Hardy-Weinberg law and evolution:

In the absence of genetic changes in a population or as long as a population is maintaining Hardy-Weinberg law, the evolution does not occur.

⇒ The genetic equilibrium is caused by the following evolutionary forces.

1. Mutation.
2. Natural Selection.
3. Non-random mating.
4. Small population size and genetic drift
5. Migration and gene flow.

→1 **Mutation:-** The law material for evolution is produced by mutation. It is caused by any mistake in duplication of gene during cell devision. Most of mutations occurring in nature are recessive. These are expressed only

when they achieve homozygous status. Continuously occurring mutation in a population constitutes mutation pressure.

→ 2. Natural selection:— Natural selection operates upon the raw materials produced by mutation. Nature selects those individuals which have beneficial mutation and eliminates containing harmful mutations. Due to this only individuals with favourable characters get better opportunities to add new individuals in population. This also provides them to spread more rapidly than other. This leads to the differential reproductions of genes. The differential reproduction of genes upsets Hardy-Weinberg equilibrium and helps evolution to progress.

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→3. Non-random mating:— Hardy-Weinberg equilibrium is maintained only when mating in a population is at random. But it is not possible in most cases. Mating is a selective process. Mates are chosen on the basis of a number of favourable characters such as health, beauty, mentality etc. This non-random mating causes uneven and non-random recombination of genes. As a result some genes spread more rapidly than others. The Hardy Weinberg genetic equilibrium progress of evolution.

→4. Small Population Size and genetic drift.

Large Mendelian Population is the primary need for the maintenance of Hardy-Weinberg genetic equilibrium. Because the gene frequencies change purely by chance in a small population. It is called Sewall Wright effect because it was first described by

Sewall Wright in 1931. A change in gene frequency purely by chance in small population is called genetic drift. It is insignificant in large population.

→ 5. Migration and gene flow:— When immigrated individuals mate with the inmates of the population, the transfer of genes of one population into another population occurs. This is called gene flow. This results in production of new type of genetic recombination due to an addition of genes in the gene pool.