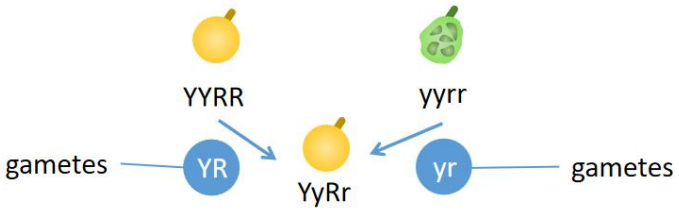
Law of Genetics

- Allele: each of two or more alternative forms of a gene that are found at the same place on a chromosome
- In an allele, their are usually two gene types: **dominant** and **recessive**, and when dominant gene appears, it will recess the recessive gene, so that recessive gene cannot be expressed in phenotype.

eg. Left-hander and Right-hander: Why right-hander is much more than left-hander? It is because the gene of right-hander is dominant, while the gene of left is recessive. Suppose the gene of right is **R**, and left is **r**. Human is diploid, so only if the two alleles in our body is **rr**, we would be left-hander, otherwise, if we are **Rr** or **RR**, we will be right-hander.

Law of Genitics

- Mendel's Laws:



Suppose pea cells are diploid, and their are two properties in its phenotype, color and shape. Each property is determined by two alleles. The alleles that control its color have two types: **Y**(yellow) and **y**(green). The one that control its shape have two types: **R**(round) and **r**(wrinkled). **Y** and **R** are dominant, and **y** and **r** are recesssive.

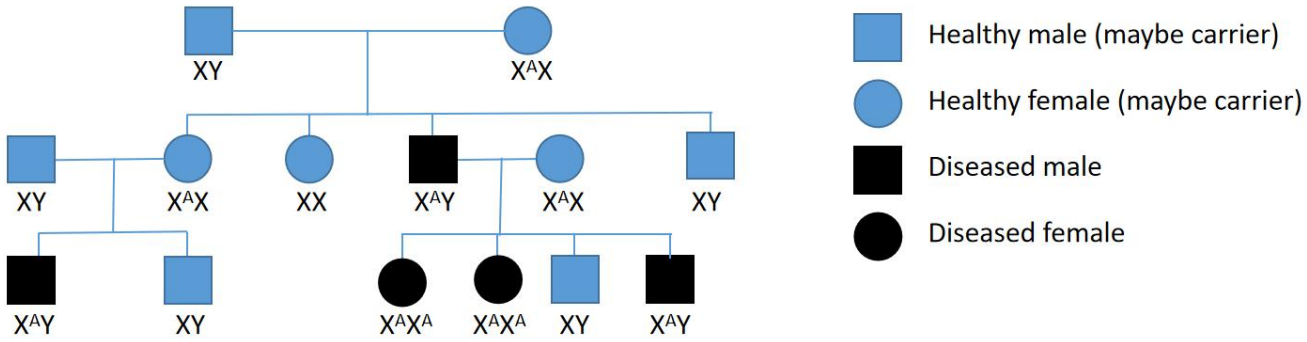
Allele	Y	y
Y	YY	Yy
y	Yy	yy

Allele	R	r
R	RR	Rr
r	Rr	rr

Gamate	YR	Yr	yR	yr
YR	YYRR	YYRr	YyRR	YyRr
Yr	YYRr	YYrr	YyRr	Yyrr
yR	YyRR	YyRr	yyRR	yyRr
yr	YyRr	Yyrr	yyRr	yyrr

Law of Genitics

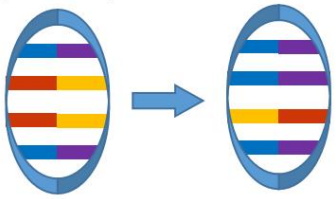
- Some genes are binded with sex, this caused some illness in a family that only some sex, or sexes with some conditions. The people with certain conditions have a very high possibility to got this illness.



eg. Color blindness is binded with X-chromosome, and is a recessive gene
We suppose X is Healthy X-chromosome, and XA is X with color blindness gene

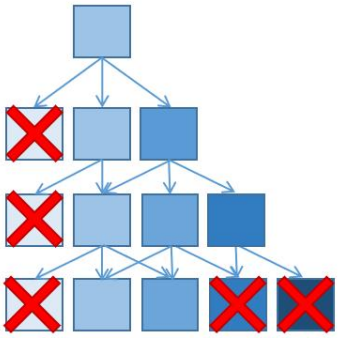
Evolution

- In modern evolution theory, **evolution** is defined as the **change** of **gene frequency** (the relative proportion of a allele) over **generations** in a **species**.
- Mainly, there are three main factors or theories that effect gene frequency: **Natural Selection**, **Genetic Drift**, and **Mutation**.
- **Mutaton** is very basic. And it is the basic of evolution, because if their is no mutation, then the gene frequency would not change, and evolution will have no meaning.



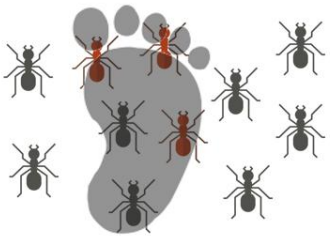
Evolution

- **Natural Selection**: This theory is proposed by **Charles Robert Darwin**. In short, he thinks evolution is made up by directionless change and directional selection. “Survival of the fittest,” that is the main idea of this theory.



natural selection

- **Genetic Drift** have no direct relations to natural selections. It is a kind of random event or fortune. Comparatively, genetic drift have much more effects in small population, while barely effect the huge population.



eg. When a small ant species are crossing the road, a naughty kid stamped on them, and it is such a coincidence that all ants with the gene of red body was dead. Thus, the gene frequency changed, and evolution happens.

Source: https://view.inews.qq.com/a/20220106A03M1100

Thank You!