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Hardy-Weinberg Principle

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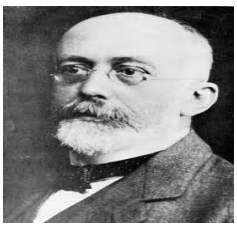
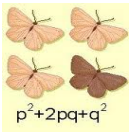
Hardy Weinberg Equation





The Hardy–Weinberg principle states that bothallele andgenotype frequencies in a population remain constant from generation to generation unless specific disturbing influences are introduced.

Constant population is mentioned as ‘equilibirum’ by Hardy - Weinberg.

Disturbing Influences

Selection

Random genetic drift

Gene flow
Meiotic drive
Non-random mating
Mutations
Limited population size
Overlapping generations

Other names of the theory

HWP

Hardy–Weinberg equilibrium
Hardy–Weinberg Theorem
HWE
Hardy–Weinberg law

Definition of Evolution

Evolution is simply a change in frequencies of alleles in the gene pool of a population. This definition of evolution was developed largely as a result of independent work in the early 20th century by Godfrey Hardy, an English mathematician, and Wilhelm Weinberg, a German physician. In 1908 they proposed "gene pool frequencies are inherently stable but that evolution should be expected in all populations virtually all of the time".

Hardy-Weinberg principle, an important concept of population genetics, predicts the inheritance of traits and gene frequencies over generations. They proposed that the gene frequency would be remain the same in all generations unless they met with any sudden changes like mutations.

Evolution will not occur if the populations met the following 7 conditions.
1. Mutation is not occurring
2. Natural selection is not occurring
3. The population is infinitely large
4. All members of the population breed
5. All mating is totally random
6. Everyone produces the same number of offspring
7. There is no migration in or out of the population

As the above 7 will always happen it is not possible to have the population without change.

The mathematical equation of

Hardy Weinberg

$p^2+2pq+q^2 = 1$

p and q are the frequencies of alleles.
p added to q always equals one .

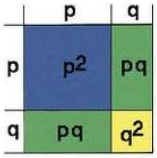
New genotypes can be derived using aPunnett square.

	Females		
	A(p)	a(q)	
Males	A(p)	AA(p2)	Aa(pq)
	a(q)	Aa(pq)	aa(q2)

Genotype

AA Aa aa
P^2 2 pq q^2

• 25% of the offspring are homozygous for the dominant allele (AA)
• 50% are heterozygous like their parents (Aa) and
• 25% are homozygous for the recessive allele (aa) and thus, unlike their parents, express the recessive phenotype.

Signific 

ance of the Hardy-Weinberg Equation

• Geneticists were able to use Punnett squares to predict the probability of offspring genotypes for particular traits
• It allows to find the genotypes of the parents
• Helps to find out the heterozygous or homozygous condition
• Used the same thing for entire populations

Want to know more about Hardy Weinberg Principle? Click here to schedule live online session with e Tutor!

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Reference Links:

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