

Genetic Liability, Threshold Model.

Both Liability and the threshold model are term associated with multifactorial disorders. A lot of multifactorial traits such as height and intelligence display continuous variation which seems logical based on the large number of genetic and environmental factors that can affect them. However some multifactorial disorders such as diabetes mellitus and autism can be seen to display discontinuous variation with individuals either being affected or not with no intermediate state. The threshold model allows this phenomenon to be explained.

Liability

Liability is a term used to collectively describe all the genetic and environmental factors that contribute to the development of a multifactorial disorder. Although it is impossible to directly measure the liability of a certain individual, the liability for a group of people can be estimated based on the number of affected individuals within that group. Liability is best represented as a standard distribution curve as most individual who are unaffected will posses some degree of liability with only a small portion of a population having a liability that is very low or that exceed the threshold level (see figure below).

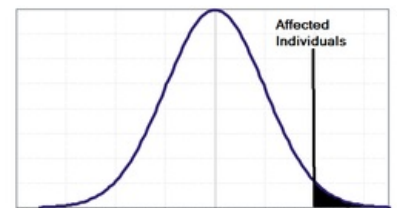
The Threshold Model

At the point an individual accumulates a certain liability, they will be affected by the disorder. The level of liability at which this occurs is referred to as the threshold level. The liability required to exceed the threshold level is the same in all individuals; however, individuals with affected relatives (especially first degree relatives) will have a higher chance of exceeding the threshold level and being affected. This is due to shared genetic and environmental factors. As a general rule, the later in life a multifactorial disorder develops, the more it is dependent on environmental factors (the lower the heritability). The pattern of multifactorial inheritance allows multifactorial disorders to be differentiated from autosomal disorders which they can resemble at a quick glance.

Links

Related Articles

- Multifactorial Inheritance
- Disorders with Multifactorial Inheritance in Man
- Heritability
- http://en.wikipedia.org/wiki/Genetic_disorder



A standard distribution of liability with the threshold level marked (black line) along with affected individuals (black)