

Meditation and yoga can 'reverse' DNA reactions which cause stress, new study suggests

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Lead investigator Ivana Buric from Coventry University's Centre for Psychology, Behaviour and Achievement. Credit: Coventry University

Mind-body interventions (MBIs) such as meditation, yoga and Tai Chi don't simply relax us; they can 'reverse' the molecular reactions in our DNA which cause ill-health and depression, according to a study by the universities of Coventry and Radboud.

The research, published today in the journal *Frontiers in Immunology*, reviews over a decade of studies analysing how the behaviour of our [genes](#) is affected by different MBIs including mindfulness and yoga.

Experts from the universities conclude that, when examined together, the 18 studies—featuring 846 participants over 11 years—reveal a pattern in the molecular changes which happen to the body as a result of MBIs, and how those changes benefit our mental and physical health.

The researchers focus on how gene expression is

affected; in other words the way that genes activate to produce proteins which influence the biological make-up of the body, the brain and the immune system.

When a person is exposed to a [stressful event](#), their sympathetic nervous system (SNS)—the system responsible for the 'fight-or-flight' response—is triggered, in turn increasing production of a molecule called nuclear factor kappa B (NF-κB) which regulates how our genes are expressed.

NF-κB translates stress by activating genes to produce proteins called cytokines that cause inflammation at cellular level—a reaction that is useful as a short-lived fight-or-flight reaction, but if persistent leads to a higher risk of cancer, accelerated aging and psychiatric disorders like depression.

According to the study, however, people who practise MBIs exhibit the opposite effect—namely a decrease in production of NF-κB and cytokines, leading to a reversal of the pro-inflammatory [gene expression pattern](#) and a reduction in the risk of inflammation-related diseases and conditions.

The study's authors say the inflammatory effect of the fight-or-flight response—which also serves to temporarily bolster the immune system - would have played an important role in mankind's hunter-gatherer prehistory, when there was a higher risk of infection from wounds.

In today's society, however, where stress is increasingly psychological and often longer-term, pro-inflammatory gene expression can be persistent and therefore more likely to cause psychiatric and medical problems.

Lead investigator Ivana Buric from the Brain, Belief

and Behaviour Lab in Coventry University's Centre for Psychology, Behaviour and Achievement said:

"Millions of people around the world already enjoy the health benefits of mind-body interventions like yoga or meditation, but what they perhaps don't realise is that these benefits begin at a molecular level and can change the way our genetic code goes about its business.

"These activities are leaving what we call a molecular signature in our cells, which reverses the effect that stress or anxiety would have on the body by changing how our genes are expressed. Put simply, MBIs cause the brain to steer our DNA processes along a path which improves our wellbeing.

"More needs to be done to understand these effects in greater depth, for example how they compare with other healthy interventions like exercise or nutrition. But this is an important foundation to build on to help future researchers explore the benefits of increasingly popular mind-body activities."

More information: Ivana Buric et al, What Is the Molecular Signature of Mind?Body Interventions? A Systematic Review of Gene Expression Changes Induced by Meditation and Related Practices, *Frontiers in Immunology* (2017). [DOI: 10.3389/fimmu.2017.00670](https://doi.org/10.3389/fimmu.2017.00670)

Provided by Coventry University

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