

EPIGENETICS

Mind affects matter?

New research suggests that experiencing intense psychological trauma may have a genetic impact on a person's future children.



The findings imply that children of individuals who experience profound stress in life, e.g. Holocaust survivors, may be more likely to develop stress or anxiety disorders themselves.

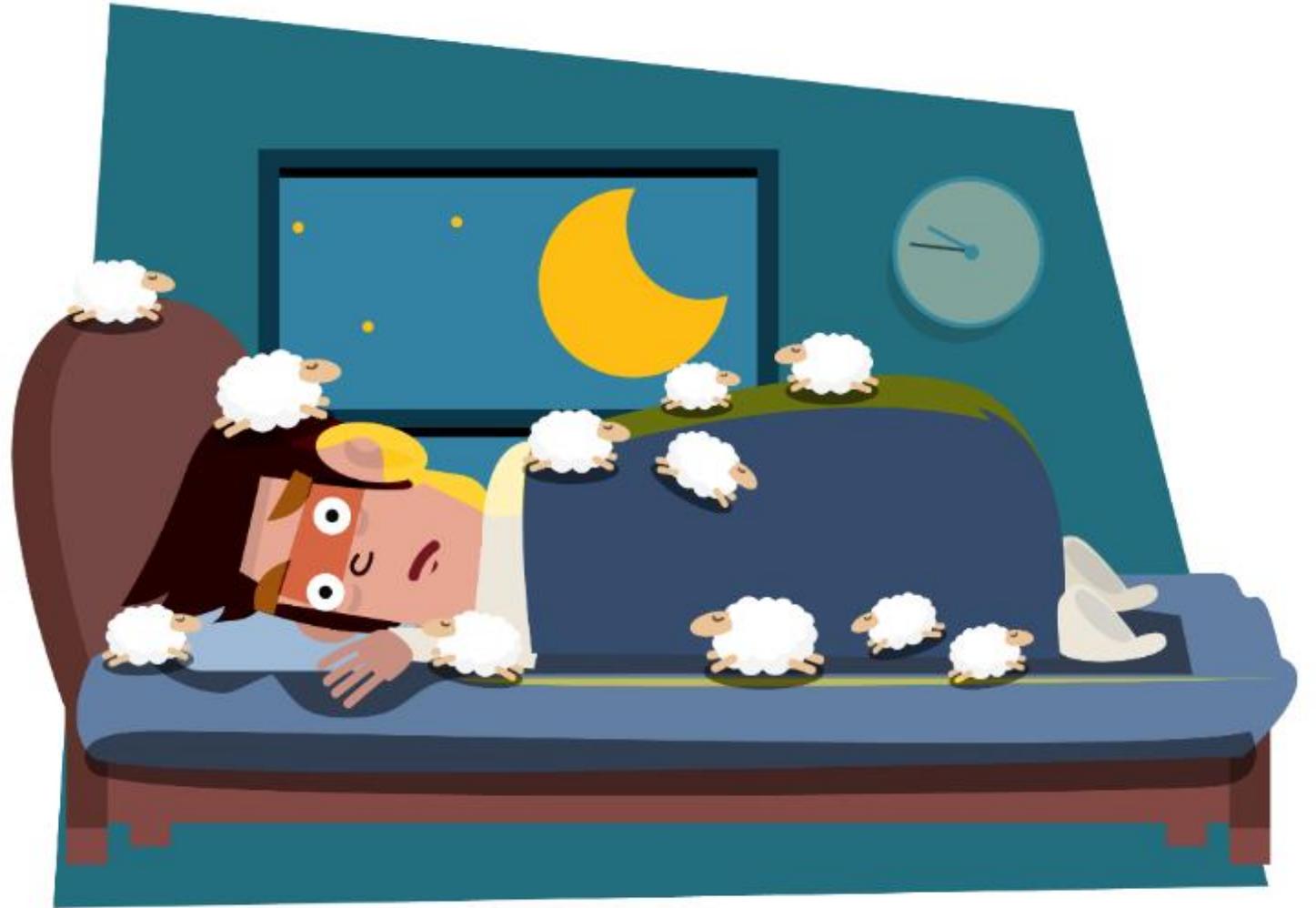




Scientists have long known that parents pass genetic traits down to their children, but research suggests that life experiences can also produce chemical effects in DNA.

