OPINION

Un-identical twins

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28 MARCH 2008

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The first indication that autism has genetic origins came from **twin studies**. Ditto for schizophrenia and many other diseases.

The idea that monozygotic twins born after a single zygote divides into two embryos are genetically identical has been the defining feature of thousands of studies, including ones that have tried to tease out the different influences of genes and environment.

Apparently, they were all a bit off.

According to a study in this month?s issue of the ***American Journal of Human Genetics***, monozygotic twins aren?t exactly identical.

It turns out that these twins have different copy number variations in which large pieces of DNA are either missing or are present in multiple copies. As we?ve been learning with increasing frequency over the past two years, these copy number variations may be important in diseases such as **autism** and **schizophrenia**. Of the 19 pairs in this study, for example, only one twin in each of nine pairs showed signs of Parkinson?s disease or dementia.

We already knew that identical twins become gradually less identical as they age and are exposed

to different environments, accumulating **epigenetic** modifications. These are changes in which the genetic sequence itself remains the same, but chemicals that attach to the genes turn them on or off, and in that way alter each twin?s risk of developing, say, cancer or diabetes.

It?s not yet clear whether copy number variations are similarly accumulated over time, or whether they are present at birth or before. And it?s much too soon to conclude that the variations may be the reason for the dementia seen in one twin but not the other.

What?s perfectly clear, however, is that monozygotic twins aren?t perfectly identical.