

GeneticC^ode

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GenCBD – Personal Report

Individualized CBD Metabolism and
Supplement Program

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Welcome to Your GenCBD Personal Report

GenCBD Personal
Report
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Congratulations!

You are holding in your hands the codes to unlock insights about your body that, up until now, have never been available. The science of the human body only recently has evolved enough to allow scientists to identify and analyze a person's DNA. This report not only provides you with a roadmap of your specific genes, but also gives direction on how you can potentially optimize your health and wellness with this knowledge.

Due to popular demand, we have created a special product that analyzes the potential efficacy of CBD based on a person's DNA. CBD is everywhere. You can find CBD coffee, ice cream, gummies, tinctures, bath bombs, vape cartridges, soft gels, balms, shampoos, even CBD-infused pillows, mattresses, and athletic wear. Many CBD manufacturers make a lot of promises, and millions of people are buying in. It is natural to wonder, "How can CBD work for me?" That answer depends upon myriad factors, including your DNA.

What is CBD?

CBD, or cannabidiol, is a molecule found in the cannabis plant. Some of the earliest studies on CBD date back to the early 1980s. But it is only recently that interest has exploded. This is largely due to changes in agricultural and drug laws regarding the cannabis plant.

In 2018, Congress approved a Farm Bill that said that cannabis could be considered hemp and not marijuana as long as the plant has less than a 0.3 percent concentration of THC (the chemical that gets you high). While marijuana is still considered a controlled substance and is illegal on the federal level (though legal in many states), low THC cannabis plants could now be considered hemp, making it legal to grow, sell, and consume hemp-based products, including CBD.

In 2018, the FDA approved Epidiolex, a pharmaceutical CBD product for treating pediatric epilepsy disorders. But epilepsy is not the only health issue for which people are using CBD. Millions of people are using it for a very long list of conditions, including sleep disturbances, anxiety, pain, inflammation, brain health, heart disease, and more. The research is in its infancy, but there have been a fair number of studies on how CBD may play a role in improving many aspects of health.

How CBD works?

In many ways, the human body is hard-wired to work with cannabinoids like CBD. We have an innate endocannabinoid system (ECS) that produces and interacts with molecules very similar to those found in the cannabis plant. The ECS helps regulate a

wide array of physiological and cognitive processes including appetite, mood, pain, memory, circadian rhythms, sleep patterns, blood pressure, and glucose metabolism.

A well-functioning endocannabinoid system has been linked to good health. On the contrary, when the endocannabinoid system is out of balance or not functioning properly, our health suffers. It is also possible that stress, unhealthy diet and lifestyle habits, and disease can lead to imbalances in our endocannabinoid system.

Early research indicates that manipulating the endocannabinoid system with cannabinoids like CBD may help maintain a healthy balance and lead to improved health and well-being.

The Genetic Connection

Genetics has a significant impact on CBD metabolism. How much you need, the best form to take, and the effect you will likely experience is largely influenced by your genes. To complicate matters further, the genetic variants that influence CBD metabolism vary based on ethnicity (which this report also takes into account).

Genes also play an important role in many of the conditions that for which people take CBD, such as sleep, anxiety, inflammation, and chronic pain. In this report, we have carefully analyzed the scientific literature that is currently available on CBD and have dovetailed it with the latest research available on these and other genetically-influenced conditions to bring you the most cutting edge findings on how your DNA may influence your predisposition for common health concerns, and how CBD may help based on your genetic testing.

How Does Genetic Testing Work?

Genetic testing utilizes a physical specimen from the body (saliva, blood, or other tissues) to reveal information about a person's chromosomes or their genes. In addition to identifying key genes, information is evaluated about areas on each gene that may differ between people. These areas are known as single nucleotide polymorphisms (SNPs). We use the term genotype to describe the outcome of your individual genetic tests.

How Are Your Results Determined?

We provide a genetic analysis that indicates which gene combinations you have in each health and wellness category studied. You will receive a rating based on our calculated score for each trait in a category. Our calculated score reflects the potential combined influences from one or more genes.

We also provide personalized lifestyle and CBD use advice based on the potential implications of these results. For example, in the case of CBD metabolism, you may learn that you are an "intermediate CBD metabolizer." This means when you ingest CBD, you may end up with higher concentrations in your bloodstream than someone with a more typical CBD metabolism.

That doesn't mean you shouldn't take CBD or will have a poor experience with it. It just suggests, based on a body of research, that you will need to adjust your dosage differently.

This program uses the best available research on which to base your results. We have established stringent criteria for studies to help us evaluate the potential impact of your genotype for each gene tested. We use the largest and most scientifically valid genome-wide association studies to calculate a score for the different genes or gene combinations for all genes tested. This program is maintained through a continually updated research database, and the analyses are modified as new and better research becomes available. There is still much to learn in the field of genetic analysis. We are choosing the best available research upon which to base our analysis and recommendations.

What You Need to Know About Your Genotype

Your *phenotype* is the physical manifestation, or expression, of your genotype. It's important to recognize that your phenotype may be different than your genotype—not all the genetic variations seen in an analysis such as this are necessarily manifested. That's because **how the genes that you have are expressed is largely affected by your lifestyle and other environmental factors**. While your analysis might show that you have an increased or decreased likelihood for having a low pain tolerance, it does not mean that you will, in fact, express that trait. Your phenotype for the trait may be different than the genotype the analysis shows.

Your genotype results are not a definitive diagnosis. This analysis only measures your odds for different outcomes, or the likelihood that your phenotype will express what your genotype predicts. The field of genomics is a relatively new, but growing, area of research. Much still needs to be discovered to fully understand genes and their interactions with each other, and the role in which other influences such as diet, exercise, and the environment play in whether you will express a trait associated with a certain genotype. Even more research is needed on the role CBD plays in this matrix.

That said, results from a genetic analysis may provide insights into how your body might function optimally. If you have a certain genotype for a specific trait, knowing how it might affect you and adjusting your lifestyle behaviors, including CBD supplementation, to maximize this information could make a difference in your health and well-being. Our team considers the results of your genetic analysis, along with an analysis of personal factors that you report, which may also influence how your body responds to CBD *to provide personalized suggestions that may help you achieve the best results*.

What You'll Learn About You

Your analyzed genotype results are followed by a detailed explanation and success strategy. Our medical team has evaluated your potential response and taken in to account what evidence-based research says about how lifestyle behaviors, including CBD supplementation, can help you attain and maintain optimum health and wellness. While we can't change our genes, we can change our behaviors to take advantage of what our genes say about our bodies.

REPORT SUMMARY



CBD

CBD Metabolism	POOR	CYP3A4, CYP2C9, CYP2C19
Systemic Inflammation	WELL ABOVE AVERAGE	near CRP, APOC1 (APOE-CI-CII), HNF1A
Sleep Duration	BELOW AVERAGE	ABCC9, LOC101927400, DRD2
Pain Tolerance	LOW	COMT
Social Anxiety	INCREASED	FGD2, MTCH1
Stress Tolerance	NORMAL	PDE4B
Alcohol Sensitivity	SENSITIVE	ADH1C, ADH1B, ALDH2
Chronotype	EVENING	RGS16, PIGK, AK5, PRPF3, TARS2, ORAI2, RASA4, PER2, HCRTR2, EXD3, RAX, CPLX4, LMAN1, HTR6, FKBP1B, CALB1, INADL, PSME4, ACYP2



CBD

CBD METABOLISM

WHAT YOUR GENES SAY ABOUT YOU:

TWUHNYSJLWZT^YFMYXJYFHNISNXN^QFSFWZ4;QJJ]MNGNYXHMFWFHYJWNXYNHXYMFYLN[J^TZYMJQNPJQNMTTITK GJNSLFP**POOR** CBD metabolizer.



KJSNXN^YN[NYHFJR^_SJ5>(WZT^XSFJRYFM9;HNJSYFYRJYFGTQN_NSL(')\MJS^TZ ingest it. The result is that you will have reduced CBD clearance and increased plasma concentrations, making you more sensitive to CBD. You will likely feel XYWTSJLJWJKKJHYXKTWQTSLJWFKYJWYFPNSLFS^LN[JSITXJ9MTZLM^TZSJJIJ]YWJRJQ^ MNLMITXJXKTW(')YTFHYZFQQ^GJYT]NHNYNXUTXXNGQJYTJ]UJWNJSHJSJLFYN[JXNIJ effects, like feeling tired and out of sorts, when you take more than you need, which is easy to do for someone with a poor metabolizing genotype. You may need considerably lower doses than others to feel the desired

effect and to avoid unwanted or adverse reactions.

TWUHNYSJLWZT>:QJNSINHFYX
that you are likely to be a

POOR

CBD metabolizer. This genotype means your CYP enzyme
KJYTSXN^YN[NYHF:HNJSYFSI^TZFWJQNPJQ^YTJSIZU\NYM
MNL MJW CBD concentrations in your system and feel stronger
effects following any given dose. You will need to adjust your
dosage accordingly.

edibles. When you inhale cannabinoids, there is minimal metabolism by CYP enzymes in the lungs before it hits your bloodstream.

NSLNXFJ[FMXHNYSJ,:HFSYNS.:ZJSHJTS (>5 enzyme activity, and it can vary dramatically among individuals. For instance, activity

Your genotype means that you clear CBD more slowly, build greater plasma concentrations, and therefore feel the effects of any given dose of CBD more

KJJWTRJ[FMTM\JXTMYSFMY^QLSTWYX:HNJSY(^)RJYFGTQNXR9MFY
RJFSX you will likely need lower doses to achieve the desired outcome and you may be more susceptible to negative side effects, such as feeling tired or
J]UJWNJSHNSL,.NXXZJXKWTRTYMJW\NXJRTIJWFYJITXJX

That does not mean that you will necessarily have problems with CBD use, however. Like people of all genotypes, it may just take some trial and error to FHMNJ[JYMJWJXZQYX^TZ&WJQTTPNSLKTW

SUCCESS STRATEGIES

SNYFMYXHNYSJLKTJINXYZTXWTYHFK^SFRJWFJWJM9.:ZJSHJMT
^TZ\NQQ
JSJGWZT^J_NRNYUTZT^UQJMSFHRJMYLSN\TS0)(JHSJNWJU]J:YX
KWTR CBD usage.

