

By Moshe Szyf, Science Editor

Abuse Causes a Suicidal Switch in Brain Gene Activity

At least, it does in the hippocampus

An abused child does not have only an impaired behavior, but also a structurally different brain. That happens because early child abuse appears to permanently change gene expression in the brain, as pointed by a postmortem investigation of suicide victims, recently published in the Nature Neuroscience journal. It is clear that we are the result of gene interaction and of the environment. External factors may determine which genes are turned on and off, thus impacting on our development. Some of the control switches are set before our birth, but many are programmed in early life and, in fewer cases, throughout our lives. Genes are deactivated by adding methyl groups to their control DNA stretch. Food quality and quantity and psychical factors (like stress or maternal care) are proven to impact these "epigenetic" changes. In 2004, a team led by Moshe Szyf at the McGill University in Montreal found that young rats neglected by their mothers displayed different levels of methylation and stress reactions compared to well-cared pups. That study also revealed that certain interventions can change those gene expressions. The new research analyzed the same phenomenon in humans, and started from the fact that many suicide victims has been abused or neglected in early childhood. Hippocampus, a brain nucleus involved in memory and mood, has been proven to be reduced in victims of abuse. The team investigated this brain nucleus in 13 suicide victims with a known history of early neglect or abuse. The results were compared with the analysis of 11 hippocampuses coming from 11 age and gender matched controls, who had experienced normal care but had perished in sudden accidents. The researchers looked for hippocampal genes activity assessing the presence of protein-producing RNA. RNA showed that, in the case of those who had committed suicide, much more genes had been deactivated, pointing that the hippocampus had decreased activity and the suicide risk could have been boosted by epigenetic effects. "The altered methylation is the result of child abuse and not suicide itself. The question is whether we could design an intervention - dietary, social, pharmacological - that could reverse it," said Szyf. Suicide victims who had not experienced abuse could confirm the new finding. "There's going to be a lot of heterogeneity in people who commit suicide," Arthur Beaudet, from the Baylor College of Medicine in Houston, Texas, told NewScientist.