That might explain it!

The findings may provide an explanation for why some people struggle with anxiety and stress disorders despite having never experienced trauma themselves.





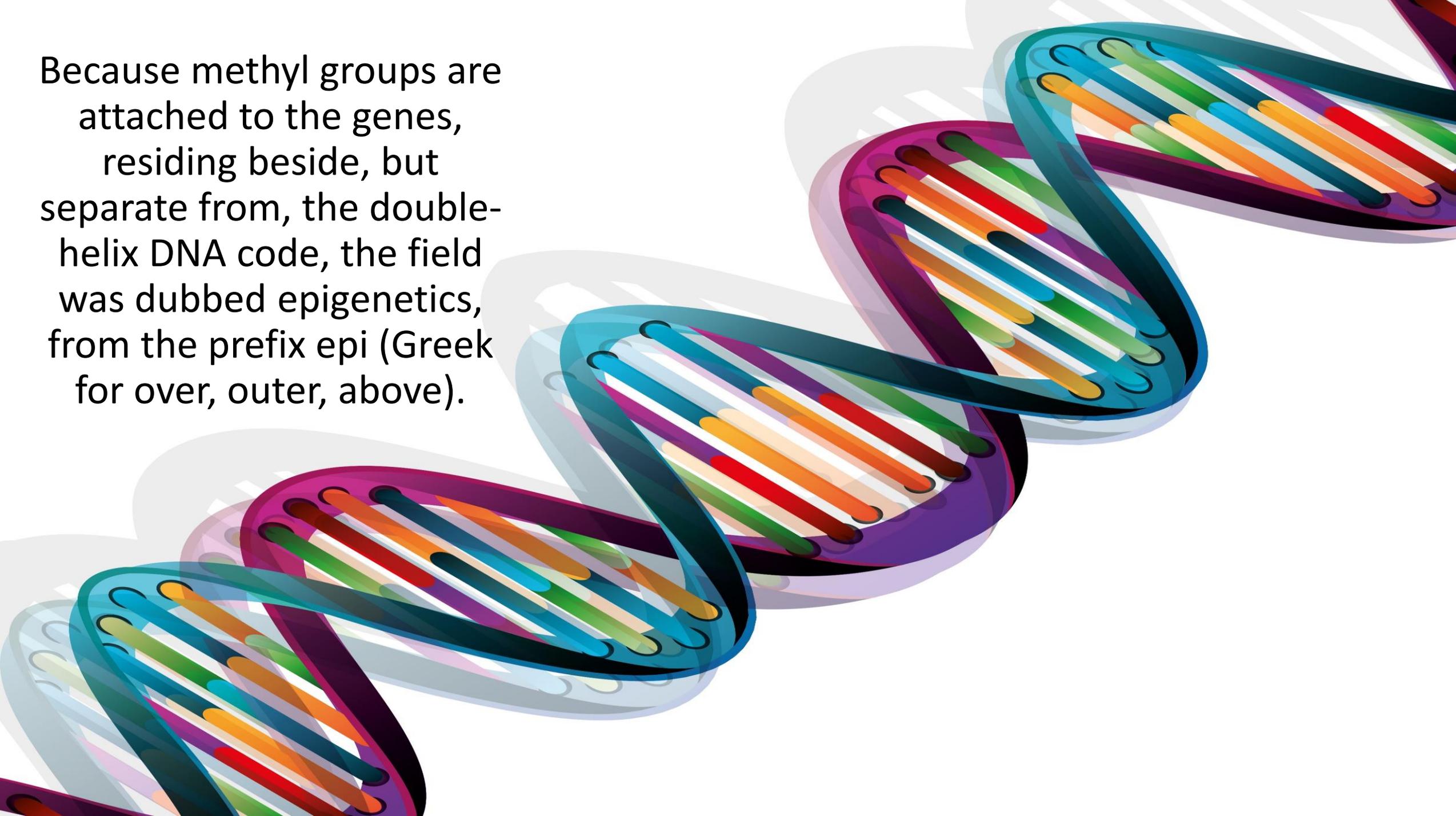
Since the 1970s, researchers have known that the tightly wound spools of DNA inside each cell's nucleus require something extra to tell them exactly which genes to transcribe, whether for a heart cell, a liver cell or a brain cell.