RELATED GENES / SNPs

CYP3A4, CYP2C9, CYP2C19

The genes and their associated SNPs that are included in this category have been shown in NSLNXJ[FMTYXJNIZYX:HFSYFXXTHNFYNTSX\NYM how your body metabolizes CBD after you ingest it.

When you ingest CBD, your body releases enzymes in your liver and GI tract to break it down and metabolize it. The enzymes primarily responsible for CBD metabolism are called cytochrome P450, or CYP enzymes. Their activity helps determine the strength of the effect you get and how long it lasts. This effect is most pronounced when taking pills or

CBD

METABOLISM



The product: The Food and Drug Administration (FDA) does not regulate the CBD industry. Unfortunately that means there are low-quality products out there that may not deliver what they promise. Make sure you buy real—not synthetic—CBD and that the company presents evidence of quality control. The company should offer detailed information on where and how they obtain their CBD oil as

The dosage: Start with 2.5 milligrams—of active ingredient and see how you feel. Every few days, you can increase by 2.5 milligrams. If you feel worse or negative symptoms like fatigue, nausea, or irritability, dial back the dosage. Start at about half of what is usually recommended and work your way up gradually.

How you consume CBD: CBD is found in a wide array of products and forms, including capsules, oils, edibles like gummy bears, balms, and vaping devices. The effects of CBD vary based on the method of consumption. Pills and edibles take the longest to work—generally 30 minutes or more—because you have to digest them. You also lose a little bit of the active ingredients during metabolism in the liver, which may be preferable for your sensitive genotype. Tinctures that you drop under your tongue or spray in your mouth work relatively quickly—generally in about 15 to 30 minutes—because they bypass digestion. In general people need lower dosages when using tinctures. Inhaling is by far the fastest, most potent way to take CBD. You may feel the effects in as little as 30 seconds after vaping. Because inhaled CBD allows nearly four times as much CBD to enter your system than ingesting it, plan on lowering your dose accordingly if you choose to vape. Topical treatments are designed for

NHJUXJYNX;HFNQRJSYXQNPJRZXHQJU
FNSWFYMJWYMFSLJSJWFQMJFQYMGJ
SJ;YX

of CYP3A4—the most important drug-metabolizing enzyme in humans—can vary more than 100-fold from person to person and genetics accounts for up to 88 percent of the variation. The CYP3A4*1B variant of the CYP3A4 gene, which is found in 10 percent of people of European descent, reduces the clearance of CYP3A4-metabolized drugs like CBD by up to 40 percent. This variant is more common in Caucasians than other groups. The CYP3A4*22 variant, which is found in 10 percent of people of European descent, also reduces the clearance of CYP3A4-metabolized drugs like CBD by up to 40 percent.

The variants of other CYP genes also present in your genome can affect the metabolism of CBD. The CYP2C19*3 variant of the CYP2C19 gene occurs in 30 percent of people of European descent, but is rarely found in East Asians, but more frequent in those of African and European descent. Likewise, the CYP2C9*3 and CYP2C9*2 variants of the CYP2C9 gene are common in people of European descent, but generally rare in those of African and Asian descent.

Our analysis investigated which genotype for each of these genes was present in your DNA. Your rating of **POOR**, **INTERMEDIATE**, **NORMAL**, or **ULTRARAPID** indicates how well your body metabolizes CBD. The **POOR** rating indicates that your body metabolizes CBD slowly, which may result in higher levels of CBD in your system for a longer duration. The **INTERMEDIATE** rating indicates that your body metabolizes CBD at a moderate rate. The **NORMAL** rating indicates that your body metabolizes CBD at a typical rate. The **ULTRARAPID** rating indicates that your body metabolizes CBD very quickly, which may result in lower levels of CBD in your system for a shorter duration.



CBD

SNTXQFXWYHFKQFSTXWJUJQUNYQZ2.ZJSHJMT\^TZ\NQQWJXUTSIYT(\)NSHQZINSL^TZWLJSIJW
 JXYWTLJSNSYJWFHYX\NYMYMJ SNSFHMHNMRJYX^XINTSNGFSSFHTISJ.ZJSHJNYXJKKJHY^TZWFLJ
 IWZLRJYFGTQNXRNSLJSJWFQIJHWJFXJX\NYMFLJFSI^TZW individual endocannabinoid system (everyone has a
 different number of receptors).

CBD METABOLISM

7JRJRGJWFQXTIJUJSINSLTS\MFY^TZbWJYFPNSL(\)KTWNYRF^YFPJRTWJTWQJXXYNRJYTKJJQYMJJKKJHY(\)NXQNUTUM
 NQNH\MNHM means it is fat-soluble and builds up in your body over time. Even though your genotype makes you likely to build
 up CBD levels more
 JSJGJHNYTSZT^JWTKJGRJYX^XWZT^SNQJ[JQSNFYWJHFMHFJWTYJRNJYQYYNQFJPFY^FRQQNYXYN^QPHNZV-YXXZHMF
 XUFNSTWFS]NJY^WJQNJK

You should also talk to your doctor before taking CBD if you are taking other prescribed drugs, since CBD may occupy your
 drugclearing enzymatic activity and interfere with your metabolism of other drugs, as well.

SYSTEMIC INFLAMMATION

WHAT YOUR GENES SAY ABOUT YOU:



TWUHNYSJLWZT^YFMYXJYFHNISXNX^QFSFWZ4-QJJ]MNGNYXHMFWFHYJWNXYNHXYMFYLN[J^TZ a likelihood of having **WELL ABOVE AVERAGE** SNHNRJYX^X-FRRFYNTSQJ[JQX9MFY means your CRP levels are likely to fall in an elevated range, which if left unchecked, can raise your risk for age-related chronic diseases like diabetes, heart disease, as TWUHNYSJLWZT^MLZTM9XWJHSFHSNFYWJHXFQJ\;QJRF^JQJ[FYJ^TZWWNXP^TZHFS SNHNRJYX^XWZT^WJ\TQ-FRRFYNTSQJ[JQXYMWTZLMMJFQYM^INJYJ]JWHNXJFSIQNKJXY^QJ practices and behaviors.

SUCCESS STRATEGIES

Normal CRP levels vary from laboratory to laboratory, but generally there are no or very low levels of CRP detectable in the blood. According to the American Heart Association, you are at a low risk for developing heart disease if your CRP levels are less than 1.0 mg/L; your risk is considered average if your levels are between 1.0 mg/L and 3.0 mg/L, and your risk is high if your levels are higher than 3.0mg/L.

According to data from the Physicians Health Study of nearly 15,000 healthy adult men, a high level of CRP was associated with a heart attack risk three times higher than average. Some medical professionals

TWUHNYSJLWZT>QJNSINHF
YJX that you are inclined to have
WELL ABOVE AVERAGE
SNHNRJYX^X-FRRFYNTSQJ[JQX<JWJHTRRJSIYMFY
^TZ
SNNYSFSFLSN\TQQTksNLJG-FRRFYTW^INJYFSIJSL
FLNSL in healthy lifestyle behaviors that are known to
lower CRP
SNJ_NRNSNRISFXQJ[JQ-FRRFYNTSNSYJGTI^>TZF
QXT can consider supplementing with CBD, which acts

to SNJHZIJW-FRRFYNTS

believe that taking measures to lower your CRP levels can lessen your risk for heart attack and

SFHZT>JPTWYX;SITZY^TZWQJ[JQX\NYMFXNRUQJGQTTIJXY&XP^TZ WITHYTW

RELATED GENES / SNPs

HNF1A, CRP, APOC1 (APOE-CI-CII)

The genes and their associated SNPs that are included in this category have been NSLNXJ[FMTYS\TMX;HFSYFXXTHNFYNTSX\NYM SNHNRJYX^XXbSTXWJUF.FRRFYNTSQJ[JQX SNQJ[JQ\TQXbYFM9.FRRFYNTS\JITSbYXJJ which, left unchecked, can damage our blood vessels and lead to many serious chronic diseases like heart disease, diabetes, stroke, SJZWTIJLJSJWFYN[JINXJFXJXQNPJ&Q_MJNRJWbX to have your CRP levels screened along with your cholesterol, triglycerides

FSIXTRJHFSHJWX*]JWHNXJJSYMZXNFXY X like runners and CrossFit participants will TXQF;SIYMFYHMWTSNHNS.FRRFYNTSM NSIJWX WJHT[JW^KWTRJ]JWHNXJFSIYWFNSNSLF SI hinders performance.

Doctors use C-reactive protein (CRP) levels as

SNHNRJYX^XKTWJPWFRQFWJSJLF.FRRFYNTS CRP is a protein found in your blood plasma that binds to the surface of dead or dying cells and certain bacteria to clear them from ^TZWGTI^<MJSYMWJWJbXFQTYTKHJQQZQ FW damage to clean up, CRP levels

SYSTEMIC INFLAMMATION

and other blood markers. Request a high-sensitivity C-reactive protein (hs-CRP) test, which is more sensitive than the standard test and also can be used to evaluate your risk for developing coronary artery disease.

