

Gene x environment interaction: Do we fail to identify influential environmental determinants of health by ignoring genes?

Prof. Irva Hertz-Picciotto, University of California, Davis, Ca, USA.

Despite a common perception of the importance of both environmental and genetic factors in the aetiology of most diseases, there are relatively few robust, replicated gene–environment interactions in the epidemiological literature. Furthermore methods for the evaluation of GxE interactions are still being developed. Two distinct perspectives on geneXenvironment interactions have been voiced in epidemiology circles. One argument for studying such interactions is an enhanced power to identify associations of a health outcome with both the gene polymorphism and the environmental exposure, as compared with separate studies examining marginal effects for each factor separately. On the other hand, it is widely assumed, either explicitly, or implicitly based on actual practice of researchers, that pursuit of interactions should be limited to exposures and/or genes that show an overall (marginal) effect in a population. The wisdom in each of these contradictory views hinges on the state of nature, namely, the degree to which underlying interactions actually occur even when marginal associations are unremarkable. This session will discuss geneXenvironment interactions, whether current strategies have been adequate to identify these relationships, and results of some simulations designed to identify what sets of parameter values are compatible, for given sample sizes, with the two alternatives: "marginal association first," vs. "interactions regardless.