

A

Despite its bad reputation, stress historically had a vital role to play. Commonly referred to as the 'fight or flight' mode, the sudden release of stress hormones like adrenalin and cortisol causes the heart to beat faster, airways to dilate and blood vessels to open up, all of which push the body towards optimal performance and, ultimately, survival. In the rest of the animal kingdom, this is still often the difference between life and death. As he springs off to freedom, the lucky gazelle who escapes the lion can thank this primal evolutionary response.

B

In ordinary modern life, although we're in little danger of being stalked by wild beasts down city streets, our bodies react to stress in the same ways. Experiencing anxiety, fear and stress is considered a normal part of life when it is occasional and temporary, such as feeling anxious and stressed before an exam or a job interview. It is when these acute reactions are prolonged or cannot be switched off, however, that serious physical, social and cognitive issues can result. In contrast to the normal everyday stress of modern life, chronic stress is a pathological state which can significantly interfere with daily living activities such as work, school and relationships, wreaking havoc on the body's immune, metabolic and cardiovascular systems.

C

Of major concern is the impact on the brain. Researchers have found that the hippocampus, the control centre of memory and our ability to learn, can physically shrink in response to prolonged release of stress hormones like cortisol which result from chronic stress. Neurons in this area do not just get smaller, but actually die, which weakens the neural connections, affecting the way memories are organised and stored in the brain. A chronically stressed person would recognise this as a 'brain fog', and it also has ramifications for other areas such as creativity and adaptability.

D

While this part of the brain gets smaller, another area, the amygdala, which is involved in processing emotions, can grow with chronic stress. Across species, a larger amygdala has been found to correlate with aggression and this, coupled with the weakened connection to the prefrontal cortex, the brain's decision-making centre, can profoundly impact mood and behaviour. With the link between emotions and decision-making compromised, a person is much less able to stop and reflect, becoming instead reactive and short-fused. Think of the difference between being able to tolerate a screaming child and instead giving in to the desire to scream back.

E

In the past, it was accepted that there was a limited number of neurons in the brain and as they died off as a result of ageing, stress or substance abuse, for instance, they were lost forever. It turns out, however, that this is not the case and that stem cells within the brain are actually able to create new neurons. In other words, lost neurons can be replaced. What makes this discovery even more powerful is the fact that replenishing neurons is rather straightforward. One of the most powerful stimulants for neuron growth is physical activity. So, in addition to its role in the reduction of stress hormones in the first place, and its ability to stimulate the release of endorphins, exercise has now been shown to contribute to the repair of the chronically stressed brain.

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