

Rewiring the Brain

for Lifelong Recovery



SILVER RIDGE

A PREMIER PROGRAM BY PYRAMID HEALTHCARE



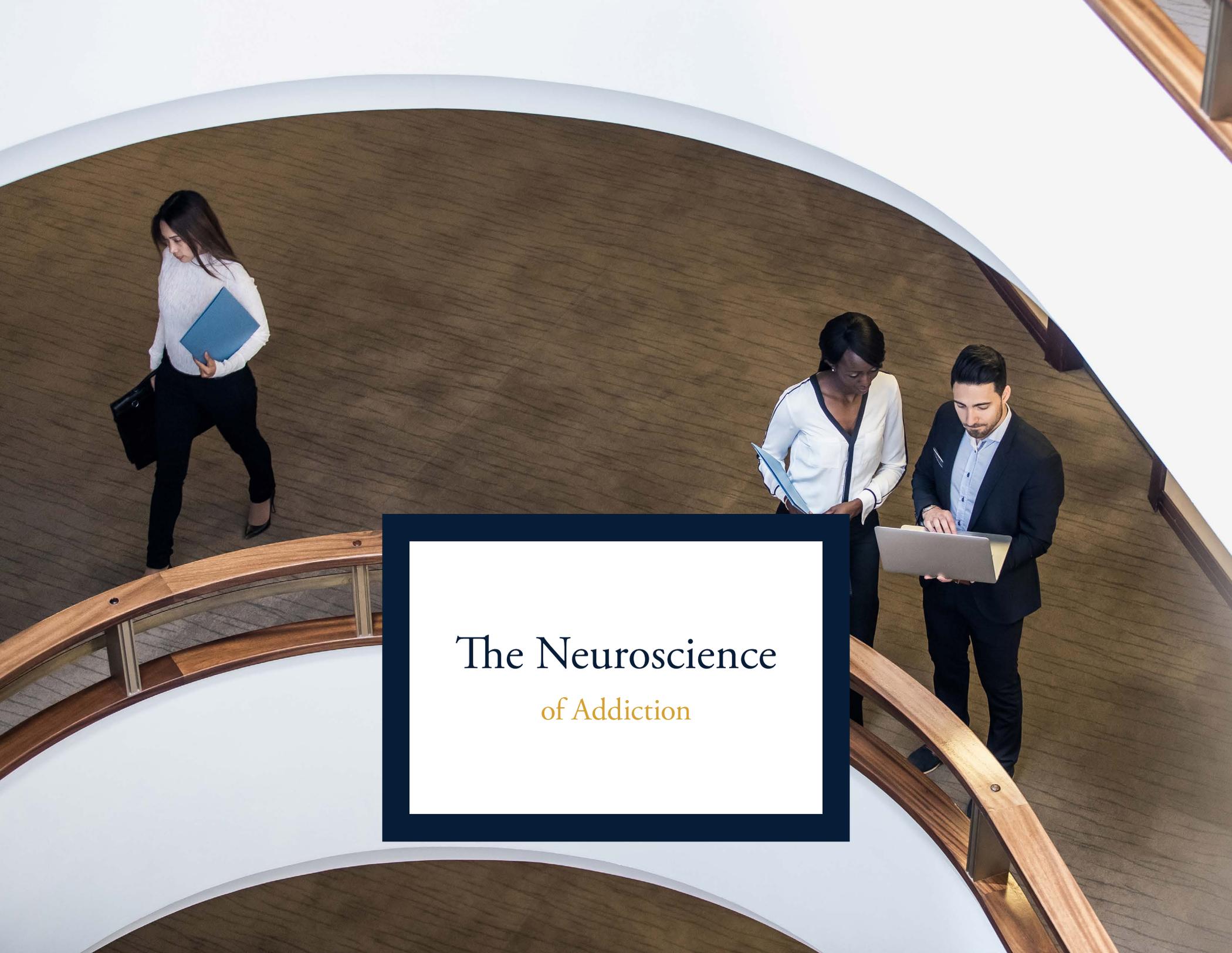
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Addiction is a complex disease, marked by changes in the brain's chemical functions and physical structures. Successful recovery is all about rewiring the brain.

Let's take a look at the addicted brain and explore what it takes to rewire it for lifelong recovery.



