

Smoking a pain in the back

A new Northwestern Medicine study has found that smokers are three times more likely than nonsmokers to develop chronic back pain, and dropping the habit may cut your chances of developing this often debilitating condition.

"Smoking affects the brain," said Bogdan Petre, lead author of the study and a technical scientist at Northwestern University Feinberg School of Medicine. "We found that it affects the way the brain responds to back pain and seems to make individuals less resilient to an episode of pain," Science Daily reported.

This is the first evidence to link smoking and chronic pain with the part of the brain associated with addiction and reward.

The results come from a longitudinal observational study of 160 adults with new cases of back pain. At five different times throughout the course of a year they were given MRI brain scans and were asked to rate the intensity of their back pain and fill out a questionnaire which asked about smoking status and other health issues. Thirty-five healthy control participants and 32 participants with chronic back pain were similarly monitored.

Scientists analyzed MRI activity between two brain areas (nucleus accumbens and medial prefrontal cortex, NAc-mPFC), which are involved in addictive behavior, and motivated learning. This circuitry is critical in development of chronic pain, the scientists found.

These two regions of the brain "talk" to one another and scientists discovered that the strength of that connection helps determine who will become a chronic pain patient. By showing how a part of the brain involved in motivated learning allows tobacco addiction to interface with pain chronification, the findings hint at a potentially more general link between addiction and pain.

"That circuit was very strong and active in the brain's of smokers," Petre said. "But we saw a dramatic drop in this circuit's activity in smokers who — of their own will, quit smoking during the study, so when they stopped smoking, their vulnerability to chronic pain also decreased."



hyderabad-person.blogspot.com

Weight-loss surgery lowers type 2 diabetes risk

Weight-loss surgery significantly lowers an obese person's risk of developing type 2 diabetes, researchers report.

This reduced risk was independent of other factors such as smoking, high blood pressure and high cholesterol, according to the study, Health Day said.

"Our results suggest that bariatric surgery may be a highly effective method of preventing the onset of new diabetes in men and women with severe obesity," study author Martin Gulliford, a professor of public health at King's College London, said in a journal news release.

"We need to understand how weight-loss surgery can be used, together with interventions to increase physical activity and promote healthy eating, as part of an overall diabetes prevention strategy," he added.

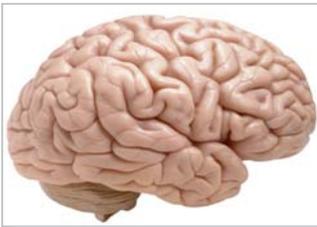
Being overweight or obese is a major risk factor for diabetes, and up to 3 percent of severely obese people develop diabetes each year, the study authors noted in the news release.

This study included more than 2,100 obese adults without diabetes who underwent weight-loss surgery, such as gastric bypass or gastric banding, and the same number of obese adults who did not have weight-loss surgery or other obesity treatments.



abc.net.au

Biological fat with sugar attached essential to brain



firstaidteam.com

Fat and sugar aren't usually considered healthy staples, but scientists have found that a biological fat with a sugar attached is essential for maintaining the brain's store of stem cells.

According to sciencenewsline.com, neural stem cells help the brain develop initially, then repopulate brain cells lost to usual cell turnover as well as to a trauma or malady, such as a head injury or stroke.

While the cell population and activity decrease as a natural part of aging, scientists at the Medical College of Georgia at Georgia Regents University are studying how neural stem cells are normally maintained with the long-term goal of helping the supply stay robust despite aging as well as infirmity.

They have discovered that in mice missing the sugar-containing lipid ganglioside GD3, neural stem cells have a dramatically impaired ability to self-renew,

said Dr. Robert K. Yu, MCG neuroscientist.

The scientists focused on brain areas with typically the largest supply of neural stem cells: an area just below several midbrain cavities filled with cerebrospinal fluid, called the subventricular zone, as well as the hippocampus, a major center for learning and memory.

Mice missing ganglioside GD3 on the membranes of neural stem cells had much smaller supplies of the cells in these key areas throughout life and expressed signs of lost hope with behaviors such as not actively seeking dry land when placed in water, Yu said. Additionally, the mice had impaired maintenance of the area of the brain involved in the sense of smell as well as the portion of the hippocampus that enables formation of new memories.

