Bridget Stuart (B) Year 13

IS DRUG ADDICTION CAUSED BY NATURE OR NURTURE?

It was theorised in the 2000s that there was such a thing as an 'addiction gene,' which would cause a carrier to become an addict and was inheritable. However, there is not a singular so-called 'addiction gene.' In fact, there are at least more than 50 different genes that will contribute to causing addiction. These genes lead to addiction in a number of different ways, but no single gene will directly cause a person to become a drug addict. When scientists search for 'addiction genes,' they are actually searching for the genetic differences that cause a person to be less or more vulnerable to addiction. People who possess such genes, having primarily tried a certain drug, will be much more eager to try it again, thus they are more susceptible to becoming addicted. These people may experience a more rewarding and more pleasurable high. They might also find it much harder to quit once started, by experiencing more intense withdrawal symptoms. However, as addiction is a very complex mental illness, only certain combinations of certain genes will result in vulnerability, and sometimes the genes will only lead to vulnerability under very specific environmental conditions. Therefore due to this complexity, not all carriers of addiction genes will express the trait and no two addicts will possess the same combination of addiction genes…

Epigenetics and Addiction: Certain circumstances or events in life can cause a gene to be silenced or expressed. Everything from exposure to tobacco, to what an individual eats or where they live can overtime cause chemical modifications around genes that lead to those genes being switched on or off. Chemical tags, or epigenetic markers, attach to DNA, instructing that cell to either activate or silence a particular gene. Epigenetic changes to gene expression are not final and can sometimes be reversed, however there is a lot of new research suggesting that Epigenetic changes can be inherited. In between each generation, the epigenetic markers are eliminated in cells named 'primordial germ cells' (PGC), which are the predecessors of the gamete cells. This enables every gene to be read afresh for each new generation. The primordial germ cells (PGC) are very efficient at this 'reprogramming' of DNA, however recent research at the University of Cambridge, funded by the Wellcome Trust, found that some rare forms of DNA methylation can 'avoid' the erasing process. Thus, the epigenetic information can be transmitted to the subsequent offspring and generations. Epigenetic changes to DNA can also occur during pregnancy, and act directly upon the foetus. Circumstances such as, the mother's diet or stress levels can lead to epigenetic changes in the foetus.