The Neuroscience
of Addiction

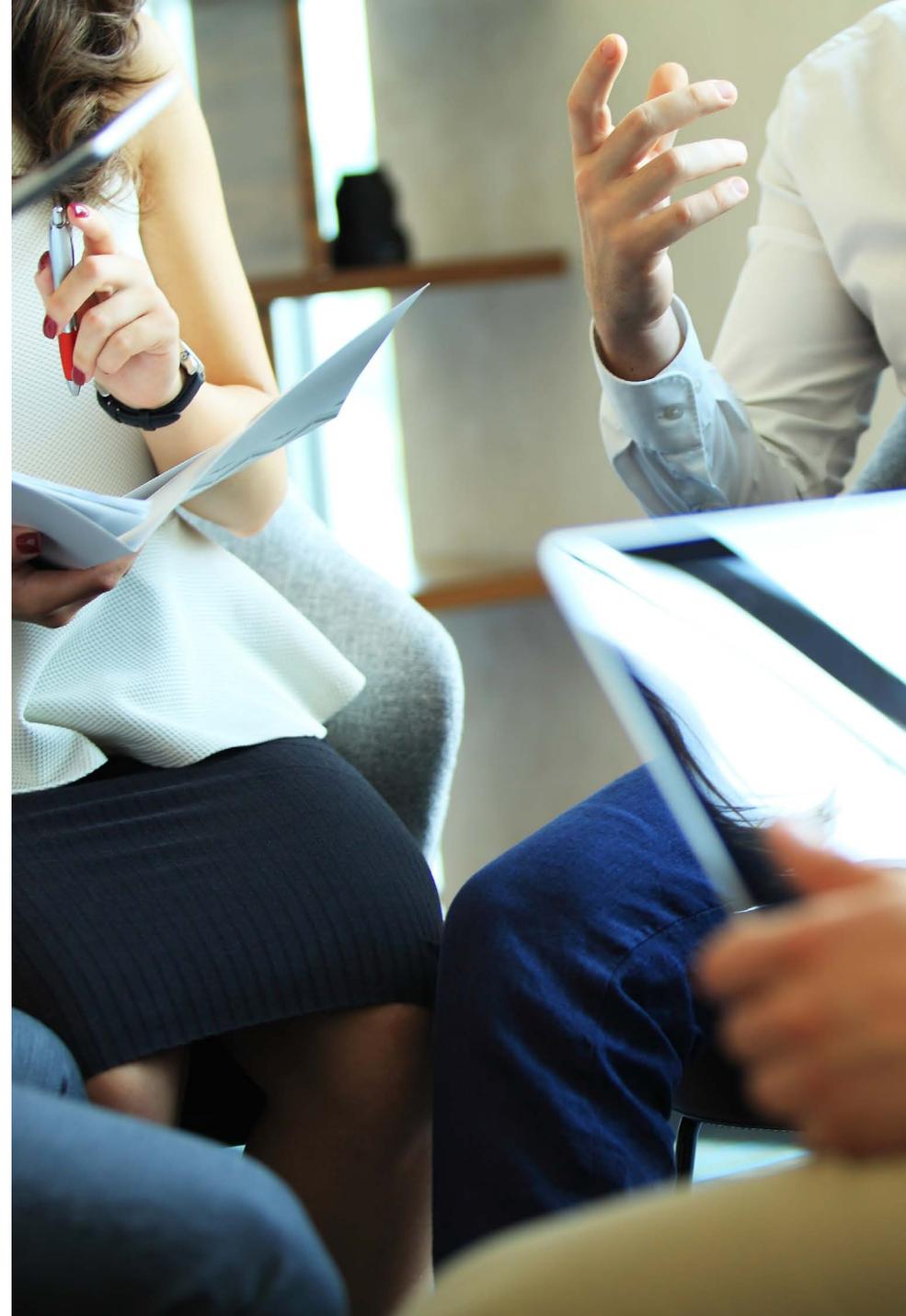
To understand how to rewire the brain after addiction, it's important to understand how addiction affects it.

A Quick Primer on Brain Function

The brain is a complex network of around one hundred billion neurons. Neurons are nerve cells that send chemical and electrical messages throughout the body to control everything we do, think and feel. Neurons have a transmitting end and a receiving end. Between each neuron is a gap called a synapse.

When a neuron needs to send a message, it manufactures chemicals called neurotransmitters, which are stored in packets called vesicles. An electrical signal causes the vesicles to open up and release the neurotransmitters into the synapse. The chemicals travel across the synapse and link up with the receptors on the receiving neuron like a key in a lock.

Once the message is received by the receiving neuron, the neurotransmitters disconnect from the receptors, move back into the synapse and re-enter the sending neuron to be used again next time. The process of neurotransmitters leaving the synapse and re-entering the neuron is called "reuptake."



Different drugs act on different types of neurotransmitters in varying ways by increasing or reducing chemical activity or preventing reuptake so that chemicals act on the neurons for a longer period of time. How a drug acts on a specific neurotransmitter determines the effects you feel.

One thing all drugs have in common is that they all produce a dopamine rush in the pleasure center of the brain. Dopamine, a feel-good neurotransmitter, produces feelings of pleasure, and it's an important chemical in the learning, reward and memory processes in the brain.