What's cooking?

One such extra element is the methyl group, which works like a placeholder in a cookbook, attaching to the DNA within each cell to select only those genes necessary for that particular cell's proteins and following the 'perfect recipe'.

Because methyl groups are attached to the genes, residing beside, but separate from, the double-helix DNA code, the field was dubbed epigenetics, from the prefix epi (Greek for over, outer, above).





Originally these epigenetic changes were believed to occur only during fetal development. But pioneering studies showed that molecular bric-a-brac could be added to DNA in adulthood, setting off a cascade of cellular changes resulting in cancer.

Sometimes methyl groups attached to DNA thanks to changes in diet; other times, exposure to certain chemicals appeared to be the cause.





Geneticists were especially surprised to find that epigenetic change could be passed down from parent to child, one generation after the next, inherited much like a mutation in a gene.

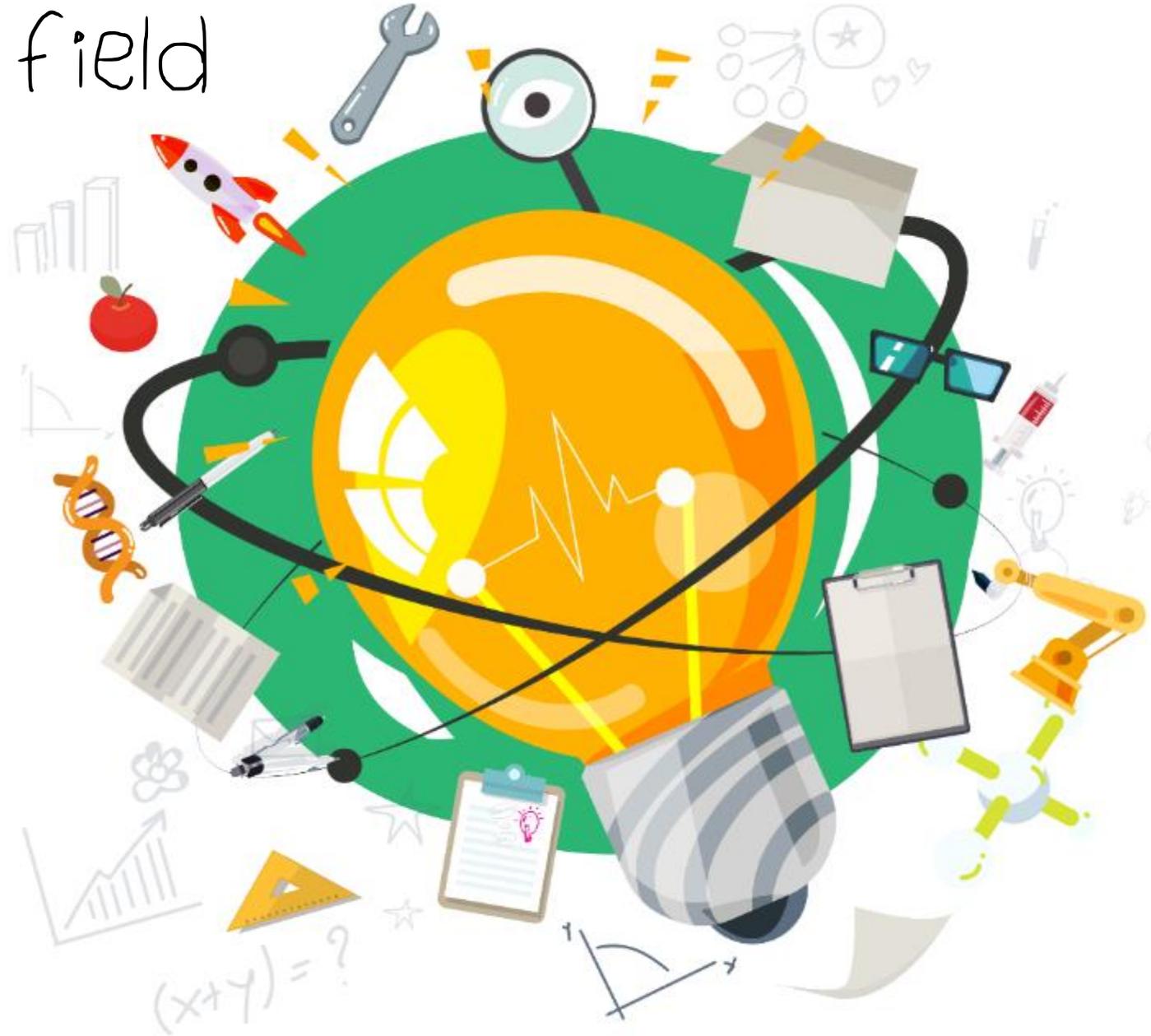
A new question grew

If diet and chemicals can cause epigenetic changes, could certain experiences — child neglect, drug abuse or other severe stresses — also set off epigenetic changes to the DNA inside the neurons of a person's brain?



And created a new field

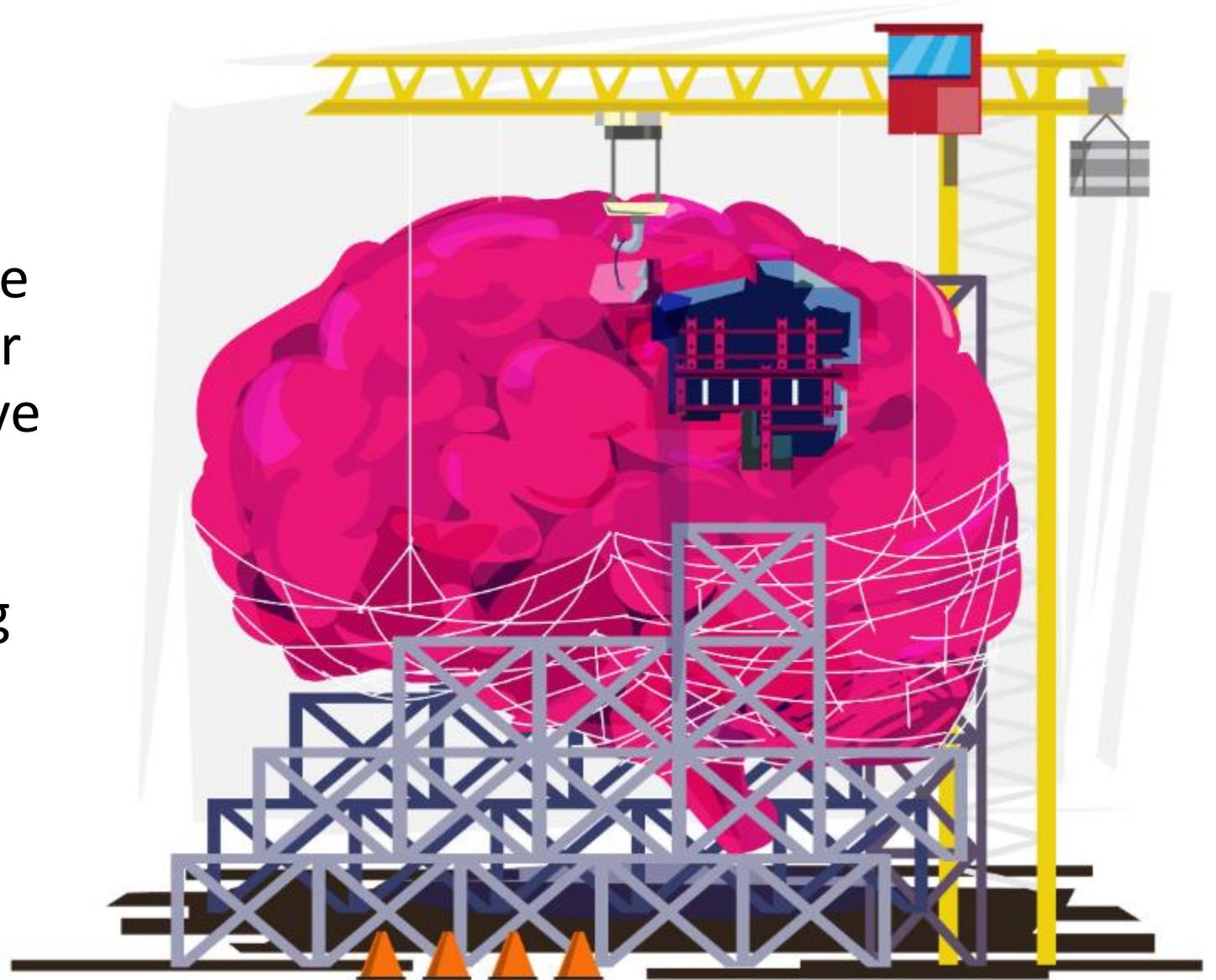
That question turned out to be the basis of a new field, behavioral epigenetics, now so vibrant it has spawned dozens of studies and suggested profound new treatments to heal the brain.





