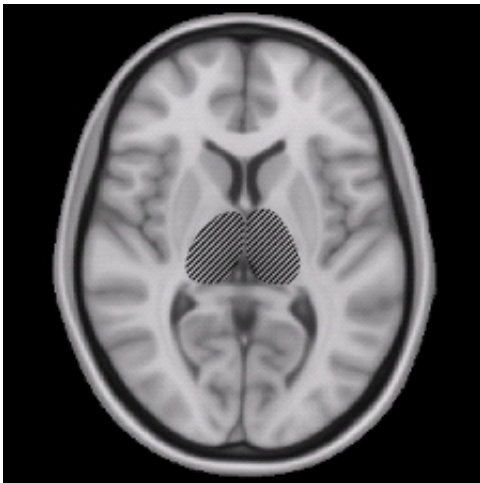


# Enriched environments hold promise for brain injury patients

November 11 2014

---



As football players are learning, a violent blow to the head has the potential to cause mild to severe traumatic brain injury—physical damage to the brain that can be debilitating, even fatal. The long-term effects run the gamut of human functioning, from trouble communicating to extensive cognitive and behavioral deterioration. To date, there is no effective medical or cognitive treatment for patients with traumatic brain injuries.

But a new study from Tel Aviv University researchers points to an "enriched environment"—specially enhanced surroundings—as a promising path for the rehabilitation of mild traumatic brain injury

(mTBI) patients. The research, published in *Behavioral Brain Research*, was led by Prof. Chagi Pick of TAU's Sagol School of Neuroscience and Sackler Faculty of Medicine and conducted by a team of researchers from both TAU and TAU-affiliated Tel Aviv Sourasky Medical Center.

## **Mice move on up**

The study, conducted on mice at a TAU laboratory, followed two groups of animals with minimal traumatic brain injury. The first group was kept in standard cages and maintained under routine conditions, while the second enjoyed "enriched environments," replete with sensory stimuli, open space, and plentiful opportunities to eat and exercise.

"A house may survive an earthquake, but up close you will see cracks in the walls. This is what may happen following traumatic [brain injury](#)," said Prof. Pick. "An MRI might determine that the brain looks normal, but fast forward two years and the patient, who was married and successful, is suddenly unemployed, divorced, and miserable—without any awareness or understanding that new and lasting cognitive and emotional difficulties (including various degrees of amnesia, difficulty concentrating, depression, apathy, anxiety, and even a prominent personality change) emerged due to a car accident two years earlier.

"Doctors in the emergency room harness the Glasgow Coma Scale to assess the extent of brain trauma in incoming patients—from a child who falls off the bed to a victim of a major accident," Prof. Pick continued. "In the majority of cases, doctors determine minimal damage according to the symptoms that appear over a very short period of monitoring—just 30 minutes. In 85% of cases, this is accurate, but in 15% of cases, a cascade of serious damage has just begun, and we don't really know why. But this is what we are trying to figure out."

## An environment of riches

According to the study, an "enriched environment" may play a critical role in brain regulation, behavior, and physiology. Using a model of minimal TBI in mice, the team evaluated the effect of transition to an enriched environment on behavioral and cognitive parameters. Using the Novel Object Recognition task, in which mice exhibit different levels of curiosity about new objects placed in their cages, and run different mazes to establish navigation abilities, the researchers sought to determine the mice's level of functioning in standard cages versus enriched environments—cages with additional stimuli, running wheels, plenty of food, open space, and water. The mice exposed to an enriched environment showed a marked improvement in recovery from brain injuries.

"We have shown that just six weeks in an enriched environment can help animals recover from cognitive dysfunctions after [traumatic brain injury](#)," said Prof. Pick. "Possible clinical implications indicate the importance of adapting elements of enriched environments to humans, such as prolonged and intensive physical activity, possibly combined with intensive cognitive stimulation. Through proper exercise, stimuli, and diet, we can improve a patient's condition. No one is promising a cure, but now we have evidence that this can help."

Provided by Tel Aviv University

Citation: Enriched environments hold promise for brain injury patients (2014, November 11) retrieved 20 April 2024 from <https://medicalxpress.com/news/2014-11-enriched-environments-brain-injury-patients.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is

provided for information purposes only.