How Drug Abuse Transitions to Addiction

Addiction is characterized by compulsive drug or alcohol use despite the negative consequences of using. People who are addicted to drugs or alcohol have lost control over their use and will use more or for longer periods of time than they intend. They may want or try to stop using, but find they can't—at least, not for the long-term.

Addiction causes a rewiring of the brain's reward system. The reward system is a collection of brain structures and neural pathways that govern motivation and desire. It produces the positive emotions that come with pleasure. The reward system is where classical conditioning takes place—remember Pavlov's dog, which was conditioned to salivate every time a bell rang because it associated the bell with getting fed.



**WHEN YOU TAKE DRUGS, THE HIPPOCAMPUS,
OR THE MEMORY CENTER OF THE BRAIN,
RECORDS A MEMORY OF THE INTENSE
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The reward circuit is designed to help us stay alive and perpetuate the species by associating certain life-sustaining activities—eating food, having sex, exercising—with pleasure. Pleasure and reward are extremely powerful motivators that ensure we keep doing these activities.

According to Harvard Medical School, all pleasure is registered by the brain in the same way, whether the pleasure is produced by a cupcake, a kiss or binge-watching Netflix.¹ Whatever the activity, the brain carefully controls the amount of dopamine that's released. But drugs serve as a shortcut to pleasure, and they flood the brain with up to 10 times the amount of dopamine that's naturally released. This causes greater feelings of pleasure than nearly anything in nature can produce.

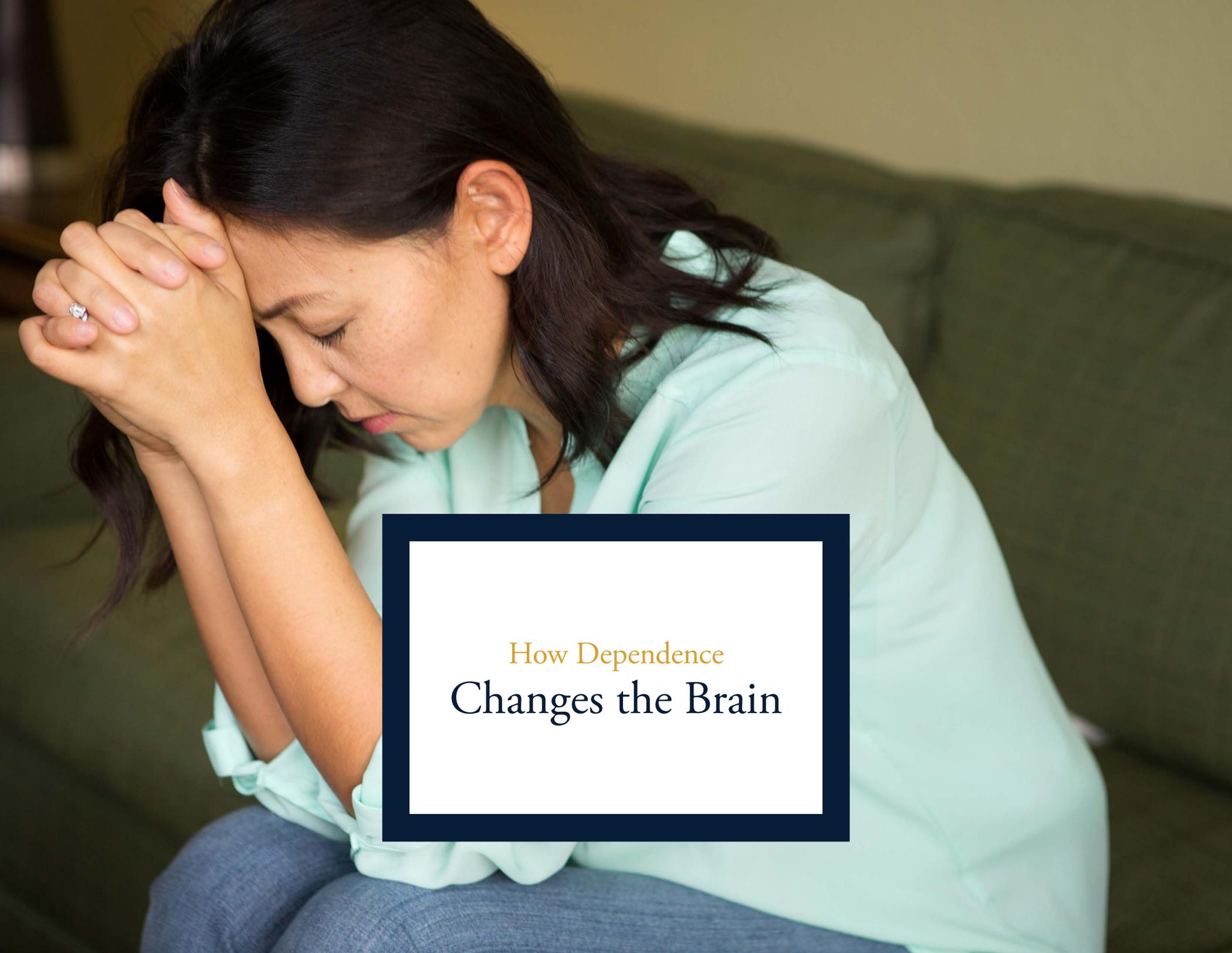
When you take drugs, the hippocampus, or the memory center of the brain, records a memory of the intense pleasure they produce. The amygdala creates a conditioned response to the environmental cues that are present during using. The cues can be people, places, things or emotions, and these become triggers for cravings once the addiction develops.