- According to the new insights of behavioral epigenetics, traumatic experiences in our past, or in our recent ancestors' past, leave molecular scars adhering to our DNA.

Our experiences, and those of our forebears, are never truly gone, even if they have been forgotten. They become a part of us, a molecular residue holding fast to our genetic scaffolding.



The DNA remains the same, but psychological and behavioral tendencies are inherited. You might have inherited not just your grandmother's knobby knees, but also her predisposition toward depression caused by the neglect she suffered as a newborn.





Or not!

If your grandmother was adopted by nurturing parents, you might be enjoying the boost she received thanks to their love and support.

Not just bad stuff

The mechanisms of behavioral epigenetics underlie not only deficits and weaknesses but strengths and resiliencies too.



Can you change your DNA?

For those unlucky enough to descend from miserable or withholding grandparents, emerging drug treatments could possibly reset not just mood, but the epigenetic changes themselves. Like grandmother's vintage dress, you could wear it as is, or have it altered.



Recent developments in our understanding of the impact of severe trauma show it affects not just the mind but also the body, creating physical changes that also need to be addressed.





Scientists now have proof that trauma is passed on, or rather its impact on how we feel, and how we behave, can be superimposed on the DNA of the next generation.

Example

Those who lived through the Holocaust, who were in prison camps or were forced to hide in dark, cramped, inhuman conditions perpetually afraid that at any moment they might be discovered, have been found to have low levels of cortisol.

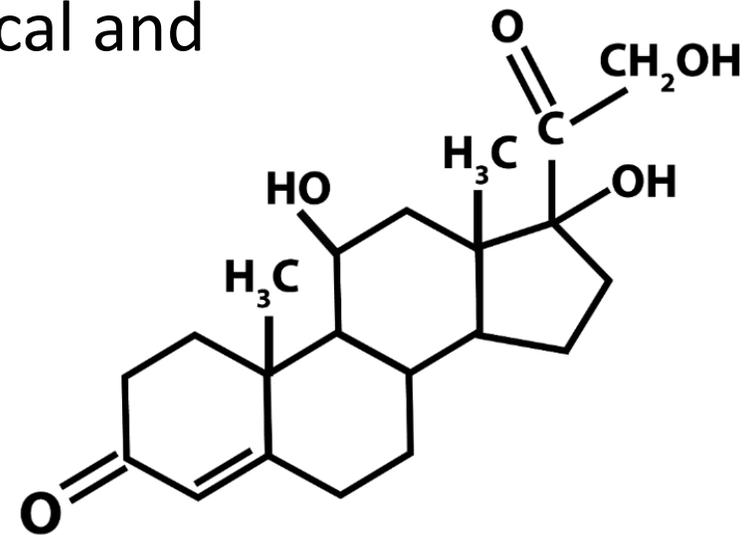


What is cortisol?

Cortisol is the hormone that the body releases into the bloodstream as we experience panic and fear and whose main function is to mobilize our energy and will to survive.

Cortisol helps prioritize important body functions under stressful circumstances and is important for the immune system, regulating blood pressure, the cardiovascular system, metabolism, and more.

Low cortisol levels can greatly affect quality of life, causing a plethora of unpleasant symptoms and health issues, both physical and psychological.



Much more significant, though, is the discovery that the **descendants** of those who have suffered war, violence, incessant fear also have lower levels of cortisol than average.



Researchers say these discoveries should alert us to the importance of how we react and respond to trauma survivors.

Survivor's prospects for recovery, scientists argue, are dependent on what happens to them immediately after the trauma.

