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Linkage analysis

© SPMM Course Adoption studies Adoption studies are useful to differentiate the effects of genes and environment. The basic method of the adoption study lies in comparing the rates of disorder in biological relatives and adoptive relatives. There are many types of adoption studies.

Types Compared groups

Group1 Group2 Parent as proband (1 and 2) Adopted away children of ill parents (biological or adoptive) Adopted away children of well parents (biological or adoptive) Adoptee as proband (3) Biological relatives of (ill and well) adoptees Adoptive relatives of (ill and well) adoptees Crossfostering (4) Children with ill biological parents but raised by well adoptive parents Children with well biological parents but raised by ill adoptive parents

Adoption studies have certain potential problems. (1) There is a tendency for higher rates of some psychiatric difficulties amongst adopted children as adoption itself occurs due to various difficult social circumstances. (2) Adoptive parents are more likely than not to resemble biological parents as social agencies attempt to match the families of origin to families of adoption. B. Molecular genetic studies Linkage analysis During prophase I of meiosis, homologous chromosomes line up and occasionally exchange portions of their DNA. This process is termed crossover or synapsis. When a crossover event occurs between two loci, x and y, the resulting chromosomes may contain a new combination of alleles at loci x and y. This new combination is called a recombination. Because crossover events occur more or less randomly across chromosomes, loci that are located farther apart are more likely to experience an intervening crossover and thus a recombination of alleles. This offers a means of assessing the distance between loci on chromosomes. Alleles of loci that are close together on the same chromosome are likely to be inherited together; these loci are said to be linked. To be linked, these alleles must be syntenic i.e. on the same chromosome. If two loci are on different chromosomes, or if they are far apart on the same chromosome, their alleles will be transmitted independently. As crossing over is an independent event for each locus, if an allele at one locus is transmitted, there is a 50% chance (as in coin tossing) that a given allele at the

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