ADD Genetics and Smoking

When we are young and just learning about genetics, we learn about tall and short pea plants, straight and curly hair, and how many blue-eyed children a couple can expect to have. Genetics is simple when all you contemplate is dominant and recessive genes with tiny Punnett squares. Then, the high school biology teacher throws you for a loop. There's co-dominance…and di-hybrid crosses. The Punnett squares get larger and more difficult to figure out. Just when you think that you know what you are doing, epigenetics comes along. What in the world is epigenetics, and why is it important in the study of Attention Deficit Disorder?

Genes are the code that makes you who you are and me who I am. We are all made from a basic code, called DNA, where genes are combined, re-combined and expressed to make each human a unique being. Yes, even identical twins are unique! While they are mostly alike, each monozygotic (from one egg) twin will have copy number variants (CNV) that differ. What does CNV mean? A CNV is a small segment of DNA that is unique to each individual. Sometimes, CNVs are missing, and at other times there are multiples. Research has shown that ADD is, in part, linked to CNVs on Chromosome 16. That's a chromosome that influences brain development.

Genes live to express themselves! No, they don't do art projects or play music; a gene is a little chemical factory that can be switched on or off. Whether genes are switched on, or expressed, helps to decide your weight, height, and whether or not you have Attention Deficit Disorder. Recent studies indicate that smoking while pregnant may predispose the child to developing Attention Deficit Disorder. A newer study gives evidence that maternal smoking may influence successive generations of offspring to have Attention Deficit Disorder.

A study was published in The Journal of Neuroscience and conducted by researchers at Florida State University College of Medicine. Their research was part of a scientific effort to understand and explain the recent spike in cases of ADD. In this study, mice were used to examine multiple generations to see if the effects of smoking would be transmitted through successive generations. Researchers concluded that
genetic damage done by smoking was transmitted through the female mice to future generations. More research needs to be completed by studying human subjects to see if this also holds true with humans.

A person doesn't just inherit genes that are unchanged as they are passed down from one generation to the next. When the gene sequence is changed, some of those changes might be able to be passed on to successive generations. These epigenetic changes can affect whether a familial tendency toward Attention Deficit Disorder is expressed in the maternal offspring or not. In short, ADD might be caused, in part, by whether a person's grandmother smoked when she was pregnant.

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