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Repeated heavy drug use leads to ironclad associations between the drug, the environmental cues and the pleasure. The brain's learning, reward and memory centers communicate in a way that motivates us to seek out the source of the pleasure again and again. This leads to new pleasure-related physical pathways in the brain that produce a powerful conditioned response of intense cravings when the environmental cue, or trigger, is present.

The changes in key brain regions and the cravings they produce ultimately lead to the uncontrollable need to take the drug at any expense. They also lead to dysfunctional thought and behavior patterns that perpetuate the addiction. People who are addicted believe they can't cope without the drug, and they will do everything in their power to obtain it, including things they may not have done before the addiction developed. No matter how hard they try, most can't end their addiction for good without help.

For most people, successful recovery depends on a high-quality treatment program that helps them identify and change these self-destructive thought and behavior patterns by rewiring—or creating new pathways in the brain—to form new habits that promote good health, positive emotions and feelings of well-being.



How Dependence
Changes the Brain



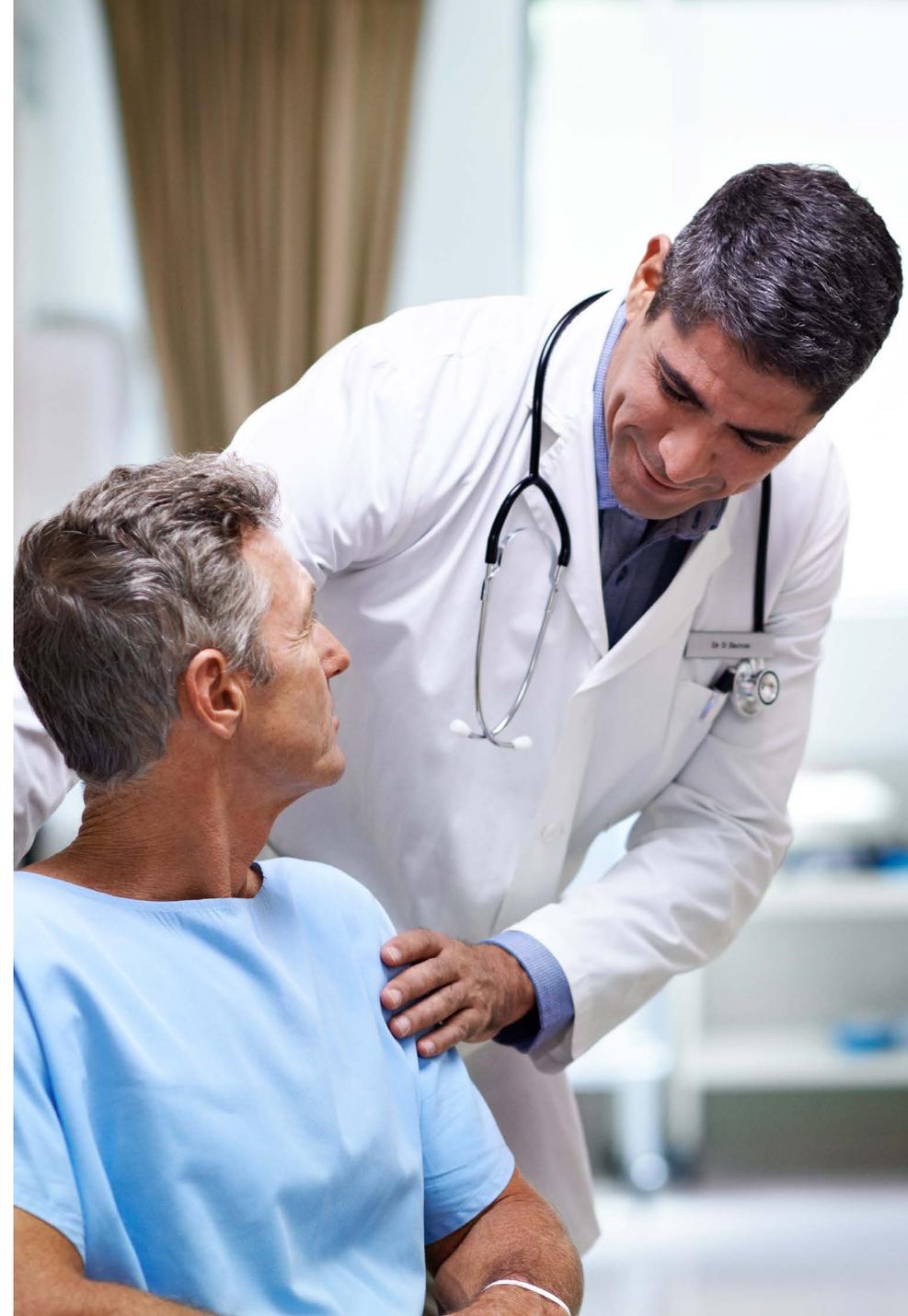
Addiction and dependence aren't the same thing, although they're usually diagnosed together under the umbrella of "substance use disorder." Dependence is a physical, rather than psychological, need for a drug. It's characterized by physical withdrawal symptoms that occur when you suddenly stop using drugs or alcohol.

