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Epigenetics: Chemicals Turn Genes On and Off at the Wrong Times

by David Gutierrez, staff writer

(NaturalNews) Scientists are increasingly becoming aware of a new mechanism by which pollutants can damage the health of living organisms -- epigenetic changes, in which a chemical changes how a gene is expressed.

While some chemicals are toxic (attacking the body's systems directly) and others are mutagenic (changing the actual code of an organism's genes), others do not change the way a gene is written, but instead how it acts in the body.

Epigenetic changes "can lead to increased susceptibility to disease," said Linda S. Birnbaum, director of the National Institute of Environmental Health Sciences and of the National Toxicology Program. "The susceptibility persists long after the exposure is gone, even decades later. Glands, organs, and systems can be permanently altered."

Epigenetic changes have been identified that increase the risk of Alzheimer's disease, asthma, breast cancer, prostate cancer, diabetes, heart disease, obesity, learning disabilities, Parkinson's disease and more.

One example was recently uncovered by researchers at the University of Cincinnati, who conducted a study on children in New York City who had been exposed to high levels of air pollutants in the womb. These children had higher rates of asthma than children who had not had such exposure.

Upon performing genetic tests, the researchers found that all the exposed, asthmatic children had a methyl group molecule attached to the ACSL3 gene, causing it to be less active than normal. None of the unexposed children had this molecule attached to their ACSL3 gene.

Researchers have also found epigenetic changes in children conceived through in-vitro fertilization. They believe that the chemicals used to incubate the fertilized eggs before implantation might cause epigenetic changes that lead to the higher rates of abdominal wall defects and cancers observed in such children.

Like mutations, epigenetic effects can be passed on to a person's offspring.

"There is a huge potential impact from these exposures, partly because the changes may be inherited across generations," Birnbaum said. "You may be affected by what your mother and grandmother were exposed to during pregnancy."

Sources for this story include: www.environmentalhealthnews.org.