FACING ADDICTION WITH HOPE AND UNDERSTANDING

# The Science of Forgetting to Remember: How Emerging Research on Addictive Memory Offers New Hope for Families Facing Relapse

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## INTRODUCTION:

For families who have watched a loved one return to substance use after months or even years of sobriety, the pain of relapse can feel incomprehensible. Why, after so much effort, so much progress, does the pull of addiction reassert itself so powerfully? Increasingly, neuroscience is providing answers — and those answers are generating genuine hope. A 2025 study published in the Bulletin of Experimental Biology and Medicine by Beregovoy and colleagues examines a promising biological mechanism that may one day reshape how clinicians approach relapse prevention: the targeted disruption of addictive memory itself.

This research matters deeply to families because relapse is not a moral failure. It is, at its core, a memory problem — a neurological phenomenon rooted in how the brain encodes and preserves the emotional and sensory associations of substance use. Understanding this distinction between character and chemistry is not merely academic. It is the foundation upon which compassionate, hope-based support for loved ones must be built.

## ANALYSIS OF PRIMARY SOURCE:

The Beregovoy study investigates the effects of myelopeptide MP5, a naturally occurring peptide derived from bone marrow cells, on the extinction of addictive memory in laboratory mice. Using a conditioned place preference model — a standard experimental design in which

animals learn to associate a specific environment with the rewarding effects of a drug — researchers found that MP5 significantly accelerated the extinction of morphine-induced place preference in C57BL/6 mice. Crucially, the peptide also preserved synaptic plasticity in the hippocampus, the brain region most associated with learning, memory formation, and spatial navigation.

The study notes that "the rapid formation and high stability of addictive memory are the main causes of frequent relapse of alcohol and drug diseases, which limits the possibility of complete recovery" (Beregovoy 2025). This framing is essential. Relapse is not evidence of weak willpower or insufficient motivation. It is the expression of a memory system that has been profoundly and durably reorganized by prolonged substance exposure. The hippocampus, when flooded repeatedly with drug-associated cues, forms connections of extraordinary stability — connections that environmental triggers, emotional stress, or even familiar sensory experiences can suddenly reactivate, sometimes years after active use has ceased.

What makes MP5 particularly noteworthy is the dual nature of its effect. It does not merely suppress memory — an approach that risks broader cognitive impairment — but instead accelerates extinction while simultaneously supporting the synaptic flexibility necessary for new, healthy learning. The contrast with MP2, which produced no such effects in the same study, suggests a highly specific mechanism rather than a general immunomodulatory response. For families, this distinction holds promise: future treatments may one day help a loved one's brain more readily form the new associations that sustained recovery requires, without erasing the cognitive capacity needed for rebuilding a life.

## SUPPORTING RESEARCH CONNECTIONS:

The mechanisms explored in the Beregovoy study gain additional context when considered alongside current understanding of neuroplasticity

more broadly. Reporting drawn from Verywell Mind's widely read educational resource on how neuroplasticity works describes the brain's capacity to reorganize itself by forming new neural connections throughout life. This principle is directly relevant to addiction recovery: the same plasticity that allows the brain to encode addictive memory with such tenacity is also the mechanism through which recovery, behavioral change, and the formation of healthier habits become possible. For families, this is a message of genuine hope — the brain that was changed by addiction is also a brain capable of being changed again, given the right conditions, support, and time.

Research on neuronal plasticity during motor rehabilitation following spinal cord injury, covered in Nature, offers a compelling parallel from a different clinical domain. Studies in rehabilitation science have demonstrated that intentional, structured training following neurological injury can stimulate the reorganization of neural pathways and support functional recovery — outcomes that would have seemed impossible under older, more static models of brain function. The implication for addiction recovery is significant: therapeutic environments, behavioral interventions, and relational support are not merely psychological comforts. They are neurologically active experiences. Every therapy session, every supportive family conversation, every structured routine that replaces a drug-seeking behavior may be, at the cellular level, contributing to the rewriting of entrenched neural patterns.

The COVID-19 pandemic research published in Wiener klinische Wochenschrift, which examined how delayed treatment during strict lockdown measures affected patient outcomes in time-sensitive nerve surgery cases, introduces a sobering but important dimension. The study underscores that neurological and physiological recovery processes are not infinitely patient — timing matters, and delays in accessing appropriate care can meaningfully impact outcomes. For families navigating addiction, this parallel is instructive. Waiting for a loved one

to "hit bottom" before seeking help, or delaying connection to evidence-based treatment while hoping the problem resolves on its own, may allow neurological patterns of addiction to deepen and stabilize further. The emerging science suggests that earlier, more proactive engagement with treatment — when synaptic patterns remain more malleable — may be meaningfully advantageous.

## SYNTHESIS:

What emerges from reading these sources together is a coherent and deeply human narrative about the nature of change. The brain is not a fixed machine; it is a living, adaptive system that continuously reorganizes itself in response to experience, intervention, and relationship. Addiction hijacks this adaptability with devastating efficiency, forming memories of extraordinary power and persistence. But the very mechanisms that make addictive memory so durable are also the mechanisms that make recovery possible. Research like Beregovoy's on myelopeptide MP5 represents the frontier of an effort to work with the brain's own architecture rather than against it — to accelerate the natural process of extinction and restoration that behavioral recovery seeks to support.

For families, this synthesis carries a message that is both clarifying and liberating. When a loved one struggles with relapse, they are not demonstrating indifference to the suffering of those around them. They are navigating a neurological landscape in which powerful memories, laid down in the hippocampus and reinforced over years, are being triggered by cues that may not even be consciously recognized. Understanding this does not remove accountability, but it radically reframes what accountability means — and it points families away from shame-based confrontation and toward patient, informed, and structurally supportive engagement.

## CONCLUSION:

The science of addictive memory is advancing, and with it, the foundation for a more compassionate public and family understanding of relapse and recovery. The research explored here reinforces what FAHU has long maintained: facing addiction with hope and understanding is not a soft or naive position. It is the position most rigorously supported by evidence. The brain can change. Memory can be extinguished. New pathways can be built. Families who choose to walk alongside their loved ones with patience, knowledge, and sustained compassion are not passive bystanders — they are, in the most literal neurological sense, participants in the conditions that make healing possible.

# Works Cited

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