Hunt for magic molecule to manage stress

Our world is evolving so fast that biologically we can no longer keep up and it’s stressful to keep trying. So says Alon Chen, a neurobiologist who specializes in stress at Israel’s Weizmann Institute of Science.

He says we just haven’t had enough time to adapt. While we are designed to cope with short bursts of stress, we struggle to deal with the ongoing chronic stress of contemporary living.

Chen, who recently delivered lectures in Sydney and Melbourne as a guest of Weizmann Australia, believes modern life has outstripped evolution.

When our ancestors encountered a hairy mammoth, they were programmed for the instinctive fight or flight stress response. They were facing an intense and dangerous challenge; their survival at stake. All the right bodily systems turned on and they were on high alert.

When the mammoth lumbered away, their stress systems turned off and they gradually regained their equilibrium.

These challenges were months apart, during which time they could recuperate, relax and rest their stress response. We, on the other hand, are subject to unrelieved stress, of varying degrees of intensity.

Many of us push on for years without breaking long enough to recover. We live with stress every day.

Chen says stress results from any demand or challenge to homeostasis, our internal balance system. It can be real or perceived, current or anticipated, physiological or psychological, or a mixture.

The perception of and response to it is highly individual and is determined by a combination of genetic and environmental factors.

Although continuing modern stress is not immediately life-threatening and we have many ways of dealing with it, our bodies still activate a series of so-ordinated responses organized to protect homeostasis and enhance our chances of survival.

But when the stress is unrelieved, these responses become less effective and can affect bodily systems. Unrelieved stress has been associated with a range of conditions from anxiety to type 2 diabetes.

Chen and colleagues recently changed the activity of a single gene in the brains of mice to induce the equivalent of 20 days of stress. With this, the mice not only became anxious but developed symptoms associated with type 2 diabetes.

His work focuses on the mechanisms of stress in the brain and the associated genes. He is particularly interested in understanding the mechanism that turns on a stress response and the one that turns it off.

Recently his team demonstrated the role of three mouse genes important in recovery from stress.

The results, published this month in the Proceedings of the National Academy of Science, provide his team with a new target. If they can activate these genes in humans, they may have found a way to help people cope and better recover from stress.

They will need to find a molecule that people can safely swallow to activate these mechanisms.

Essentially, it will be a molecule that restores homeostasis.

“Everything is molecules,” says Chen.