

Your genetic map

Gene	SNP	Genotype
OPRM1	rs1799971	AA

What do your genetics tell us?

Individuals with the AA genotype may experience increased opioid efficacy for pain, and opioid-related drugs to treat addiction, and may require a decreased dose of opioids as compared to individuals with the AG and GG genotypes. However, this has been contradicted in some studies. In some studies those with the AA and AG genotypes were found to experience increased efficacy, and to require a decreased dose, as compared to those with the GG genotype. Other factors may also have an influence.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/18250251

Pharmacogenomics: Pain

Tramadol

Tramadol, sold under the brand name Ultram, among others, is an opioid pain medication used to treat moderate to moderately severe pain.

Your genetic map

Gene	SNP	Genotype
OPRM1	rs1799971	AA

What do your genetics tell us?

Individuals with the AA genotype may experience increased opioid efficacy, and may require a decreased dose. However, this has been contradicted in some studies. Other genetic and clinical factors may also have an influence.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/21837673

Pharmacogenomics: Onco

Methotrexate

An antineoplastic antimetabolite with immunosuppressive properties. It is an inhibitor of tetrahydrofolate dehydrogenase, and prevents the formation of tetrahydrofolate, necessary for synthesis of thymidylate, an essential component of DNA.

Your genetic map

Gene	SNP	Genotype
MTHFR	rs1801133	GG

What do your genetics tell us?

Patients with the GG genotype and leucemia or lymphoma who are treated with methotrexate: 1) may have a better response to treatment 2) may be at a decreased risk of toxicity 3) may require a higher dose of methotrexate, and 4) may be at a lower risk of folate deficiency as compared to patients with the AA or AG genotype. This association has been contradicted or not found in multiple studies. Other genetic and clinical factors may also have an influence.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/22143415

Pharmacogenomics: Onco

Vincristine

Vincristine is an anti-tumour vinca alkaloid isolated from Vinca Rosea. It is marketed under several brand names, many of which have different formulations, such as Marqibo (liposomal injection) and Vincasar. Vincristine is indicated for the treatment of acute leucemia, malignant lymphoma, Hodgkin's disease, acute erythraemia, and acute panmyelosis. Vincristine sulfate is often chosen as part of polychemotherapy because of its lack of significant bone–marrow suppression (at recommended doses) and unique clinical toxicity (neuropathy).

Your genetic map

Gene	SNP	Genotype
LOC1009	rs924607	TC

What do your genetics tell us?

Patients with the TC genotype may have decreased, but not absent, risk of peripheral nervous system diseases when treated with vincristine as compared to patients with the TT genotype. Other genetic and clinical factors may also affect a patient's response to vincristine.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/25710658

Pharmacogenomics: Onco

Fluorouracil, capecitabine, pyrimidine analogues, tegafur and Neoplasms

Fluorouracil (5-FU), sold under the brand name Adrucil, among others, is a medication used to treat cancer. By injection into a vein, it is used for colon cancer, esophageal cancer, stomach cancer, pancreatic cancer, breast cancer, and cervical cancer. As a cream it is used for actinic keratosis and basal cell carcinoma. It is a potent antimetabolite used in the treatment of cancer. It is a drug that blocks the methylation reaction of deoxyuridic acid, converting it into thymidylic acid by inhibiting an enzyme that is important for the synthesis of thymidine, which, being part of the DNA molecule, stops its formation. The drug is specific to the S phase of the cell phase cycle. 5-Fluorouracil is involved in the synthesis of DNA and inhibits, to a small degree, the formation of RNA. The two actions combine to promote a metabolic imbalance that results in cell death. The inhibitory activity of the drug, by its analogy with uracil, has an effect on the rapid growth of the neoplastic cells, which, preferentially, take advantage of the uracil molecule for nucleic acid biosynthesis.

Your genetic map

Gene	SNP	Genotype
DPYD	rs67376798	TT

What do your genetics tell us?

TT-genotype patients treated with fluoropyrimidine-based chemotherapy may exhibit 1) increased clearance of the drug and 2) decreased, but not absent, risk and reduced severity of drug toxicity as compared to patients with the AT genotype. The combination (FOLFOX, FOLFIRI or FEC) and delivery of the drug may influence risk for toxicity. Other genetic and clinical factors may also have an influence.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/17700593

Pharmacogenomics: Onco

Cisplatin

Cisplatin is a chemotherapy medication used to treat a number of cancers. This includes testicular cancer, ovarian cancer, cervical cancer, breast cancer, bladder cancer, head and neck cancer, esophageal cancer, lung cancer, mesothelioma, brain tumours and neuroblastoma.

