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PHARMA HIGHLIGHTS

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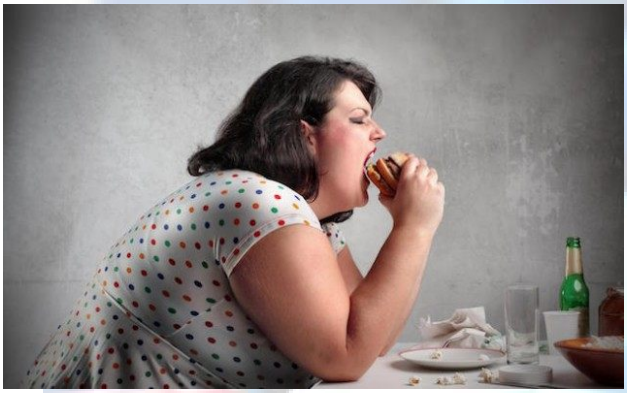
Ketamine May Help With Depression Linked to Overeating

Trans and saturated fats contribute substantially to the chronic development of cardiac complications and concomitantly to obesity. Large amount of American diet is made up of processed foods which contains these bad fats and ultimately increases LDL-low density lipoprotein level in obese individuals. About 66% of American adults are obese.

Obesity induces type 2 diabetes among 60 chronic diseases. According to a 2008 study in the Journal of the American Medical Association, individuals with type 2 diabetes are 54 percent more prone to have depression than those without type 2 diabetes. High fat content diets affect central nervous system badly; it interrupts cognitive function and shrinks hippocampus which is responsible for storing and processing memory and most importantly induces development of depression. To establish relevance between depression and diabetes, neurobiologist and senior study author Ronald Duman said, depression and chronic stress damage synaptic connections in the brain. The effects of a high-fat diet overlap with the effects of chronic stress.

Depression is a serious medical condition in which a person feels very sad, hopeless and unimportant and often is unable to live in a normal way. In psychiatry, depression is a mental state of altered mood characterized by feelings of sadness, discouragement, and despair. In addition, persistent depression can lead to major depressive disorder, or it may be symptomatic of another psychiatric disorder such as schizophrenia. Some scientists found that ketamine can reverse symptoms associated with depression. Ketamine is broadly used as general anesthetics before surgical procedure. Ketamine has distinct mechanism of action compared to traditional antidepressants like SSRI (selective serotonin reuptake inhibitor), MAOI (mono amine oxidase inhibitor), TCA (tricyclic antidepressant) and benzodiazepine combination. Moreover, ketamine works within 2 hours in treating depressive patients. Ketamine falls under class of drugs which antagonize NMDA (N-methyl-D-aspartate) receptor. Conventional antidepressant generally affects neurotransmitter levels in CNS such as dopamine, serotonin, norepinephrine but ketamine affects different part of the brain by controlling glutamate level. Glutamate is responsible for almost 90% of synapses of human brain and ketamine focuses on glutamate by activating mTORC pathway which is involved with cellular responses to energy and metabolism. High fat content foods interfere with mTORC pathway in cell and ketamine has been found to reverse the disruption in mTORC signaling pathways.



To figure out the effects of ketamine on the cellular metabolism, further studies need to be done. Moreover, scientists also have to find out safer way to administer ketamine with reduced side effects such as addiction and urinary bladder inflammation. In spite of what has just been said, depressive patients have the tendency to abuse ketamine because it is regarded as recreational drugs for their dissociative, hallucinogenic and euphoriant properties. So considering all the risk factors and potential benefits, doctors or clinicians should prescribe ketamine medication judiciously to a patient with major depressive disorder.

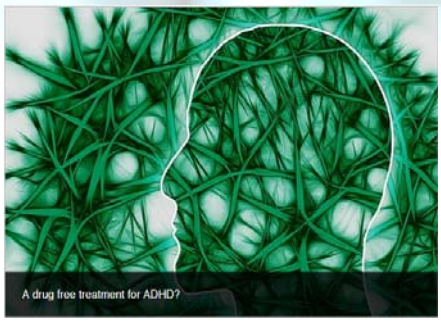
–Walid Azam

http://labroots.com/trending/health-and-medicine/2122/ketamine-may-help-with-depression-linked-to-overeating

Treatment of ADHD without Drugs

The mental disorder, Attention Deficit Hyperactivity Disorder or ADHD is one of the largest issues affecting children and their ability to learn. Males are three times more likely to develop the disorder than females and the average age for diagnosis is 7 years old, but there is a correlation between the severity of the disorder and diagnosis at a younger age. In children who have a severe manifestation of the disorder, the average age for diagnosis is 5 years of age. It is very troubling to parents of the children who suffer from it and to the school systems who have to find new ways to educate children with ADHD. Medication is an option, but the use of stimulants is controversial and parents and medical professionals are always looking for better options than medication alone. A program that started at Yale University in New Haven Connecticut hopes to provide families who deal with ADHD with a new drug free program of brain training and physical exercise to improve focus and hopefully academic and social success as well.

