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Early Experience Can Reverse the Effects of Genes

Researchers at UCLA have discovered that early family experience can completely reverse the effect of a genetic variant linked to depression. Under the direction of Shelley E. Taylor, Ph.D., principal investigator and chief of the lab, the team discovered that among offspring from cold, non-nurturant, or conflict-ridden families, those with the short form of the serotonin transporter gene (5-HTTLPR) were at greater risk for depression, as some previous research has found. However, among offspring from nurturant families characterized by warmth and supportiveness, those with the short form of the 5-HTTLPR gene had a significantly reduced risk for depression.

Young adult men and women who participated in the study completed assessments of depression, early environment, and current stress. For example, participants were asked how often they had been loved and cared for, insulted, sworn at, or shown physical affection by their families. Salivary samples were used to determine if their standing on the 5-HTTLPR had two short alleles (s/s), a short and a long allele (s/l), or two long alleles (l/l) for the serotonin transporter gene. Findings showed that the particular combination of alleles alone did not predict if an individual was more likely to develop symptoms of depression. Rather, it was the combination of the genetic variant (s/s) and the person's environment that determined whether that person experienced symptoms of depression.

Among other implications, the findings suggest that the short form of the 5-HTTLPR is highly responsive to environmental influence, and that rather than predicting

risk for depression, its effects vary substantially, depending on how supportive the external environment is.

These conclusions were bolstered by parallel evidence collected by the team which showed that a current supportive environment reduced risk of depression among those with the *s/s* form of the 5-HTTLPR gene, whereas those experiencing a great deal of stress in their lives had an increased risk of depressive symptoms if they had the *s/s* variant of the 5-HTTLPR.

“Genes are not destiny,” Taylor noted. “Although some genes confer particular risks, others, such as variants of the 5-HTTLPR, are clearly highly responsive to input from the early and current environment. That means, among other conclusions, that there is an important role that parents and even friends can play in conferring protection against the risk of depression that stress can confer.”

The study adds a new component to evidence that the environment can regulate biology and steer the effects of genetic predispositions. “It indicates just how important a loving and caring family can be,” commented Baldwin Way, a co-investigator on the project. The other members of the research team were William Welch, Clayton Hilmert, Barbara Lehman, and Naomi Eisenberger.