Your genetic map

Gene	SNP	Genotype
XPC	rs2228001	TT

What do your genetics tell us?

Patients with the TT genotype may have a decreased, but not non-existent, risk for toxicity with cisplatin treatment as compared to patients with the GG or GT genotype. Other genetic and clinical factors may also affect a patient's risk for toxicity.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/19434073

Pharmacogenomics: Onco

Irinotecan

Irinotecan, sold under the brand name Camptosar, among others, is a medication used to treat colon cancer and small cell lung cancer. For colon cancer it is used either alone, or with fluorouracil. For small cell lung cancer it is used with cisplatin.

Your genetic map

Gene	SNP	Genotype
UGT1A1	rs4148323	GG

What do your genetics tell us?

Patients with the GG genotype with cancer who are treated with irinotecan-based regimens may be at a decreased risk for neutropenia as compared to patients with the AA genotype. Other genetic and clinical factors may also impact a patient's risk of neutropenia.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/19299905

Pharmacogenomics: Onco

Mercaptopurine

Mercaptopurine (6-MP), sold under the brand name Purinethol, among others, is a medication used for cancer and autoimmune diseases. Specifically, it is used to treat Acute Lymphocytic Leucemia (ALL), Chronic Myeloid Leucemia (CML), Crohn's disease, and ulcerative colitis. For ALL it is generally used with methotrexate.

Your genetic map

Gene	SNP	Genotype
NUDT15	rs116855232	CC

What do your genetics tell us?

Patients with CC genotype who are treated with thiopurines for Inflammatory Bowel Diseases (IBD) or Acute Lymphoblastic Leucemia (ALL) may have a reduced, but not absent, risk of developing leukopenia, neutropenia or alopecia as compared to those with the TC or TT. Patients may also tolerate higher doses of thiopurines and be less likely to discontinue thiopurine treatment as compared to TC or TT patients, possibly due to their reduced risk for adverse effects. Other factors may also have an effect.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/25624441

Pharmacogenomics: Onco

Tamoxifen

Tamoxifen is a drug that is used as a complementary therapy for breast cancer. It is used for a long period after the end of surgery and chemotherapy, and has been shown in different studies to significantly reduce the likelihood of a recurrence of the tumour.

Technically, it is classified as a selective modulator of estrogen receptors. Its mechanism of action is based on its antiestrogenic effect; that is, it blocks the action of this hormone,w which stimulates the development of tumour cells. It is not useful in all breast cancers, but only in those whose cells have specific estrogen receptors. Its action is not limited to the breast, because different organs have receptors for estrogen.

Your genetic map

Gene	SNP	Genotype
CYP19A1	rs4646	AA

What do your genetics tell us?

The AA genotype in women with breast cancer who are treated with tamoxifen (with or without anastrozole, cyclophosphamide, docetaxel, doxorubicin, epirubicin, exemestane, fluorouracil, letrozole, paclitaxel, radiotherapy) may lead to INCREASED treatment EFFICACY in PRE-MENOPAUSAL women, AND DECREASED treatment EFFICACY in POST-MENOPAUSAL women, as compared to patients with the AC and CC genotypes. Other factors may also have an influence.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/26191232

Pharmacogenomics: Other

Peginterferon Alpha-2b

Peginterferon alfa-2b is a form of recombinant interferon used as part of combination therapy to treat chronic Hepatitis C, an infectious liver disease caused by infection with the Hepatitis C Virus (HCV). HCV is a single-stranded RNA virus that is categorised into nine distinct genotypes, with genotype 1 being the most common in the United States, and affecting 72% of all chronic HCV patients. Treatment options for chronic Hepatitis C have advanced significantly since 2011, with the development of Direct Acting Antivirals (DAAs) resulting in less use of Peginterferon alfa-2b. Peginterferon alfa-2b is derived from the alfa-2b moiety of recombinant human interferon, and acts by binding to human type-1 interferon receptors. The activation and dimerization of this receptor induces the body's innate antiviral response by activating the Janus kinase/signal transducer and activator of transcription (JAK/STAT) pathway.