When you heavily abuse drugs, the brain adapts by changing the activity of involved neurotransmitters. For example, in response to large, unnatural surges of dopamine, the brain will reduce the activity of the dopamine system to compensate. This leads to tolerance, which means that you need increasingly larger doses of the drug to get the same effects that a smaller dose once produced.

As you continue to increase the amount of drugs you take, the brain continues to adapt. At some point, a shift in neurotransmitter activity may occur, and the brain may begin to need the drug in order to operate in a way that feels normal. Then, when you quit using, normal neurotransmitter activity rebounds and produces unpleasant physical symptoms like headache, nausea and vomiting, seizures and shifts in heart rate and blood pressure. In some cases, withdrawal symptoms can be dangerous or even deadly.

Medical detox is the first step in treatment if dependence has developed. Detox is the process of allowing all traces of the drug to leave the body so that the chemical function of the brain can return to normal. Medical detox is supervised by medical and mental health professionals who administer a variety of medications as needed to reduce the severity of withdrawal symptoms and help the brain return to normal more quickly.

In the case of opioid dependence, medication-assisted treatment has been shown to be the most effective way to handle dependence and promote successful recovery from the addiction. Medication-assisted treatment involves taking medication that prevents withdrawal symptoms—including intense cravings—from occurring while helping to normalize brain function so that individuals can focus on beating the addiction.





How Stress, Trauma
and Mental Illness
Affect the Brain



ADDICTION ALMOST ALWAYS HAS UNDERLYING CAUSES. THE MOST COMMON ARE CHRONIC STRESS, A HISTORY OF TRAUMA AND MENTAL ILLNESS.

Addiction almost always has underlying causes. The most common are chronic stress, a history of trauma and mental illness, and each of these affects the brain in a variety of ways, increasing the risk of substance abuse and addiction.

At any time—but especially when they occur in childhood—stress, trauma and mental illness affect the brain. They prevent the development of healthy coping skills, feelings of self-worth and a sense of competence in the world. They can prevent the brain from developing intimacy skills, self-motivation and a sense of identity. They can promote the development of guilt, feelings of inferiority or worthlessness, a fear of commitment and the inability to trust other people.

All of these issues contribute to the substance abuse that leads to addiction. People who have a history of trauma, live with mental illnesses like anxiety and depression or suffer from the kind of chronic stress that comes from poverty or abuse are likely to self-medicate with drugs or alcohol in an attempt to feel better. Over time—quickly or slowly, depending on a number of factors—this can lead to addiction and dependence.

Successfully treating addiction requires addressing its underlying causes. This includes getting symptoms of mental illness under control, developing a higher level of self-awareness and self-esteem and learning essential coping skills for dealing with negative emotions.

Treatment for substance use disorders is all about rewiring the brain to think and behave in healthy ways, to experience positive emotions naturally and to effectively cope with negative emotions and experiences. The Substance Abuse and Mental Health Services Administration stresses that there is no single pathway to recovery that works for every individual.² Addiction is highly complex and very personal, and successful recovery depends on an individualized treatment plan that addresses an individual's specific and unique needs, issues, problems and challenges.





Traditional "Talk" Therapies for
Rewiring the Brain

Psychotherapy, or "talk" therapy, is the foundation of successful addiction treatment programs. According to the National Institute on Drug Abuse's Principles of Effective Treatment, cognitive-behavioral therapy is the most widely used and successful therapy for addiction.³ However, a holistic approach to addiction treatment will involve a variety of therapies that address a range of issues and help rewire the brain from many different angles.

