Myopia: Gene-environment Interaction

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Abstract

Introduction*: Myopia has reached epidemic proportions in Japan, Hong Kong, Taiwan and Singapore. This review summarises the evidence for environmental and genetic factors as well as gene-environment interaction for myopia for both epidemiologic studies as well as animal models. *Methods*: A literature review was conducted after a Medline search on articles on the genetic or environmental aetiology of myopia in animal or epidemiologic studies. Articles on the methodology of gene-environment studies were also reviewed. All articles reviewed were articles published in peer-reviewed journals. *Results*: Cross-sectional studies have found a positive association between myopia and near work activity such as reading and writing. Likewise, laboratory research has shown that environmental factors such as visual deprivation may lead to the development of myopia in animals. While linkage studies in humans are currently being conducted to identify possible markers for myopia in the human genome, several neurotransmitters, modulators and growth factors that influence refractive development have already been identified in animal models that may help identify candidate genes. Epidemiologic studies have also evaluated the combined effects of hereditary factors, environmental factors and gene-environment interaction on myopia development. *Conclusions*: Both genes and environmental factors may be related to myopia. There are no conclusive studies at present, however, that identify the nature and extent of possible gene-environment interaction. Further linkage analysis, affected sib-pair studies, and family-based association studies may better identify the nature of gene-environment interaction.

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