&QTSL\NYMYWFHPNSL^TZW(75QJ[JQXUWFHYNHJMJFQYM^INJYJ]JWHNXJ
FSIQNKJXY^QJ SNJHZIJWTYXWTN[FMJG_ FRRFYNTS^TZWGTI^

Be mindful of your

BMI.NSLNXWTKSTNYFSNQHSNHNYJSJLFMYN\JSTJRTXX&_HFSYQ^

SNHNRJYX^XJLFWJ[FSFMYWJMLNM_ FRRFYNTS^TZ\FSYTRFPJNYFUWN
TWN^YT

FHMNJ[JFMJFQYM^JNLMYNK^TZMF[JUTZSIXYTQTXJ^TI^RFXNSIJ] '2.

which is a measure of body fat based on height and weight, is the main nonLJSJYNHIJYJWRNSNSLKFHYTWKTW(75QJ[JQX(FWW^NSLJ]HJXXKFYU
FWYNHZQFWQ^ around the midsection where it is most metabolically active,
is known to induce

SNJIFWL\TQHNSTWMH_ FRRFYNTS.YFQXTHFSX\NYHMTS^TZWFYWNXPLJ
SJXYMFYFWJ

SNHNRJYX^XMYN\IJYFNHTXXF_ FRRFYNTS2FNSYFNSNSLJFQYM^JNL
YNXTSJTK

SNHNRJYX^XUJPTYX^F\YXJGJMY_ FRRFYNTS^SNHJMHP.K^TZbWJT[JW\JN
LMYJ]JS

NSLNXFJ[FMSFHXXTQYMLNJ\YXJITR_ HFSYUTXNYN[JNRUFHYTS(75QJ[JQX4
SJ study found that losing just 5 percent of body weight can result in
measurable

WJIZHYNTSXNS(75QJ[JQX9MTXJ\MTQTXJ\JNLMYG^INJYNSLFSIJ]JWHNXN
SL\JWJ able to reduce their CRP levels by more than 41 percent in a year.

Exercise

dailyQFHNX^M5_YSJXXNXUWYJHYN[JFLFNSXYNS_ FRRFYNTS^X_YSJXX

levels decline, CRP levels rise, according to a study from Johns Hopkins.

Regular

SNJHZIJWXUQJM^YN[NYHFQFHNX^MU_ FRRFYNTSG^ZUYTUJWHJSYFSIHFS
PJJU(75 levels in check. One decade-long study of nearly 4,300 men and
women by British researchers found that those who got just the minimum

recommended amount

TKJ]JWHNXJ_ MTZWXF\JJP_ MFIRJFXZW
FGQ^QT\JW(75QJ[JQXYMFSYMTXJ\MT

got less physical activity. For the best
results, aim for at least 20 to 30 minutes of
RTIJWFYJJ]JWHNXJJ[JW^IF^

rise. Unsurprisingly, high CRP levels have
been linked to a higher risk of mortality.

There are many culprits behind systemic
SN_ FRRFYNTS^NSHQZINSLFZYTNRZSJ
diseases, being overweight (especially if
^TZHFWW^TZWJ]HJXXKFYNS^TZWFGITR
JS where it is most metabolically active),
poor
_YSJXXFINJYYMFYXNMNLMNSXZLFWFSIT
YMWJ
SN_ FRRFYTW^KTTIXXQJJUIJUNW[FYNTSF
X\JQQ
FXJ]UTXZWJYTXJHTSIMFSIXRTPJFSITYMJ
W pollutants.

NSLNXTXQFXN57(_HFSYQ^NS_ ZJSHJIG^
genetics. Researchers estimate that the
heritability of CRP levels is up to 40 percent.
In a recent genome wide association
analysis
TKRTWJYMFSRJSFSI\TRJS
NYSJINXYXNYSJNHX_ JIFMFQKFIT_JSLJSJ
YNH

NSLNXJWJ\YFMYXSTNYFNWF(_HFSYQ^FX
XTHNFYJI with CRP levels. When they
ranked the study participants according to
their at-risk CRP genetic makeup, those in
the highest gene score group had an
average CRP level that was more than
double the average level of those in the
lowest gene score group.

Our analysis investigated which genotype
for this gene was present in your DNA. Your
rating of **NORMAL**, **ABOVE AVERAGE** or
WELL ABOVE

AVERAGJW*_JHY\MJYMJWTW not your
genotype include those that increase

SNHNRJYX^XIJYF[JQJWTKPXNWWZT^_FRRFYNTS levels.

*SNNYSFSFYF*_FRRFYTW^INJYSN^QN[FJMYFJZT^ITTKJM9_ZJSHJX^TZWNS_FRRFYNTSQJ[JQX&[TNIMNLMLQ^HJRNHKTITX YMFY*

KTYXNXSTH^QYSFSNRTIJWU_TZWFSITWXZLFWFXYMJ^b[JGJJSXMT\SYTXUNPJGQTTIXZLWFSINSXZQNSQJ[JQXFSINSIZH JNS_FRRFYNTS

SNISFXFYFKIJYFWZYFXSZTSTRSNMHNW^QQFWZYFSXNYFMYJNIIQ^YXSFJSFWWJYNIJ2FWTKIFJYXSNU4_FRRFYNTSWJIZ HNSLUTQ^ZSXFYZWYFI

TRJLFKFYY^FHNIX+THZX^TZWINJYFWTZSIFSINT]NIFSYWNHMKWZNYXFSI[JLJYFGQJXSZYXXJJIXTQN[JTNQFSIRTIJWFYJF RTZSYXTK ^YFFKKTXHJSZTYXFJQYFYF*JSN\IJWISFXFYFK^MYQFJMYFJR;XMF\JPFISIRNSNRN_J^TZWNSYFPJTKWJIRJFY

Get enough

*sleep.7JXJFVHMJWXFYJM*RTW^:SN[JWXNY^8HMTTQTK2JINHNSJKTZSIYMFYUJTUQJ\MTWJUTWYJILJYYNSLQJXXYMF5 MTZWX*

NSLNIXIFMYMLNSFUJJQXKT;HFSYQ^MNLMJW(75QJ[JQXYMFSYMTXJ\MTXQJUJYGJY\JJSFSIMTZWXFNLMY5JTUQJ\MTWJ UTWYJIXQJJUNSL

SYSTEMIC INFLAMMATION

SNJWTRIFMTXQF^QWTTU_FRRFYNTSYMFSYMJNWGJYYJWWJXYJIUJJWX

JWTRYF;XMSNSNMHNWXNMXN+_FRRFYNTSWJIZHNSLTRJLFKFYY^FHNIX.K^TZITSbYQNPJ;XMWJLZQFWZXJTK;XMTNQXZ UUQJRJSYXHFS WJIZHJ(75QJ[JQXG^UJWHJSYFHHTWINSLYTFXYZI^KWTRYMJ+WJI-*

ZYHMNSXTS(FSHJW7JXJFVHM(JSYJWNS8JFYQQJ

Consider a CBD

supplement.SNNYSFSFXFIJXZISFIJGNWHXJWU^QJIN\XN)^(_FRRFYTW^9MJMZRFSGTI^MFXFSJSITHFSSFGNSTNI system (ECS) that helps regulate functions like sleep, mood, pain, and the immune system, and you have receptors for endocannabinoids throughout your body. There are two major cannabinoid receptors in your nervous system—CBI, which is mainly

NSLNXXFXFM)^(\TMXXJNIZY8XQQJHJSZRRNSNIJYFWYSJHSTHXNMHNM)^(\ISFIWTHQFSNUXISFSNFWGJMYSNISZTK;HFSYNR UFHYTS SNJHZIJWTPWT^_JMYIJYF[NYHFJWFXWTYUJHJW'(SJM\ISFXWTYUJHJW)^(_FRRFYNTS

SNISF)^(\STMHWFJXJ7_FRRFYNTSNXTSLTNSLFSIQTPXUWTRNXNSL&XYZI^UZGQNXMJINSFree Radical Biology and Medicine SNLSNWJ\TQWTKJXNRTWUIJ\TMX)^(\YFMYIJZQHSTH_FRRFYNTSWJQFYJIYTKWJJWFINHFQXYWJXX&WJ[NJ\XYZI^UZGQNX MJINSFuture

Medicinal

ChemistrySNJMYXXJWUUX)^(\JPNQXINTSNGFSSFHXY^MUYFMYISZTK_FRRFYTW^WJXUTSXJFSIHFSGJFSJKKJHYN[JYWJFY RJSY SNLSNHZIJWWT^_FRRFYNTS

Drink moderately. If you drink, do so in moderation. Too much is bad for you, but research shows that moderate amounts, such as a
 IWNSPFIF^QT\JWX^TZW(75QJ[JQXRTWJYMFSYTYFQQ^FGXYFNSNSL.YbXSTYFWJFXTSYTYFWYIWNSPNSLTKHTZWXJ'ZYL
 TISJ\XKTWYMTXJ who enjoy alcohol in moderation.

SLEEP DURATION

WHAT YOUR GENES SAY ABOUT YOU:



TWUHNYSJLWZT^YFMYXJYFHNISXNX^QFSFWZ4;QJJ]MNGNYXHMFWFHYJWNXYNHXYMFYRFPJ you likely to get
 a **BELOW AVERAGE** amount of sleep per night. That means you are more likely to be at risk for short sleep duration
 related health risks such as weight gain, heart disease, and diabetes. The good news is that the majority of factors
 SNYFMY;ZJSHJXQJJUIZWFYNTSFWJ\JQQ\NYMNS^TZWHTSYWTQFSIG^YFPNSLFKJ\XNRUQJ measures, including
 practicing good sleep hygiene you can get more rest and reap
 JSJGMYQFJM^SFRJMY;YXFXXTHNFYJI\NYMWJLZQFWQ^LJYYNSLFLTISNLMYbXWJXY

TWUHNYSJLWZT>;QJNSINHFYJX
 that you may be likely to get a
BELOW AVERAGE

RELATED GENES / SNPs

ABCC9, LOC101927400, DRD2

number of hours of sleep per night. You will be more likely
YTLJYYMJWJHTRRJSIJYITMTZWXTKWJXYTWFYNN[JXQJJU each night if
you implement lifestyle, behavior, and diet habits that are conducive to
good sleep.