Cognitive-Behavioral Therapy

The cornerstone of high-quality treatment is cognitive-behavioral therapy, or CBT. This therapy helps people identify their dysfunctional thought patterns, such as black-and-white thinking, catastrophizing, jumping to conclusions and focusing on the faults of others. Since thoughts turn into behaviors, learning to think in healthier ways promotes healthier behaviors. CBT also helps people develop essential coping skills for dealing with stress, cravings and other triggers for relapse. The skills people learn in CBT help them successfully navigate recovery once treatment is complete.⁴



Family Therapy

Addiction has a powerful impact on the family system and leads to household dysfunction and problematic communication among family members. Family dysfunction is an important trigger for relapse. Family therapy helps rewire the family brain, so to speak, so that each member of the family can heal from the effects of the addiction and the family can learn healthy ways of communicating and behaving with one another.

Motivational Interviewing

Because of the way addiction affects brain function and thought patterns, many people who are addicted are conflicted about recovering. An individual may want to stop using while also wanting to keep using. Quitting can be a scary thing when your identity is wrapped up in using and you believe you need drugs or alcohol in order to cope with or enjoy life. Motivational interviewing helps individuals move from ambivalence or uncertainty about recovery to finding their own intrinsic motivation for making positive decisions that promote recovery.

Pharmacotherapy

Pharmacotherapy, or the use of medications, is an important therapy for people who have a co-occurring mental illness like anxiety or depression. Treating the symptoms of mental illness through therapy and medication is a major factor for successful recovery and an improved quality of life.

Contingency Management

So powerful is the reward system in the brain that offering tangible rewards for abstinence has been shown to be an effective way to rewire the brain and promote healthy choices in early recovery. Contingency management draws on the neuroscience of reinforcing positive behaviors and

involves offering cash, prizes or vouchers in exchange for a clean urine test. An article in the *Psychiatric Times* cites studies finding that contingency management programs dramatically improve retention in treatment and promote long-term abstinence once treatment is complete.⁵





Complementary Therapies for
Rewiring the Brain



A high-quality treatment program will offer complementary therapies, which have been shown through research to be effective for treating addiction when used along with traditional behavioral therapies.

Yoga

Yoga reduces stress, increases body awareness and promotes good physical and mental health. The American Psychological Association cites research showing that yoga helps reduce anxiety and depression and helps to heal emotional wounds.⁶ Harvard Medical School cites a study that found yoga helps reduce the severity of symptoms associated with post-traumatic stress disorder, common among trauma survivors.⁷

Meditation

Meditation continues to gain popularity in mainstream medicine for its powerful benefits to the brain. Meditation puts the brain in the alpha brainwave state, which is a calm, relaxed and focused state of mind. Not only that, but it helps rewire the brain to better access the alpha state at any given time. This leads to lower stress levels and an improvement in how external events affect you, according to researchers at MIT and Harvard University.⁸

Regular meditation practice leads to a deep level of self-reflection and self-awareness, which help individuals better cope with cravings and stress. It promotes mindfulness, which is the state of being aware of the present moment and is essential in recovery.

Recent research shows that meditation actually changes the physical structures of the brain, including increasing gray matter volume and increasing the cortical thickness in areas of the brain that govern memory and the regulation of emotions. A Harvard study found that regular meditation leads to decreases in brain cell volume in the amygdala, which governs feelings of fear, anxiety and stress.⁹ In some people, according to the study, meditation relieves symptoms of depression as effectively as antidepressants.

