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Sweet scent of new-mown grass puts paid to stress

Wendy Zukerman | *August 26, 2009*

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THE smell of freshly cut grass reduces stress and protects nerve cells from the damage that stress can cause, according to researchers at the University of Queensland who have bottled the chill-out fragrance.

Nickolas Lavidis, a senior lecturer from UQ's school of biomedical sciences, studied the long-term effect of intermittent chronic stress in rats and mice.

"This is the kind of stress a human being would experience at work," Dr Lavidis said.

He found that the nerve cells in a part of the brain involved in memory, called the hippocampus, were smaller after animals experienced chronic stress.

As a result, the nerves did not send effective messages to each other and long-term memory was significantly impaired.

Dr Lavidis and PhD students Elizabeth Butt and Ei Leen Leong used microelectrodes to measure the electrical impulses travelling across the hippocampus of the animals to observe the effect of stress on their nerve cells.

Nerves communicate through electrical signals. In chronically stressed animals, fewer impulses were measured, telling researchers that stress reduced the ability of nerves to communicate in the hippocampus. Less communication between the nerves in this area leads to memory loss. And smelling freshly cut grass can prevent this loss.

"If the same animals with chronic stress are exposed to the smell of the chemicals within cut grass, the damage that occurs to the hippocampus is prevented," Dr Lavidis said. "The structure of the nerve cells that communicate memory look exactly the same as an animal that hasn't been stressed. In effect, it prevents the damage, loss of function and loss of memory."

But why?

"There is a direct connection between the olfactory system, your smell receptors, to the part of the brain associated with fear and anxiety, called the amygdala," Dr Lavidis explained.

The amygdala is vital to our stress response. It simulates the sympathetic nervous system, which increases blood pressure, heart rate and sweating. And it controls the release of stress hormones, such as cortisol.

"The olfactory system dampens the stress response from the amygdala," Dr Lavidis said.

The researchers are unsure precisely how smelling certain odours disrupts the amygdala's ability to fire up the sympathetic nervous system. One possibility is that fewer neurons from the amygdala are reaching the neurons that directly activate the sympathetic nervous system.

According to Dr Lavidis, the stress relieving effects of certain smells, like freshly cut grass, were unrelated to recognising the odour and the fond memories attached to it.

"It's such a low concentration that gets into your nose and you need a higher concentration of these smells to recognise them," he said.

In addition, the part of our brain that recognises smell happens higher up in the cortex.

To bottle the scent and create the "eau de grass" fragrance, the UQ researchers identified 18 chemicals found in freshly cut grass. They narrowed down the ones that might influence stress by observing which chemicals

most effectively dampened the electrical signals being sent to the sympathetic nervous system in animals. The final product is a cool and fresh fragrance.

While no official human trials were conducted, 67 of Dr Lavidis's students voluntarily smelled the fragrance. "They all reported to me the pleasantness of the smell and the positive effect it has had on them under different situations, including exam periods," Dr Lavidis said.

The team is researching possible medicinal benefits of other natural smells, such as lavender and bay leaf.