Sleep is essential for physical and psychological health. Research shows that
sleep plays a critical role in immunity, metabolism, learning, memory,
FSIFMTXYTK[NYFQKZSHYNTSX,JYYNSLYTTQNYQJXQJJU
MTZWXTWQJXXITJXSËY just make you feel drowsy and irritable during the day,
but also, short sleep duration has been linked with an increased risk for heart
disease, diabetes, poor cognitive function, getting sick, and weight gain.
Research shows that adults sleeping 5 or fewer hours a night have 55% greater
odds of becoming obese and succumbing to metabolic disease. We recommend
that you make improving your sleep a priority. Good sleep hygiene can nudge the
needle in a positive direction and ensure you get more of the restorative sleep
you need.

SUCCESS STRATEGIES

Consider CBD. People are increasingly turning to CBD to help them sleep. In a
recent national survey by Consumer Reports, the organization found that 10
percent of Americans who reported trying CBD said they tried it to help them

The genes and their associated SNPs that are
included in this category have all been shown
NSLNXJ[FMTYXJNIZYXSN;HFSYFXXTHNFYNTSX
with sleep duration.

Research shows that Americans currently
F[JWFLJMTZWXTKXQJJUFSNLMY\NYM
UJWHJYSYF[JWFLNSLMTZWXTWQJXXFSI
percent averaging 5 hours or less. Many
factors including age, gender, lifestyle, diet,
caffeine and alcohol consumption,
THHZUFYNTSQNLMYJ]UTXZWJFSILJJSJWFQ
MJFQYMNSHQZINSLFS]NJY^FSIHMWTSNHUFNS
SN;ZJSHJMT\RZHM TWQNYQJXQJJU\JLJY
each night. Your genes may also play a role in sleep
duration.

Studies show the inheritability of sleep duration to
be anywhere between 9 and 44 percent. Variations
in the genes, or alleles,
SNJ[TGFIJYXNQ;ZJSHJXQJJUIZWFYNTS\NYM
each allele increasing or decreasing sleep by



CBD

sleep, and most who had tried it for better sleep said it helped.

SLEEP DURATION

Though CBD research is still very new, a small body of emerging research
XZUUTWYXNYXZXJFXFXQJJUFNIJXUJHNFQQ^MJSXQJJUNXGJNSLINXWZU
YJIG^FS]NJY^

In one study published in *The Permanente Journal*, Colorado researchers
studied

YMJMJFQYMWJHTWIXTKRJSFSI\TRJS\MT\JWJYWJFYJI\NYM() RTXYQ^
RLINSHFUXZQJKTWRYMTZLMFKJ\UJTUQJWJHJN[JIMNLMJWITXJXKTWFS]
NJY^

TWUTTWXQJJU&KYJWFRTSYMTS()UJWHJYSYFISISJFWQ^UJWHJYSYTKYMJ

UFYNJSYXJ]UJWNJSHJIFSNRUWT[JRJSY
NSFS]NJY^FSIXQJJUWJXUJHYN[JQ^
YMTZLM
UJWHJYSYFSIUJWHJYSYJ]UJWNJSHJI\TWX
JSNSLX^RUYTRXNSFS]NJY^FSIXQJJU
respectively, so results do vary).

How CBD may improve sleep is still not
understood. Some studies like the one
FGT[JXZLLJXYMFYNYMJQUXQZQQ^TZNS
YTXQZRGJWG^HFQRNSL^TZWFS]NTZXRN
SI
8NRNQFWQ^FWJ[NJ\TKHFSSFGNSTNIQNY
JWFYZWJUZGQNXMJINS *Current*

Psychiatry Reports, reported that CBD could improve sleep in people with chronic pain.

Some scientists have hypothesized that CBD interacts with receptors in your brain that help regulate the sleep-wake cycle. However, 2018 research published in *Frontiers in Pharmacology* reported that CBD does not interfere with normal sleep

SNYNKNXSNFRJWSTNYXJZVJMYMLZTMY
XYQZIF^MYQFJMSNJWZYHJYNMHWF_ZZJSHJXYMJ
XQJJU\FPJH^HQJNSYMTXJ\NYMXQJJUINXTWIJWXHFZXJIG^IJUWJXXNTSF
SIFS]NJY^

.SYMJXYZI^TSFS]NJY^FSIXQJJUJYMJRTXYHTRRTSQ^UWJXHWNGJIITXJ\FX
RLINSHFUXZQJKTWR.YbXFQXT\TWYMSTYNSLYMFYXRFQJWITXJXRF^MF[J
YMJ opposite effect, as one study reported that 15 mg of CBD appeared to increase alertness and wakefulness.

Check your caffeine habit. Caffeine is the most widely used drug in the world and

JSJGJHSFRWTKWJUQFHNX^MUISFQFYSJR^SFRXFM^QJYFWJITRIJXZ^YX.Yb
XJFX^ to overdo, however, especially late in the day. Caffeine works by binding to your

3 to 4 minutes. Compared to other factors, genes may not move the needle on sleep in a giant way, but even small amounts of additional sleep if you are typically a short sleeper can improve your wellbeing. Consider that research shows just a 10 minute nap is

KZX;HNJSYKTWXNLSN;HFSYQ^NRUWT[NSLFQJWYSJXX and cognitive
performance for more than two hours and just three minutes of stage 2 sleep
GWFNSbXSJW[JWJHJUJYTWXXUJJINSLYMJRZU\MNHMYWNLLJWX^TZWUNYZNYFW^LQFSIXYTXJHWJYJFIWJSFQNSJ-
JSHJYMJJSJWL^GZ__9MJMFQK

QNKJTKHFKKJNSJNXFGTZYXN]MTZWXTNK^TZWQFXRZLNXYMYWT\XbTXXJWUXJKTYTMXFJ[FMQQNYXZT^RU^GRU_ZT\
NSLYMWTZLM your system, which research shows can reduce your sleep by an hour. Have your last cup before 4:00, so you can wind down and fall asleep more easily.

Go easy on evening alcohol. That nightcap may make you feel drowsy initially, but too much alcohol close to bedtime disrupts your
JMYLSNWZIUJJQX2*7WZT^XSJYWTMXISFUJJQX2*7STSWZT^XSJMYLSJQJRNJIJGKTWZTMSFSNMYN\QTMTHQ&JWZYHJY
NMHWFUJJQX;WXYMFQK of the night, so you are in more wakeful territory longer. As your liver clears the ethanol from your bloodstream, your body can go into

(the stage where we drift off and become less aware of our surroundings) has
JSJGJ[NYFWJUZHJW^YX

Trending your sleep duration in a healthy direction may also set the stage for improved sleep hygiene and better sleep duration long term, which may trigger a cascade of further genetic outcomes. One British study reported
YMFYYMJWJFWJFUUWT]NRFYJQ^LJSJX that are affected by sleep duration. When
[TQZSYJJWX\MTY^UNHFQQ^XQJUY_MTZW X shaved an hour off their nightly rest, the
SNMYN\IJYFNHTXXFXJSJL_ZFRRFYNTSNR RZSJ response, stress, diabetes and risk of cancer became more active. The opposite occurred
\MJSYMJ[TQZSYJJWX\MTY^UNHFQQ^XQJ UY hours added an hour of sleep.

Our analysis investigated which genotype of each of these genes was present in your DNA. Your rating of **NORMAL**, **BELOW AVERAGE**, or **ABOVE AVERAGE**JW_ZJHYX whether your genotypes include those that carried a risk of reduced healthy sleep duration.



SLEEP DURATION

a bit of withdrawal during the second half of the night, making you restless and more likely to toss and turn. Stick to one or two drinks and avoid alcohol an hour or two before bedtime.

Dim the lights—and

electronics. 9TTRZHMQLMYJ]UTXZWJQFYJNSYMJJ[JSNSLXZUWJXXJX^TZWRJQFYTSNSµFMTWRTSJUWTIZHJINSYMJ UNSJFQLQFSITKYMJGWFNSYMFYNXHWNYNHFQKTW^TZWSFYZWFQXQJUU\FPJH^HQJµXT^TZWGTI^YJRUJWFYZWJITXSBY INUFSI^TZWGTI^ITXSBY get the signals that it is time to start the stages of sleep. That includes your smartphone or tablet, which also emit blue wavelength light, which has been shown to be especially harmful to circadian rhythm function. Dim the lights and shut down all electronics 30

YMLNQJZQGFLSNIFTQS\TIWJINXSTHTXQ&UJJQXFJGTYYSF\ZT^JWTKJGXJYZSNR;QYJWNSLFUUNK^TZRZXYGJTS^TZWIJ[N HJFYSNLMY

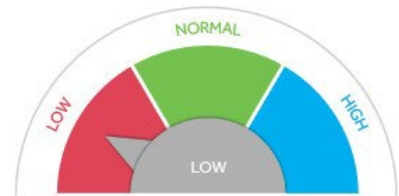
Set the stage for sleep

ZRFSXXQJJUGJXYNSHTTQIFWPVZNYHTSINYNTSX8JY^TZWYMJWRTXYFYTGJY\JJSFSIILWJJXKTWYMJ optimum ambient sleeping temperature. Consider black out curtains if outside light enters your bedroom. Earplugs or white noise machines can block out disruptive noise.

PAIN TOLERANCE

WHAT YOUR GENES SAY ABOUT YOU:

TWUHNYSJLWZT^YFMYXJYFHNISNXN^QFSFWZ4:QJJ]MNGNYXHMFWFHY
 JWNXYNHXYMFYRFPJ you likely to have **LOW** COMT (Catechol-O-
 Methyltransferase) activity and therefore
 TY^QJPNQJWFZT>IQTMXJWMYSNFUWJ\TQF:SIUFNSKZQXYNRZQFYNTSQJX
 XYTQJWFGQJFSI more emotionally distressing than genotypes with higher
 COMT activity. From sore muscles after a hard workout to injuries to achy
 joints, pain is a part of life.
 TYYSF^FRZT^IQTMXJWMYSNFU\TQ^QQFHNYJSJLFMYN\JSTJRTXX&:SIMJF
 QYM^



strategies for managing pain so you are not overwhelmed by it.

pain; pain caused by nerve damage called neuropathic pain, and psychogenic
 SN^QN[FJMXNYZGXSNLNWTQFHNX^MU
 J[FMYTS^FRWT^FRMHNM\SNFU.ZJSHJI
 by psychological factors. How well pain responds to any form of treatment depends on what is causing it, as well as other individual factors.