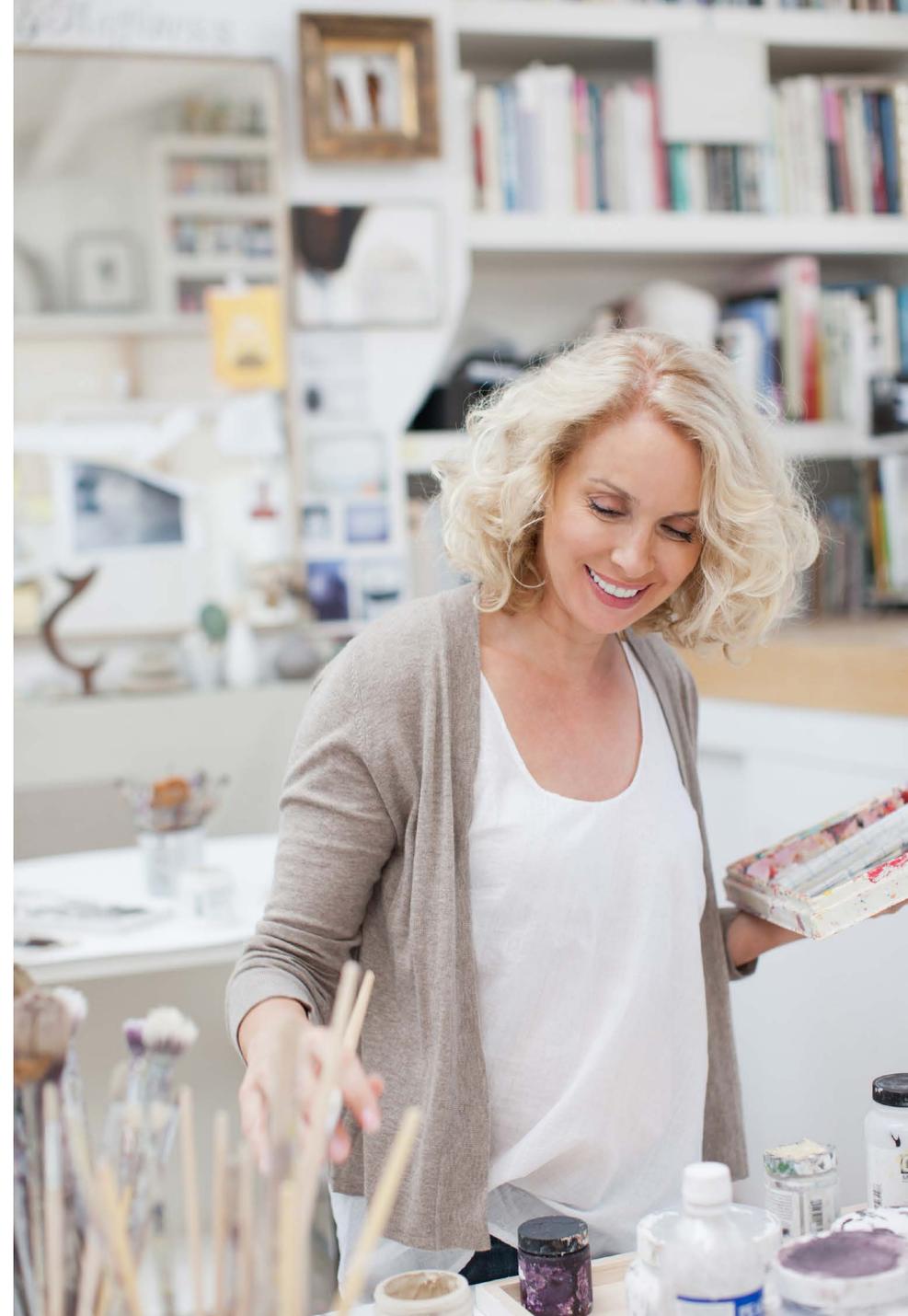
Biofeedback

Biofeedback is a therapy that helps rewire the brain by teaching individuals to use their brain to control the body's response to stress. Participants are hooked up to a machine that displays, in real time, body functions like skin temperature, muscle tension, heart rate and blood pressure. Through techniques like deep breathing and visualization, participants reduce the stress response while they watch their progress on the screen.

Art Therapy

Art therapy has been shown through research to reduce denial and increase motivation to recover. Art therapy helps individuals synthesize difficult emotions and express themselves through creative exercises.

A study published in the *American Journal of Public Health* cites a large body of research showing that arts-based therapies help heal emotional wounds through increased self-awareness and deeper self-reflection.¹⁰ These therapies have also been shown to help alter dysfunctional patterns of thinking and behaving.





Other Things You Can Do to
Optimize Brain
Health

While a number of therapies can help rewire the brain, there are a few essential tasks in recovery that help the brain recover from addiction and promote the healthy thoughts, behaviors and emotions that sustain recovery for the long-term.

Sleep. Optimal brain function requires adequate sleep, which is essential for memory formation, mood regulation and mental clarity. Getting enough sleep each night is crucial for good brain health, emotional stability and focus, all of which promote ongoing recovery.

Eat healthy food. The food you eat has an important effect on brain function. The brain needs certain nutrients for optimal chemical function, and eating a nutritious diet goes a long way toward maintaining a stable mood, preventing cravings and optimizing mental function, including tasks like thinking, learning and concentrating. A healthy diet is one that's mostly plant-based and includes a variety of fruits, vegetables, whole grains and beans along with lean proteins and plenty of fish.

Exercise. Physical exercise triggers the release of dopamine, serotonin and other feel-good brain chemicals that lead to feelings of pleasure and well-being. Regular exercise helps prevent a wide range of illnesses and promotes a stable mood for better overall physical and mental health.