Study points to causes behind age-linked memory loss



newsnetwork.mayoclinic.org

One possible reason for memory decline in older age may be that brain networks become less able to maintain their separate functions, a new study suggests.

The findings suggest the brain has a harder time with memory when its separate parts work closer together. "Too little segregation seems to be a bad thing," said study co-author Gagan Wig, of the School of Behavioral and Brain Sciences at University of Texas at Dallas, WebMD wrote.

"This study goes one step further by looking at how there may be an ideal balance to support effective brain functions among age groups," said Michael Cole, an assistant professor with the Center for Molecular and Behavioral Neuroscience at Rutgers University in New Jersey.

The researchers said advanced years are associated with less specialized brain cells, but they noted it hasn't been clear if the same decline occurs at the level of brain networks.

In the study, researchers used functional MRI scans to study

the brains of 210 people aged 20 to 89. "This was to measure blood flow in the brain while people were awake and at rest," study co-author Wig explained.

Participants also took memory and thinking tests to gauge how they formed memories and remembered things over minutes and hours, Wig said.

The researchers found that older adults had more connections between different brain sections, which translated to worse memory skills. In other words, a more-connected brain seems to be worse for memory.

But older age isn't a guarantee of a more-connected brain and worse memory. "The surprising thing we found is that this relationship is independent of age," Wig said. "There were some younger adults that had lower system segregation, and they had poor memory ability. Likewise, there were older adults who had higher system segregation and good memory ability."

From HIV to cancer, IL-37 regulates immune system

A University of Colorado Cancer Center study describes the activity of a recently discovered communication molecule of the body's immune system, Interleukin 37 or IL-37. It has been known to limit inflammation and the current study reports its activity in the adaptive immune system: IL-37 inhibits the ability of the immune system to recognize and target new antigens.

"Knowing this mechanism that underlies IL-37's effect on the immune system now allows us to study IL-37 function and perhaps dysfunction in a wide range of diseases," says Mayumi Fujita, MD, PhD, investigator at the University of Colorado Cancer Center, Medical Xpress reported.

For example, knowing that IL-37 helps to create overall immune system sensitivity could allow researchers to manipulate IL-37 levels to sensitize the immune system to recognize



Mayumi Fujita CU CANCER CENTER

and target tumor tissue, or desensitize the immune system in auto-immune conditions like rheumatoid arthritis in which the immune system acts over-aggressively toward healthy tissue.

The current study shows that IL-37 encourages the formation of semi-mature dendritic cells that migrate to lymph nodes but fail to present antigens in a way that create an immune response. It is as if IL-37 helps to maintain dendritic cells in a state of semi-immature readiness, rather than allowing them to become sensitized to new antigens.

In fact, the study showed a cascade of diminished immune system response in mice with IL-37, including lower CD40, IL-1b, IL-6 and IL-12, all of which are involved in creating an immune response.

"This implies that IL-37 may be a basic component of immune system regulation, with IL-37 levels affecting many other pieces of the overall response," Fujita says.

MIT researchers develop safer button battery

Researchers have developed a coating for button batteries to prevent them from causing chemical burns in the digestive tract if they're swallowed by children.

Button batteries are used to power a wide range of devices such as toys, calculators and hearing aids. About 5 billion of these batteries are produced every year, according to the researchers. If children swallow these batteries, they can suffer burns that cause permanent damage to the esophagus, tears in the digestive tract and even death, the researchers explained, US News & World Report said.



2012books.lardbucket.org

The new coating prevents the batteries from conducting electricity if they're swallowed. Animal tests showed that the batteries with the coating caused no gastrointestinal tract damage.

"We are all very pleased that our studies have shown that these new batteries we created have the potential to greatly improve safety due to accidental ingestion for the thousands of patients every year who inadvertently swallow electric components in toys or other entities," study co-senior author Robert Langer, a professor at the Massachusetts Institute of Technology, said in an MIT news release.

Each year, nearly 4,000 children in the United States are taken to emergency rooms after swallowing button batteries.

When batteries are swallowed, they interact with water or saliva and create an electric current that produces hydroxide, which damages tissue. Serious injury can occur within a few hours.

The researchers plan to test the coating on lithium and other types of batteries.