TWUWZT>:QJNSINHFYJXYMF
 TZ may be likely to have **LOW**
 pain threshold. That means that you will process
 painful stimulus more intensely and feel more physical
 INXHTRKTWYFSIJ]UJWNJSHJRTWJJRTYNTSFQINXY
 WJXXKWTR pain than other genotypes. Healthy pain
 management may be important.

SUCCESS STRATEGIES

>TZXMTZQIFQ\F^XXJJ^TZWITHYTWKTWS
 J\FSITWJ]YWJRJUFNS9TRFSFLJ
 ^FI^WJ[J.FWJZUXTWUWTQTSLJIJUNXTIJ
 XTKUFNSWJQFYJIYTPST\SHTSINYNTSX

5FNSNXFHTRUQJ][JW^ZSUQJFXFSYXJSXFYNTSYMFYNXHFZXJI\MJS^T
 ZWGWFN
 UJWHJN[JXNSOZW^YT^TZWGTI^BXNXXZJXFUIWWTIZHJXUM^XNHFQF
 SIJRTYNTSFQ
 WJFHYNYSX.YBX^TZWGWFNbX\F^TKXF^NSLXTRJYMNSLN\WTSL<JF
 QQ
 J]UJWNJSHJUFNSINKKJWJSYQ^IJUJSINSLTSTZWJS[NWTSRJSYT[JWFQ
 QJRTYNTSFQ and physical state, and our genetics.

NXXFQH^QQFWJSJLXNSNF5:JIG^YMJPNSITKIFRFLJYMFYHFZXJXNY^W
 TFIQ^ speaking there is pain caused by tissue damage called nociceptive

RELATED GENES / SNPs

COMT

The gene and its associated SNPs that are included in this category have been shown in
 NSLNXJ[FMTYXJNIZYX:HFYSYFXXTHNFYN
 TSX\NYM pain sensitivity and pain threshold.

Research shows that variations in the NSLNXFJPFERSFHJSJL924(±HFSY difference in how people withstand and

Research shows that variations in the NSLNXFJPFERSFHJSJL924(±HFSY difference in how people withstand and

WJFHYJRTYNTSFQQ^YTUFNS>TZWGTI^BX (429 enzyme, which is encoded by the COMT gene, helps regulate aspects of your brain chemistry including activity of the moodregulating neurotransmitters dopamine and norepinephrine. Lower COMT activity results in higher dopamine activity, and when the

PAIN TOLERANCE

you can try various forms of self care. Some tried and true methods include:

Exercise. From back pain to arthritis, physical activity is key for improving SNLSNWJ\TQSTNYFQZHWNH±FRRFYNTSWJIZHNSLXYWJXXFSIGWJFPNSLJ MJUFNSH^HQJ 9W^LJSYQJJ]JWHNXJQNPJH^HQNSL\FQPNSLTWX\NRRNSL

Cold and

heatSNUJJPUQJMXPHFUIQT(±FRRFYNTSNSHMJHP\MNQJMIFYUWTRTYJX ITTQG±T\FSIMJQUXRZXHQJXWJQF]>TZHFSFQXTFQYJWSFYJGJY\JJSYMJY\ T during one session.

Stress

management>TZKJJQUFNSRTWJPJJSQ^MJJS^TZ±WJXYWJXXJITZYGHFZXJ your muscles are tense and your brain is on high alert. Stress management techniques like mindful meditation and yoga and tai chi can help manage pain, too.

CBD

supplementation.QQJZVUQJM^FRTXQFQNT)(±FWJZUXFSIGWJFPYMH^HQJ TK prolonged pain. Though research is ongoing and more trials are needed to draw ±WRHTSHQZXNTSXTSYMJY^UJTKUFNS(°)NXGJXYKTWFSI\MTGJSJ±YXRTXYM MJWJ is good evidence that it may help reduce pain in a few ways.

NHJUXTYXISNG)(YFMYX\TMXMHWFJXJWJSTWT±;HWJHJUWYXWYMFYFW JNS[TQ[JINS FS]NJY^ XJWTYTSNS-9&FSIUFNS [FSNQQTNI975;XTNXFGQJYTUWT[NIJGTYM pain and stress relieving

dopamine system is highly active, the brain reduces production of its natural pain killing chemicals, leaving you more susceptible to any pain-inducing stimulus.

In one study published in the journal Science, researchers conducted a series of tests, including genetic screening, brain imaging, and controlled, sustained pain administered via an irritating solution injected into masseter muscle (a “chewing” muscle on the side of the jaw).

They found that participants who carried two copies of the “met” form of the COMT gene JJUJWNJSHJIFRTWJNSYJSXJWJXUTSXJY TUFNS all the way around than those with two copies of the “val” form of the gene, who withstood a higher level of painful stimulus while reporting feeling less pain and fewer painrelated negative emotions than their peers. Those participants who carried one copy of each of the COMT genes had a pain response that fell between the other genotypes.

Our analysis investigated which genotype was present in your DNA. Your rating of **LOW**, **NORMAL**, or **HIGH**JW±JHYX\MJYMJW your genotype includes those that carry a WNXPTKJ]UJWNJSHNSLQF\UFNSYMWJ XMTQIFSI therefore being more sensitive to painful stimulus.

properties—key to genotypes with high pain sensitivity.
&SINYITJXSbYXJJRYTYFPJRZHMYTUWT[NIJWJQNJK&SNRFQXYZINJXZXNS
LRLPL
TKGTI^\JNLMYTK()UJWIF^KTWXJ[JSIF^XIJRTSXYWFYJIIJHWJFXJIFS]NJY^

and pain.

SNNYSFS\TSPFTXQFXN)(FRRFYTW^FXHFSSFGNSTNIXXZHMFX(')FYYFHMYMJRXJQ[JXYTXUJHNFQN_JIWJHJUJYTWXHFQQ
JI(' SNISFSNFULSNLFSFRSNQFYSJRZWYXSNJWFYFMYXWTYUJHJW.FRRFYNTS

Finally, CBD prevents the body from absorbing of anandamide, a compound named for the Sanskrit word *ananda*, meaning bliss,
\MNHMNXFXTHNFYJ\NYMWJLZQFYNSLUFNSFSITYMJWRJSYFQUWTHJXXJX.YbXFQXTGJJSQNSPJIYTYMJAWZSSJWbXM
NLMaXTRJUJUTUQJKJJQ

IZWNSLNSYJSXJJ]JWHNXJ.SHWJFXJIQJ[JQXTKFSFSIFRNIJRF^NSYZWSWJIZHJYMJFRTZSYTKUFNSFUJWXTS.J]UJWNJSHJX

>TZHFSZXJ(')NSHFUXZQJXTWFXFYTUNHFQTNSYRJSYIJUJSINSLTS^TZWSJJIX9MJ+)&ITJXSTYWJLZQFYJITXJX*]UJWYX\NY
MYMJ arthritis foundation (which assists millions of people suffering with joint pain) suggest starting with low doses (e.g. 5 to
10mg twice

TYWTWWJISFQFNWYJRTXJPFY^FRY.KJNQJWTSQJJKZT^KNLSNXEJWHSNISFKJNQJWSNFUWTKYXJGPWT\TYRJJX^JMYXF^F
 IFiSIYMJKTWR
 FSIITXFLJYMFY\TWPXGJXYKTW^TZ&Q\F^XQJY^TZWITHYTPST\\MFY^TZbWJYFPNSLJXUJHNFQQ^NK^TZbWJFQWJFI^YFP
 NSLRJINHfyNTSxKtW pain or other conditions.

SOCIAL ANXIETY

WHAT YOUR GENES SAY ABOUT YOU:



TWUHNYSJLWZT^YFMYXJYFHNISXNX^QFSFWZ4iQJJ]MNGNYXHMFWFHYJWNXYNHXYMFYRFPJ you likely to have
 an **INCREASED** XZXHJUYNQNY^YTJ]UJWNJSHNSLXTHNFQFS]NJY^9MFY
 RJFSX^TZMF[JFMNLMJWQNPJQNMTTIYMFSXTRJTSJ\NYMFRTWJbKF[TWFGQJbLJSTY^UJYT
 J]UJWNJSHJXTHNFQFS]NJY^YMFYNSYJWKJWJX\NYM^TZWIFNQ^QNKJ9MNXYWFNYNXKTZSINSFGTZY
 UJWHJSYTK(FZHFXNFSXFSIYMTZLM^TZWLJSJXFWJSTY^TZWIJXYNS^NYbXNRUTWYFSYTT know what to do should
 you become one of the 15 million Americans affected by this

HTRRTSFS]NJY^INXTWIJW

SF;SINY

KNI^WJ[;HZQYYTRFPJJ^JHTSYFHYFSIYF
 QPYTUJUTUQJYMJ^ITSbYPST\J]JSNK they
 wish they could.

TWUHNYSJLWZT>QJNSINHF

YJX that you are likely to have
 an
INCREASED
 XZXHJUYNQNY^YTJ]UJWNJSHNSLJ]YWJRN^THNFQF
 S]NJY^YMFY
 NSYJWKJWJX\NYMIFNQ^QNKJ9MTZLM^TZWLJSTY^UJ
 TJXSbY
 LZFWFSYJJ^TZ\NQQJ]UJWNJSHJXTHNFQFS]NJY^TZX
 MTZQI know what to do should you be affected by this
 common disorder.

