

Overcoming fear: Understanding DNA ‘flexibility’ could lead to better treatments for phobias and PTSD

Fear is an important survival mechanism and so too is the ability to inhibit fear when it's no longer needed. In order to counter-balance fear, the brain engages in fear extinction. In this process, memories are formed during non-fearful experiences with similar environmental elements. These non-fearful memories then compete with the original fear memory.

Now, in a new paper published in the journal *Nature Neuroscience*, the Queensland Brain Institute's [Professor Tim Bredy](#) and his colleagues show that the ability to extinguish fearful memories in this way relies on the flexibility of your DNA.

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The findings suggest that Z-DNA forms during fear then, during fear extinction, ADAR1 binds to that Z-DNA and carries out two important jobs: it rapidly increases RNA editing and then flips Z-DNA back into B-DNA.

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The balance between fear and fear-extinction is critical to cognitive flexibility, says Professor Bredy. Indeed, the impairment of fear extinction is a key feature of PTSD and phobias. The more we understand about how fear extinction works, the more chance we have of finding better treatments for those conditions.

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