

Health

Disease in our destiny



Kathryn Borg

victims of our genetic history. Medicine has accepted the neo-Darwinist interpretations of health, in that each of our cells, equipped with a full pack of genes, mostly lives out a pre-programmed future. In other words, genetics is our destiny; therefore the blueprint for our lives and our health lies in our DNA, which is a coding that holds a fixed menu of our potential for health or illness.

However, growing evidence popularised by the work of biologist Bruce Lipton demonstrates that, far from being a pre-determined destiny, our genes exist much as subatomic particles do, only as a potential.

We are beginning to understand that the environment, our diet, our lifestyle, the quality of the air we breathe and the water we drink, the state of our relationships, the stress in our lives, all have a large say in what is ultimately expressed through our genes. Scientists are learning that it is these outside influences filtering through the cellular membrane that actually control the cell and consequently the behaviour and health of the whole organism.

Epidemiologists at the University of Rochester's medical centre followed up women taking part in a Women's Health Initiative study over a 15-year period. The study

was examining the benefits and safety of hormone replacement therapy (HRT) in more than 16,000 women. The study was halted after five years when scientists found that women taking HRT were more likely to develop breast cancer, ovarian cancer, stroke and heart disease.

The University of Rochester follow-up assumed that a higher incidence of cancer would be found among the women who had a family history of the disease. This was not the case. Evidence showed that whether or not a woman developed cancer only had to do with whether she took HRT, not whether her family members had cancer.

New findings have shown that outside influences, such as our diet or environment, can alter our genes. Researchers from the Karolinska Institute in Sweden have discovered that DNA isolated from the muscles of Type 2 diabetics carry certain distinctive chemical marks on the gene responsible for controlling the amount of fuel (either fat or sugars) burned by the body's cells. The same chemical marks have been found in those with pre-diabetes but not in healthy people.

This suggests that the development of diabetes is a process that begins with an aberration in the genes responsible for processing sugar; this process is then triggered and developed by outside influences, or 'insults', to the body. This is not a new idea, but one whose time has come through a new science called 'epigenetics' which is the study of how the environment affects genes.

"Outside influences actually control the cell and consequently the health of the whole organism"

In 1802, more than half a century before Charles Darwin published his views on natural selection, French botanist, zoologist and philosopher Jean-Baptiste Lamarck had written *Recherche sur L'Organisation des Corps Vivants*, which was the first book to set out a coherent and well-developed theory of evolution. He followed it up in 1809 by *La Philosophie Zoologique*.

Lamarck, as did Darwin, believed in an evolving chain of being. However, Lamarck differed in that he believed the environment, rather than genetic coding, was responsible for changes in animals, and that these changes could also be inherited. His views were soundly rejected and he died a pauper, his family destitute and his body buried in a lime-pit grave.

However, his work was revived in the 1950s when C. M. Waddington, a British lecturer at Cambridge, carried out studies on fruit flies demonstrating that abnormal conditions at early stages in their lives led to mutations that would be reproduced in eight generations of offspring. Waddington coined the phrase 'epigenetic landscape' to suggest that the environment helps cells to differentiate into their various jobs. Lamarck, who had been ridiculed up to then, has indeed been vindicated by many recent studies proving that environmental influences produce changes in an organism that persists through subsequent generations.

There is a host of further research, all of which has extraordinary implications for modern medicine. It makes us think again about family history as a life-or-death sentence. What the new research emphasises is that health and disease is the sum total of how we live our lives. It places the responsibility for our health squarely on our own shoulders, and not on those of our parents or grandparents.

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When we become ill it is common for us to blame our ancestors or, more specifically, our family. We see ourselves, in a sense, as the

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