Enjoy hobbies. Having hobbies and spending time each day enjoying yourself are very important in recovery. Hobbies promote the alpha brainwave state, fostering feelings of calm, relaxation and well-being. They promote feelings of pleasure and lead to goal-setting, self-satisfaction and self-confidence. Hobbies can also be an important source of social support and feelings of belonging, which are central to successful recovery.

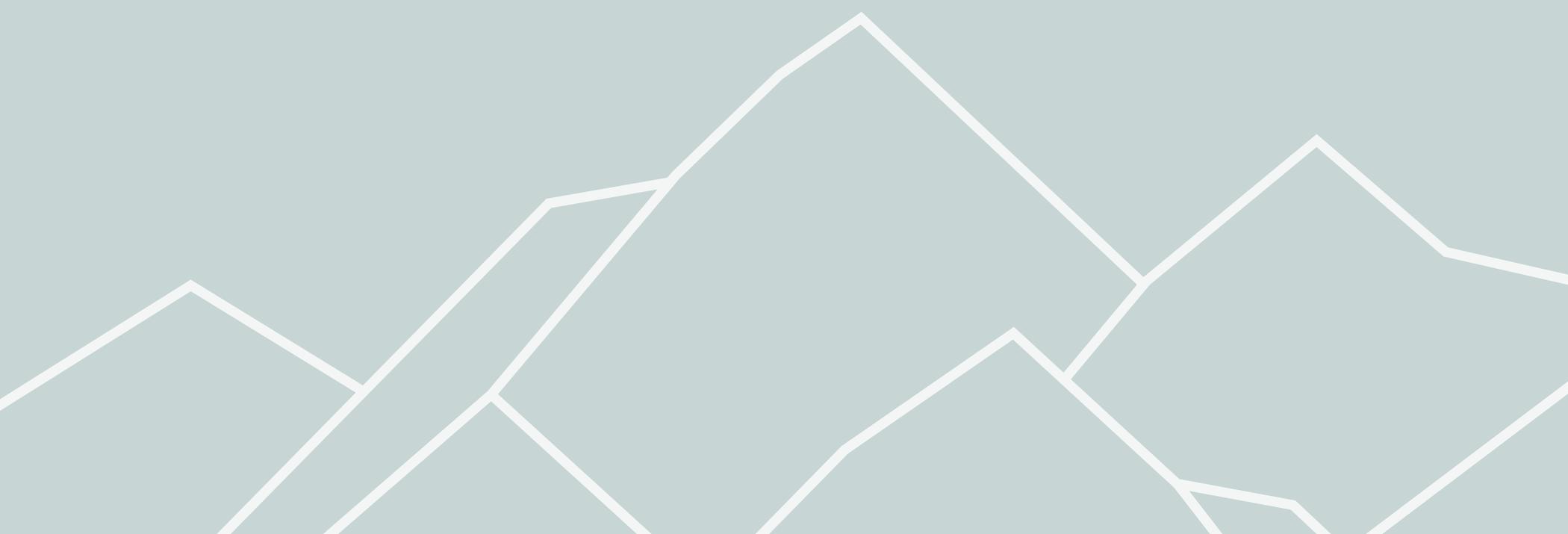
Identify purpose and meaning. Having a sense of purpose and meaning in life changes how you view yourself and the world. According to the burgeoning field of positive psychology, purpose and meaning come from identifying and using your inherent strengths every day and behaving according to your personal values. When these things occur, the result is authentic happiness, and people who are authentically happy don't feel a need to alter their state of mind or cope with unpleasantness by using drugs or alcohol.



A Better Brain
Through Treatment

The National Institute on Drug Abuse stresses that willpower and good intentions are rarely enough to end an addiction for the long-term.¹¹ Successful recovery requires new, healthier ways of thinking about yourself and the world you inhabit.

Recovery is a process of positive change that starts in the brain and radiates outward through healthier thoughts, attitudes and behaviors. A holistic treatment program addresses complex issues of body, mind and spirit for greater self-awareness and better mental health. Treatment can help you rewire your brain to end an addiction once and for all.

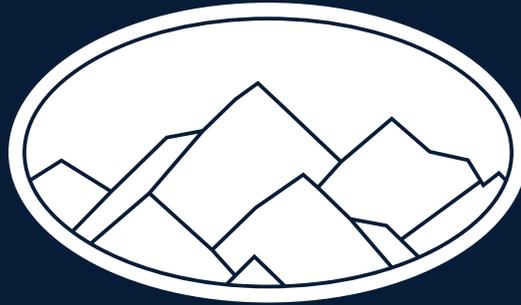


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Silver Ridge serves established midlife adults who need to retreat discreetly from their daily lives. Here, we provide the perfect setting to focus on the addictions compromising your relationships, your future and your legacy.

Every great legacy has a strong foundation. Build yours here.