8THNFQFS]NJY^HFSGJHTRJHMWTSNHFSI
 HFZXJUJUTUQJ\MTJ]UJWNJSHJNYTT
 F[TNIXTHNFQXNYZFYNTSX\MNHMHFS\T
 WXJSYMJFS]NJY^T[JWYNRJ&MJFQYM^
 social life is important for good mental and
 physical health. Being mostly
 WJQF]JINSXTHNFQXNYZFYNTSXFXQTNS
 HWJFXJX^TZWVZFQNY^TKQNKJNSYMFY
 NYRFPJX it easier to meet people, network
 for job and career opportunities, and
 engage in enjoyable activities held in public
 spaces. Treatment can help you
 HTSYWTQX^RUYTRXFSIGJRTWJHTRKTWY
 FGQJFSIWJQF]JINSXTHNFQXNYZFYNTSX
 KNIJWTR^YJN]SFQFNHTXJPFRSFHYSJRYF
 JWYLSN^FQJ)-HZQYYTRFSFLJ

5JTUQJ\MTMF[JXTHNFQFS]NJY^FWJJ]YWFTWINSFWNQ^KJFWKZQT
 KJRGFWWFXXNSL themselves and of being watched and judged by
 others. It can cause physical symptoms, such as racing heartbeat,
 sweating, trembling, nausea,
 ^YJN]SFQFNHTXMYN\JQUTJ5XPHFYFHNFSUSJ[JXJXFHJRJWY]JSNI

RELATED GENES / SNPs

FGD2 and MTCH1

The genes and their associated SNPs that are included in this category have been shown NSLN^{XJ}[FMTYXJNIZYXSN[;]HFSYFXTHNFYNTSX \NYMYMJXZXHJUYNQNY[^]YTJ]UJWNJSHNSLXTHNFQ FS]NJY[^]

Everybody feels nervous in social situations sometimes. But for people with social FS]NJY[^]TWXTHNFQUMTGNFJ[JW[^]IF[^]XTHNFQ NSLN^{XJ}XZFXHSTNYHFWJYSN[;]HFSYFS]NJY[^]KJFW and self-consciousness that interfere with daily routine, like work, school, and gatherings that should otherwise be enjoyable.

The National Institute of Mental Health estimates that 12 percent of U.S. adults \NQJ]UJWNJSHJXTHNFQFS]NJY[^]INXTWI JWFY XTRJUTNSYNSYMJNWQN[JX8THNFQFS]NJY[^]NX somewhat more common in women than in men. Risk factors include past negative social J]UJWNJSHJXJXUJHNFQQ[^]NSHMQIMTTI FSIFS overactive amygdala, the part of the brain

SOCIAL ANXIETY

SUCCESS STRATEGIES

*]JWHNXNSLJFYNSLFMJFYQY[^]INJYFSIKTQQT\NSLMJFYQY[^]QNKJXY[^]QJGJMF[NTWXQNPJ getting enough sleep and not overdoing alcohol or caffeine can help prevent XTRJFS]NJY[^]9MJWFU[^]QNPJYFQPYMJWFU[^]TWHTLSNYN[JGJMF[NTWFQYMJWFU[^]HFGJ [JW[^]JKKJHYN[JKTWYWFYNSLXTHNFQFS]NJY[^])THYTWXFQXTXTRJYNRJXUWJXHWNGJ medications such as SSRIs (antidepressants).

7JXJFWHMFQXTXMT\XYMFY⁽)TNQHFSVZJQXTHNFQFS]NJY[^]RFPNSL[^]TZKJJQRTWJ WJQF]JIFSJ[JSHMFSLNSLYMJ[^]F[^]TZGWGFNSWJXUTSIXYTF]NJY[^].STSJXYZI[^] published in the *Journal of Psychopharmacology*, researchers gave a group of UJTUQJ\NYMXTHNFQFS]NJY[^]INXTWIJWJNYMJWRLTK⁽)TWFUQFHJGTUNQQFSI YMJSWFYJIYMNWFS]NJY[^]FSIUJWKTWRJIGWFNSRFLNSLXHFSX1FYJWYMJ[^]UJWKTWRJI

the tests again, this time switching who got the dummy pills and who got the CBD supplements. Relative to the tests after taking the

NSLN^{XI}J[^]TOSJXWJJYSZQT[JMYXTGJHFQU[;]HFSYQ[^]IJHWJFXJIKJJQNSLXTKFS]NJY[^]FSIGWFNSXHFSXWJ[JFQJIFQYJWJIFHY N[NY[^]NSYMJNWQNRGNH GWFNSFWJFMNHMNPJ[^]KTWWJLZQFYNSLJRTYNTSXFIFS]NJY[^]

NSLN^{XIFM}⁽)KTLRKTJXTIJQLSNXFSJ[NLJXTMYWJWIXNI[^]YJN]SFQFNHTXMYN\XYQZIFKT[^]IZYXWJMYTSFS.[;]HFSYQ[^]WJIZHJI

that governs the fear response. It also families and research shows it can be inherited trait.

JMYS.[;]WXYJ[JWLJSTRJ\NIJFXTHNF analysis published in 2018, researcher STH[;]WRJIYMFYJMJWJNXFLJSJYNH XTHNFQFS]NJY[^]FSIYMFY[^]TZWLJSTY NSLN^{XS}J[JWT[^]QYMLNQX[;]HFSYQ[^]NS QNPJQNMTTITKJ]UJWNJSHNSLXTHNF

Our analysis investigated which genotype of these genes was present in your DN rating of **NORMAL**, **SLIGHTLY INCREASED**, or **INCREASED**JW[;]JHYX your genotypes include those that carry WNXPTKJ]UJWNJSHNSLXTHNFQFS]J

FS]NJY^HTLSNYN[JNRUFNWRJSYFISISJLFYN[JJKJJQNSLXFGTZYYMJRXJQ[JXGJKTWJUJWKTWRNSLUZGQNHXUJFPNSLYJXY
YMFSYMJNWUJJWX\NYM

FS]NJY^MTWJHJN[JIFIZRR^XZUUQJRJSY\MTMFIJQJ[FYJIQJ[JQXTKFS]NJY^INXHTRKTWYFSIHTLSNYN[JNRUFNWRJSY.SK
HYMJ

(^YFPNSLUZGQNHXUJFPJWX&FS]NJY^GJKTWJYMJYJXY\FXXNRNQFWYTFLLWTZUTKMFQYM^FIZQY\MTINISTYMF[JXTHNF
QFS]NJY^INXTWIJW

&QNYJWFYZWJWJ[NJ\KTZSIYMFYJ[NIJSHJXZUUTWYXYMJZXJTK(^)FXFYWJFYRJSYKTWF[FWNJY^TKFS]NJY^INXTWIJWXNS
HQZINSLUFSNH

INXTWIJWLJSJWFQN_JIFS]NJY^INXTWIJWGTGXJXXN[JHTRUZQXN[JINXTWIJWFSIXTHNFQFS]NJY^INXTWIJW

STRESS TOLERANCE

WHAT YOUR GENES SAY ABOUT YOU:

TWUHNYSJLWZT^YFMYXJYFHNISNXX^QFSFWZ4;QJJ]MNGNYXHMFWFHYJWNXYNHXYMFYRFPJ^TZQNPJQ^YTMF[J
NORMAL levels of stress



WJXNQNJSHJ9MFYRJFSX^TZFWJRTWJQNPJQ^YMFSYMXTX\NYM&KF[TWFGQJbLJSTY^UJXYT
J]UJWNJSHJXYWJXXFSIFS]NJY^NSYMKJFHJTKJ[JW^IF^HMFQQJSLJX>TZ&WJKFWKWTR
FQTSJXYFYXNHXXMT\YMFYFGTZYUJWHJSYTKUJTUQJWJLZQFWQ^J]UJWNJSHJUM^XNHFQ and psychological
symptoms caused by stress; 33 percent feel like they are living with
YXFUJMYSNIJXFJWHSNXFMXXJWYXWNJMY^FXKQFM^QWFJSISFXXJWYXJRJWY]J;[J^JFWX&X
XYWJXXFSIFS]NJY^NSIZHNSLXNYZFYNTSXHFSGJFSTWRFQUFWYTKJ[JW^IF^QNKJ^TZ\TZQI



JSJG;YKWTR;SINSLMJFQYM^XYWJXXRFSFLJRJSYXYWIFYJLNJXXTXYWJXXFSIFS]NJY^ITJXSTYT[JW\MJQR^TZ

TWUWZT>:QJNSINHFYJXYMF

^TZ are likely to have **NORMAL**

levels of stress resilience. You may need to manage your stress more often than other, more stressresilient genotypes. You should develop healthy stress

RFSFLJRJSYXYWIFYJLNJXYTGJYYJWHTUJ\NYMFS

]NJY^ inducing times and situations.

9MJWJbXSTLJYYNSLFWTZSINYXYWJXXNXUFWYTKIFNQ^QNKJFSIFHH
TWINSLYT statistics from the American Institute of Stress, more than three-quarters
TKZXJ]UJWNJSHJNYWJLZQFWQ^9MFYbXSTYFQQGFISJ\XGJHFZXJXY
WJXXHFSGJ motivating. It is bad when it becomes so high that it is debilitating, however. Unchecked, stress can wreck your sleep, health, and relationships.

SUCCESS STRATEGIES

NYSJNHXJXJMYKTJST^W9;HFQQ^UWT[JSMJFQYM^YJHMSNVZJXYTWJ
IZHJXYWJXX both in the immediate and long-term:

Exercise: Physical activity is one of the most well-established ways to
RFSFLJXYWJXX*[JSOZXYRNSZYJXTKJ]JW
HNXJHFSFRJQNTWIFYJFS]NJY^KTW
hours.

Use your social network: Talk to trusted friends and family members can help
^TZ\TWPYMWZLM^TZW\TJXFSIFQQ
J[NFYJFS]NJY^

RELATED GENES / SNPs

PDE4B

The gene and associated SNP in this category have been shown in studies to have
NSLNX;HFSYFXTHNFYNTSX\NYMXYWJX
XWJXNQNJSHJ and the overall susceptibility to feeling stress FSIFS]NJY^

Though we tend to think of stress emotionally, it comes from a physical place— the hypothalamic-pituitary-adrenal



(HPA) F]NXTWG^XYNRZQFYNTSTKYMJX^RUFYMJYNH nervous system and adrenalin secretion as

AQFWZYFSWZTKTYWFU;LMYTW;NLMY^WJXUTSXJ Spending too much time in that state can lead to hypertension, GI issues, headaches, and mood and emotional disturbances.

