

# Statistical Tests for Pleiotropy

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## Abstract:

Pleiotropy is a situation in where a single gene influences multiple phenotypic traits and can be categorized in a variety of types. Here, we focus only on two primary types: mosaic and relational pleiotropy. In mosaic pleiotropy, a gene affects two or more traits, whereas relational pleiotropy can be defined as the situation in which a gene affects two traits but only one trait is affected independently and the other trait is affected as a result of the gene influence on the first trait. We propose two novel statistical methods for testing these two types of pleiotropy via an *intersection-union test* for mosaic pleiotropy and a *mediation analysis approach* for relational pleiotropy.