Your genetic map

Gene	SNP	Genotype
IFNL3	rs12979860	TC

What do your genetics tell us?

Patients with the TC genotype and Hepatitis C genotype 1 may exhibit a decreased response (sustained virological response, SVR) when administered peg interferon alpha (2a, 2b) and ribavirin as compared to patients with the CC genotype. Patients with the TC genotype may also have lower spontaneous clearance in acute HCV infections than patients with the CC genotype. Other genetic and clinical factors may also have an influence.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/21145807

Pharmacogenomics: Other

Ribavirin

Producing broad-spectrum activity against several RNA and DNA viruses, Ribavirin is a synthetic guanosine nucleoside and antiviral agent that interferes with the synthesis of viral mRNA. It is primarily indicated for use in treating hepatitis C and viral hemorrhagic fevers. HCV is a single-stranded RNA virus that is categorised into nine distinct genotypes, with genotype 1 being the most common in the United States, and affecting 72% of all chronic HCV patients. It is reported that ribavirin might be effective only in the early stages of viral hemorrhagic fevers, including Lasser fever, Crimean-Congo hemorrhagic fever, Venezuelan hemorrhagic fever, and Hantavirus infection. Ribavirin is a prodrug that is metabolised into nucleoside analogs, blocking viral RNA synthesis and viral mRNA capping. Before the development of newer drugs, ribavirin and dual therapy was considered the first-generation and standard antiviral treatment. Newer drugs developed as hepatitis C viral infection treatments can be used to reduce or eliminate the use of ribavirin, which is associated with serious adverse effects.

Your genetic map

Gene	SNP	Genotype
IFNL3IFN	rs12979860	TC

What do your genetics tell us?

Patients with the TC genotype and Hepatitis C genotype 1 may exhibit a decreased response (sustained virological response, SVR) when administered peg interferon alpha (2a, 2b) and ribavirin. They may also exhibit lower spontaneous clearance in acute HCV infections than patients with the CC genotype. Other genetic and clinical factors may also affect a patient's response to peg interferon and ribavirin.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/21145807

Pharmacogenomics: Other

Tacrolimus

Tacrolimus (also FK-506 or Fujimycin) is an immunosuppressive drug mainly used after an organ transplant, to reduce the activity of the patient's immune system and, thereby, the risk of organ rejection. It is also used in a topical preparation for the treatment of severe atopic dermatitis, severe refractory uveitis, after bone marrow transplants; and the skin condition vitiligo. It was discovered in 1984 from the fermentation broth of a Japanese soil sample containing the bacteria Streptomyces tsukubaensis. Tacrolimus is chemically known as a macrolide. It reduces peptidyl-prolyl isomerase activity by binding to the immunophilin FKBP-12 (FK506 binding protein), creating a new complex. This FKBP12-FK506 complex interacts with and inhibits calcineurin, thus inhibiting both T-lymphocyte signal transduction and IL-2 transcription.

Your genetic map

Gene	SNP	Genotype
CYP3A5	rs2740574	TT

What do your genetics tell us?

Transplant recipients with the TT (CYP3A4) genotype may require a decreased dose of tacrolimus as compared to patients with the TC or CC genotype. Other genetic and clinical factors, such as CYP3A5 (rs776746), may also affect a patient's dose requirements.

More information:

Pharmacogenomics: Other

Viagra (Sildenfail)

Sildenfail is a vasoactive agent used to treat erectile dysfunction and reduce symptoms in patients with Pulmonary Arterial Hypertension (PAH). Sildenafil elevates levels of the second messenger, cGMP, by inhibiting its breakdown via Phosphodiesterase Type 5 (PDE5). PDE5 is found in particularly high concentrations in the corpus cavernosum, erectile tissue of the penis. It is also found in the retina and vascular endothelium. Increased cGMP results in vasodilation, which facilitates the generation and maintenance of an erection.

Your genetic map

Gene	SNP	Genotype
GNB3	rs5443	CC

What do your genetics tell us?

Patients with the CC genotype and erectile dysfunction who are treated with sildenafil may be less likely to exhibit a positive erectile response as compared to patients with the TT genotype. Other genetic and clinical factors may also influence a patient's response to sildenafil.

More information:

https://www.ncbi.nlm.nih.gov/pubmed/12576843

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