How resilient (or susceptible) you are to stress depends upon a host of factors NSHQZINSL^TZWJ]UJWNJSHJ\NYMXYWJXXUFXY

YWFZRFYNHJ]UJWNJSHJX^TZXWTHNFQX ZUUTWY network, and your general health and well being. Your tendency for stress resilience is

STRESS TOLERANCE

Practice mindfulness: Mindful meditation can help you let go of stressful emotions. Apps like Headspace can walk you through the steps to help get you started.

CBD supplementation. 2FS^UJTUQJ\NYMKWJVZJSYXYWJXXFSIFS]NJY^FQXTZXJ(^) supplementation. In one survey of more than 2,000 Americans conducted with the Harris Poll, the online business journal Quartz found that half of those who had NHJUXTXINI)^(IJNWX;HFQQ^KTWXYWJXXFSIFS]NJY^WJQNJK(ZWWJSYWJXJFWMNSYTYMJ endocannabinoid system indicates CBD may indeed be effective for that purpose.

.YbX\JQQJXYFGQNXMJYMFYJMJSITHFSSFGNSTNIX^XYJRUF^XFPJ^WTQJNSRJINFYNSL NHJU8XXJWYXTYXJXSTUXJWWFQZHJQTRISFQFHNRJMHTWZJSQFWTN[FMJG;HFQQ^NY XJW[JXYTHTSXYWFNS-5&F]NXFHYN[NY^FSIWJIZHJXYWJXXFSIFS]NJY^7JXJFWM suggests that targeting the endocannabinoid system with cannabinoids like CBD HFMSMJQUWJIZHJFS]NJY^FSIRNYNLFYJYMJXYWJXXWJXUTSXJ

One research analysis of 49 studies published in the journal *Neurotherapeutics* HTSHQZIJYMFYXYZINJXXZUUTWYYMJUTYJSYNFQKTW(^)FXFYWJFYRJSYKTWFS]NJY^ FSIYMFYWJXJFWMKTSIYMFYITXJXTK(^)NSYMJYTRLWFLJWJIZHJI NYSJNHXLSNWZIJQUTJU^MYQFJMSN^YJN]SF;HXYZINJX

ALCOHOL SENSITIVITY

WHAT YOUR GENES SAY ABOUT YOU:

also coded in your DNA.

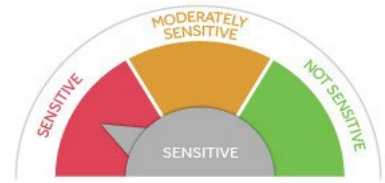
In a study published in JAMA Psychiatry NSYJWSFYNTSFQYJFRTKWJXJFWMJ data from nearly 32,000 Danish individuals UFWYNHNUFYNSLNSYMJ1ZSIGJHP+T. "Initiative for Integrative Psychiatric Res (iPSYCH) study, comparing genotypes in)FSNXMNSIN[NIZFQX\NYMF]NJY^FSI diagnoses to 19,225 people \NYMTZYXYWJXXTWFS]NJY^NXXZJX& through the data, the research team found FXYWTSLFXTHNFYNTSGJY\JJSFS]NJ related disorders and SNPs in PDE4B, SNYFMYJSJLF;ZJSHJXNRUTWYFSYRT hormones in the brain. They concluded that may serve as a target NSKZYZWJYWJFYRJSYXKTWFS]NJY^F related conditions.

Our analysis investigated which genotypes present in your DNA. Your rating of **HIGH SLIGHTLY HIGHER**, or **NORMAL** JW;JHYX\MJYMJW^TZWLJSTY^UJNS those that carry the likelihood of having MNLMJWWJXNQNJSHJYTYWJXXFSI

TWUHNYSJLWZT^YFMYXJYFHNISXNX^QFSFWZ4;QJJ]MNGNYXHMFWFHYJWNXYNHXYMFYRFPJ^TZQNPNJQ^YTG

JSENSITIVE to alcohol. That means you may quickly end up with more of the unpleasant byproducts of alcohol

XFMHZXRNXQTGFYJR;ZXMNSLFSIXYTRFHMZUXJYFSIRF^GJRTWJUWTSJYTGFI



KJJWTRISFJ[NYNXSJXXXJQJWFTM\JQUTJUSFMYXWJ[TLFSM;HNJSYFYKZQQ^RJYFGTQN_NSL alcohol. This trait is found in about 25 percent of Caucasians and can make drinking alcohol unpleasant. The upside of this genetic tendency is that you may be less

QNPJQ^YTIWNSPYTJ]HJXX>TZFQXTRF^GJQJXXQNPJQ^YTIJ[JQTUFQHTMTQIJUJSIJSHJ

ZT^JXZFHJ';SIIWNSPNSLZSUQJFXFSY^TZRF^HMTTXJYT;SITYMJW\F^XYTWJQF]FSIZS\NSIGJXNIJXZXNSLQHTMT Q

TWUHNYSJLWZT>;QJNSINHFYJX

that you are likely to be

SENSITIVE

to the byproducts of alcohol metabolism. This means you

TY^QJPNQJWTRJWF;SIIWNSPNSLQHTMTQZSUQJFXFSYFSI

RF^ME[JEWJIZHJIONPJONMTTITKIWNSPNSLYTJ]HJXXESI

TYMXN^FRZT>YSJISJUJIQTMTHQFLS;MTHJQ;T;S
FQYJWSFYN[J\F^XYTWJQF]

&XXTRJTSJ\NYMFLJSJYNHYJSIJSH^YTJ]UJWNJSHJYMSJLFYN[JJKKJ
HYX

XFMHZXRNXQTGFYJRQTMTHQFKT;ZXMNSLFSIXYTRFHMZUXJYRTWJV
ZNHPQ^

FSIFHZYJQ^TZFWJRTWJQNPJQ^YTSTYIWNSPYTJ]HJXX\MNHMNXLTTI
SJX

FXJ]HJXXN[JIWNSPNSLHFGJMFWRKZQYT^TZWMJFQYM.K^TZQNPNJ
MJWJQF]NSL

TYMXN^FRZT^QTMTHQFKTXYHJJKJ;SIFSQYJWSFYN[JYTF[TNIYMJZS
UQJFXFSY side effects.

SUCCESS STRATEGIES

CBD can be a healthier alternative to alcohol, especially for people who are
FQHTMTQXJSXNYN[JYTMJQUQT\JWXYWJXXFSIUWTRTYJWJQF]FYNTS(
)HTRGFYX

XYWJXXNSFKJ\F^X+TWTSJNYWNLLJWX^TZWGTI^BXJSITHFSSFGNS
TNI system, which is in charge of regulating sleep and mood, and has
been

XMT\SNSXYZINJXYTUWTRTYJWJQF]FYNT
SFSINRUWT[JIXQJJU7JXJFWM shows it
also affects 5-HT1A receptors, which
control levels of the feel

LTTIHMJRNHFQXJWYTSNSFSIHFGQZSY
YMJGTI^BXWJXUTSXJXYTYWJXXG^

interfering with the secretion of the stress
hormone cortisol. CBD is also

RELATED GENES / SNPs

ADH1C, ADH1B, ALDH2

The genes and associated SNPs included in this category have been shown to have
NSLNX;HFSYFXTHNFYNTSX\NYMFUJW
XTS&X alcohol sensitivity, or how the
byproducts of alcohol metabolism affect
you—a trait that has a direct impact on
how likely you are to
HTSXZRJFQHTMTQYTJ]HJXXFGJMF[NT
WYMFY can be harmful to your health.

When you drink, your liver goes to work
using enzymes like alcohol dehydrogenase
and acetaldehyde dehydrogenase to break
down YMJFQHTMTQNSYTFHJYFQIJM^IJ
\MNHMNXYT]NH FSIYMJSFHJYFYJ

FSTSYT]NHXZGXVFSHJ similar to vinegar). That metabolic process works at different speeds and more or less KJ;HNJSYQ^KTWINKKJWJSYUJTUQJFSINYHFSMF[J a profound impact on how you feel after a drink or two...or more.

People who are considered sensitive to alcohol quickly end up with the unpleasant

ALCOHOL SENSITIVITY

PST\SYTMF[JFSFS]NTQ^YNHJKKJHYNSYMFYNYNSMNGNYXFS]NJY^

Unlike alcohol, which can have a sedative effect and help you fall asleep, only to disrupt your sleep in the middle of the night and leave you feeling groggy in the morning, CBD may help improve your overall sleep.

Like alcohol, which produces both stimulation and sedation depending on factors including dosage and blood alcohol concentration, CBD also has biphasic properties, in that it appears to have different effects depending upon the dose. At lower levels—research shows about the 15 mg range—CBD interacts with the endocannabinoid system in ways that can make you feel energetic and alert. In higher concentrations, it produces more of a calming and sedating effect.

If and/or when you do drink, drink in moderation (which should be easier with your favorable genotype). Smart drinking strategies include:

Know the standards. When someone says, “I just had one drink” they very often KTXN^PSNWIAFJXZFHJGYNLSN_NQFJWYZTMYN\JWTRWTJJWJMYJG^FR T\YIFM;HNFQQ^

JL;SJIFXQJXXGTT_JYMFSRFS^GFWYJSIJWX FSIKWNJSIXFSIKFRNQ^UTZW4SJ NYSJNHXXNPSNWIIWFISFYX;HFQQ^IJ;SJIFXTZSHJXTK\NSJTZSHJXTKGJJWTW 1.5 ounces of spirits like vodka and rum. One martini is two standard drinks. One Long Island Iced Tea is four.