Dr. Bruce Wexler, Professor Emeritus at Yale and Senior Research Scientist in Psychiatry was the recipient of the NIH Transformative Research Award in 2011 and received a grant from the NIH Director's Award program for a four year study on the efficacy of a brain based video training system that combined gaming with physical exercise to enhance neuroplasticity in children of ages 5-9 years old. The grant provided Dr. Wexler with the means to implement his program, called Activate, into 220 schools, first in Connecticut and then across the country. The results have been positive so far, with many students showing



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Design: Fabiha Tasnim

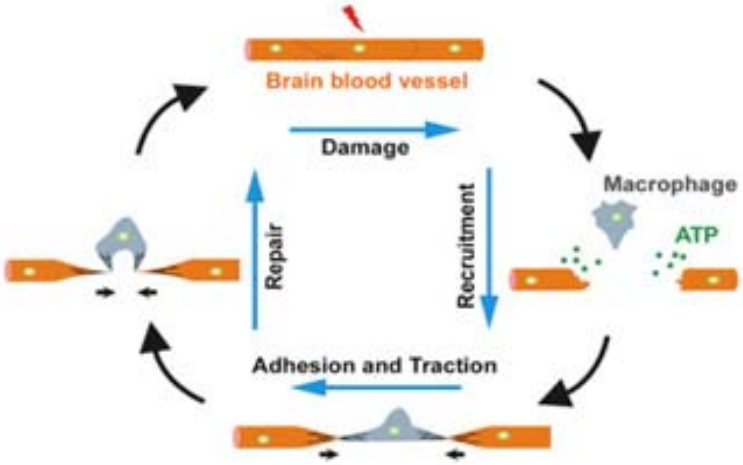
increases in cognition and focus after using the program. It combines a video game where the players get rewards and can "level up" when they make correct choices in the course of the game. In addition, there is a physical activity component as well. Dr. Wexler said, that the brain actually re-organizes itself and brings more neuro resources into neuro systems that are active. They designed physical exercises that have cognitive components so that the patients engage the same target neurosystems as do their computer exercises. One of the benefits of the program according to Wexler is that if a child tries it, and for whatever reason it does not provide any improvement, there are no side effects, no medication tapering or weaning and the only thing lost is the time the child spends using the program.

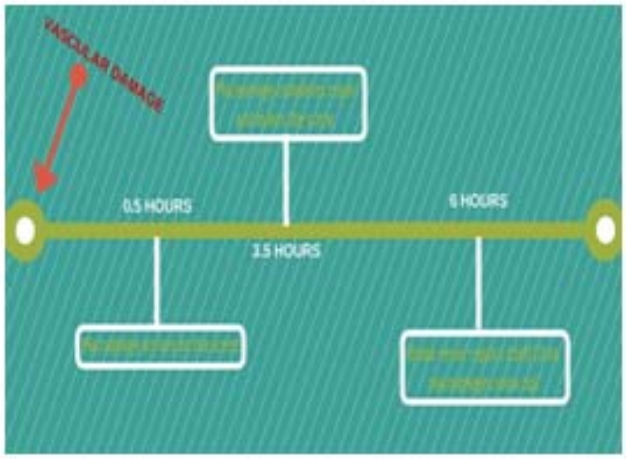
–Fabiha Tasnim

http://www.labroots.com/trending/neuroscience/2902/treat-adhd-drugs

Macrophages Repair Microbleeds in the Brain

Blood vessels have the potential to rupture all over the body, but when they break in the brain, the damage is directly associated with cognitive decline from neurodegenerative diseases. Such injury of small blood vessels in the brain, most common in elderly people especially with dementia or cerebrovascular disease can cause hemorrhagic stroke and brain microbleeds. The role of the immune system in the repair of the blood vessels was ambiguous until the current study, published in Immunity, conducted by the researchers of Southwest University in China. The study revealed the unique role of a white blood cell called macrophage in the recuperation of broken blood vessels. During the study, the research team used a multi-photon laser to cause rupture of the small blood vessels in the zebrafish brains and visualized how the organisms responded to vascular injury through a specialized microscope. Approximately 30 minutes post-laser injury, macrophage arrived to the scene of rupture. Upon arrival, the macrophage used two arm-like extensions, called filopodia or lamellipodia, to connect to both of the broken ends of the blood vessel. At a period of three hours, the macrophage reattached the broken ends using secreted adhesion molecules from the damaged blood vessel. Consequently, it was confirmed that the macrophage mediates this repair through direct physical adhesion and generation of mechanical traction forces. Another rare occurrence is two macrophages responding to the distress call emitted by ruptured small blood vessels. In this case, both of the macrophages begin the process but then quit, as if they left because they thought the other macrophage had the job covered. Lastly, the researchers also saw that zebrafish blood vessels can repair themselves independently of macrophages, but the process is much slower and less efficient. Other aspects of vascular development and remodeling are shared between zebrafish and humans, so scientists are hopeful that this discovery will also be seen in humans. Further studies backing up this hypothesis will soon help scientists improve treatments for human vascular repair.





–Tanisha Tabassum Sayka Khan

http://www.labroots.com/trending/neuroscience/3026/macrophages-repair-microbleeds-brain