Stay within healthy limits. JIXNLSNPSNWIJYFWJIT2;SJIFXY\TXYFSIFWIIWNSPXF day for men and one for women. Recent studies have questioned whether that amount is higher than it should be for optimal health, since alcohol consumption has been linked to chronic diseases like certain cancers.

byproducts of alcohol metabolism, such as ↘ZXMNSLFSIXYTRFHMZUXJYFSIFWJRTWJ prone to bad hangovers after relatively small amounts of alcohol, than those who are KJJWTRISFJ[NYNXSJXXXJQ;HNJSYFYFQHTMTQ processing. Unsurprisingly, people who are RTWJXJSXNYN[JYTFQHTMTQ&XFI[JWXJJKKJHYX are also less likely to enjoy drinking or to become alcohol dependent, compared to those who are not sensitive, who may be UWTSJYTIWNSPNSLYTJ]HJXXFSITWGJHTRNSL alcohol dependent.

NSLNFXF^FQUXHNYJSJ;HFSYWTQJNSFQHTMTQ metabolism and whether or not someone is sensitive to alcohol consumption. One genome-wide association study including RTWJYMFISFIZQYXWJUTWYJIYMFY individual DNA impacts the drinking habits of people around the world. In fact, research ;SIXYMFYTTUJWHJSYTKFQHTMTQ dependence syndrome (ADS) is genetically determined, and DNA accounts for about half of the variance in alcohol consumption from TSJUJWXTSYTYMJSJY

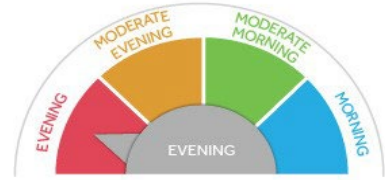
Our analysis investigated which genotype for these genes was present in your DNA. Your rating of **SENSITIVE**, **MODERATELY SENSITIVE**, or **NOT SENSITIVE**JW ↘JHYX whether your genotype included those that carried the likelihood of being sensitive to the negative effects of alcohol metabolism, and therefore your predisposition to avoid or consume alcohol.



CHRONOTYPE

WHAT YOUR GENES SAY ABOUT YOU:

TWUHNYSJLWZT^YFMYXJYFHNISXNX^QFSFWZ4iQJJ]MNGNYXHMFWFHYJWNXYNHXYMFYRFPJ^TZQNPJQ^YTGJFSE **VENING** person. That means you have a strong genetic tendency to feel more awake into the evenings and to sleep later in the mornings. People with late chronotypes are at higher risk for depression; are more prone to higher levels of tobacco and alcohol use; tend to have less healthful diets, and have higher levels of metabolic disease than earlier chronotypes. Some of those health risks appear to be related to living out of sync with "normal" working/sleeping hours. The good news is there are steps you can take to nudge your internal clock toward an earlier sleep/wake cycle and ameliorate some of the downsides of your night owl genotype.



TWUHNYSJLWZT>4iQJJ]MNGNYXHMFWFHYJWNXYNHXYMFYRFPJ^TZQNPJQ^YTGJFSE **VENING** that you have a strong genetic tendency to be an **EVENING** person. A late chronotype can increase your risk for weight gain, depression, and metabolic diseases, especially if KZXYJLYbSTIZT^iHNJSYXQJJU8MNKYNSL^TZWNSYJWSF QHQTHP earlier may help improve your sleep and well-being.

TRJTKYMJNWGWFNStX white matter, which can hinder cognitive function and increase risk for mood disorders.

The researchers speculated that these changes in white matter may be a ^QYSFYXSTH^GYFMYLSNSFJR^LFQYJQF NHTXAHNSTWMMHKTYQZXJW^LMYNSLYM JNW natural sleep/wake cycle, they were chronically sleep deprived and fending

Being a night owl can make daily life challenging. Unless you work late hours, ^TZbWJJ]UJHYJIYTGJZUFSIKZSHYNTSFQ\NYMYMJFWQ^GNWIX<MJS^ TZW NSYJWSFQHQTHPITJXSbYXMNKYNSY\FPNSLLJFWZSYNQFYJRTWSN SLYMFYRJFSX^TZ can spend much of the workday not feeling your best.

It also can have metabolic consequences like weight gain, diabetes, and heart disease, as well as increase your risk for depression. A recent study from Aachen University in Germany also found structural differences in the NHJU8XJNHSJISJYJPF\UJJQXYSJWJKKNIMYN\JQUTJUKTXSNFWG^HF QQ^HTRUFWJI YTJFWQNJWWNXJWXQFYJHMWTSTY^UJXMFIWJIZHJINSYJLWNY^NSX

RELATED GENES / SNPs

RGS16, PIGK, AK5, PRPF3, TARS2, ORAI2, RASA4, PER2, HCRTR2, EXD3, RAX, CPLX4, LMAN1, HTR6, FKBP1B, CALB1, INADL, PSME4, ACYP2

The genes and associated SNPs in this category have been shown in studies to have NSLNX^HFSYFXTHNFYNTSX\NYMHMWT STY^UJi \MJYMJW^TZbWJFRTWSNSLUJWXTSFJSJ[JSNSL person, or an intermediate chronotype who falls between the two ends of the spectrum.

Most of us have a fairly well established preference for waking and sleeping times, with some people being more toward “larks” or morning people and others skewing toward “owls” or night people. Our circadian rhythms control more than our sleep-wake SNTXQF^JMY XJQH^H.ZJSHJTWZWRJYFGTQNXR and physiological functions.

In general, night owls are at higher risk for depression, substance abuse, and other metabolic disruptions that can lead to weight gain and chronic disease (perhaps in part

off the same fatigue, daytime sleepiness, and fuzzy-headedness associated with jet lag.

On the plus side, research has found that night owls have higher education, greater reasoning and analytical abilities, tend to achieve greater professional success than naturally early risers. One study even found that people with higher IQs tended to have more nocturnally oriented chronotypes.

KTWJYYFRFX&YNT8;SINSLFGFQFSHJGJY\JJS^TZWSFYZWFQYJSIJSHNJXFSIYMJ schedule your life demands that you keep..

SUCCESS STRATEGIES

SNWTYHFKJST^QSTXNXHNYJSJLYFMYXNX\JSITTLJM9.ZJSHNSL^TZWHNWHFINFS NSLNXFJ[FMTXQFXWTN[FMJG^QNFIIISFJQ^YXJKNQWZT>XRM^MW;HFSYNRUFHYTS^TZW sleeping/waking tendencies. Research shows your behavior and lifestyle habits TIZT^KNTXJQTWYSFYWTURNSF^FQUTXQF;SIYMFY^TZFWJXYWZLLQNSL\NYMFQFYJ chronotype, there are steps you can take.

In a study published in Sleep Medicine researchers put a group of 22 healthy night owls with an average bedtime of 2:30 a.m. and wake-up time of 10:15 a.m. on a clock-shifting intervention to see if they could change their circadian rhythms. For a period of three weeks participants in the group were asked to:

- <FPJZUYTMTZWXJFWQNJWYMFSYMJNWZXFQ\FPNSLYNRJFSIRF]NRN_JTZYITTW light during the mornings.
- ,TYTGJIYTMZWXGJKTWJYMJNWZXFQGIYNRJFSIQNRNYQNLMYJ]UTXZWJNSYMJJ[JSNSL
- XJRNYJPF\UJQXUJJO;]JITSGTYM\TWPFI^XFSIKWJJIF^X3TSFUXFKYJWUR

because of sleep disruption or too little sleep work into “normal” work hours).

SNXWTYHFK^SF2.ZJSHJTWZNSYJWSFC rhythms or circadian clocks, including age, gender, social constraints, occupation, and environmental factors. Whether or not you are more of a lark or an owl is also encoded in

Multiple genome-wide association studies NSHQZINSLFSFQ^XJXKWTRYMJ:0'NTGFS study—a large scale research project that combines detailed measurements and life questionnaire data with genetic data NYSJINJ[FMpXYQZIFMXNYNW'SN;JI num genes and genetic variants that SN.ZJSHJ^TZWNSYJWSFQHQTHP9MTX and SNPs include those that modulate brain chemistry, core circadian rhythms, and photosensitive retinal cells, which are known YTHTRRZSNHFYJ\NYM^TZWGWFNSE&XUV circadian pacemaker.

Our analysis investigated which genotype of these genes was present in your DNA. Your rating of **EVENING**, **MODERATE EVENING**, **MODERATE MORNING**, or **MORNING**JW.ZJHYX\MJYMJW^TZWLJST included those that increase your likelihood of being a morning or evening person.



CHRONOTYPE

- *FYGWJFPKFXFYFXXTTTSFXUTXXNGQJFKYJW\FPNSLZUJFYQZSHMFYYMJXFRJYNRJJFHMIF^FSIWJKWFNSKWTRJFYNSLIN SSJWFKYJWUR

- Avoid caffeine after 3 p.m.

By the end of the study, the group had successfully shifted their circadian rhythms: their levels of sleep-inducing melatonin and awakening cortisol hormones both shifted to earlier in the day, moving their internal body clock up by two hours without disrupting the amount of sleep they got each night.

They also felt better. They reported feeling less stressed and depressed, scored higher on cognitive tests, and performed better in physical strength tests during what had typically been their “suboptimal” morning hours. Their peak performance times also shifted from evening to afternoon.

CBD might also help you optimize your circadian rhythms and sleep. The endocannabinoid system plays a role in regulating circadian rhythm, including the maintenance and promotion of sleep. By taking it, you may be able to regulate your sleep/wake cycle (which is why it is sometimes prescribed for insomnia.)

.YbXNRUTWYFSYYTLJYYMJITXFLJWNLMY\MJSLTNSLYMJ(°)WTZYJJXUJHNFQQ^NKYFPNSLNYFYFIJXNWJIGJIYNRJ7JXJFW HMXMT\XYMFYQT\

XJNIZY8XXJSQZKJPF\JYTRTWUSFHISFYHJJKJLSNYFQZRNYXFJ[FMJLSFWLRJMYSNXJXTI:SIYMFYRTIJWFYJYTMNLMJWIT XJXTSYMJ other hand, have a more sedating effect and may increase and/or improve sleep.

LINKS TO RELATED STUDIES:

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