

Newsletter of Science Society, June, 2023 二零二三年六月

Basic genetics 基礎遺傳學

Basic knowledge:

- Each human cell contains 46 chromosomes.
- During human fertilization, a sperm and an ovum fuse together to form a zygote. It later develops into an embryo and fetus. After about 40 weeks, a baby is born and it has the genetic materials from both mother and father.
- Gametes of human: sperm & ovum. Both are haploid while human cells are diploid.



Continuous variations:

- a type of variation which is distributed on a continuum
- example: body weight, height, heart rate, finger length

Discontinuous variations:

- abrupt variation in which there are few or no intermediate forms.
- example: blood group, ability of tongue-twisting, gender



Mendel's first law:

- Can be used to explain the monohybrid inheritance (discontinuous variations) in humans and plants

<u>Application: human having earlobes (耳珠)</u>

- Human either has earlobes or not. Having earlobes (R) is dominant (顯性) while no earlobes (r) is recessive (隱性).
- The characteristic will be first decided by dominant and then recessive.
- heterozygous (雜種) must show dominant (顯性) character.
- Have earlobes cases:
 - (1) the alleles is $RR \longrightarrow$ homozygote (純種)
 - (2) the alleles is $Rr \longrightarrow$ heterozygote (雑種)

No earlobes cases:

(1) the alleles is rr → homozygote (純種)

Cases 1)	The pa	arents a	re one RR	(純種有	<u> 耳珠)</u>	and one Rr	(雜種有
	<u>耳珠)</u>						
<u>Genetic d</u>	iagram:	<u> </u>					
Parents:	R	R	Х	R r			
	/	١		/ \	۱		
Gametes:	R	R		R	r		
(1st c	ross 3rd;	1st cros	s 4th; 2nd cr	oss <mark>3rd</mark> ; 2	2nd cross	3 4th)	
Offspring:	RR	Rr		RR	Rr		

Result: all their offspring should have earlobes

Cases 2) The parents are one Rr(雜種有耳珠) and one Rr(雜種有 耳珠) Genetic diagram: Parents: Rr Χ R r / \ / \ R Gametes: r R r (1st cross 3rd; 1st cross 4th; 2nd cross 3rd; 2nd cross 4th) Offspring: RR Rr Rr rr (No earlobe) Result: have earlobes: no earlobe = 3:1

Cases 3)	The pa	arents are	e one rr	・(純種無	<u>飛耳珠</u>)) and or	ne Rr	(雜種有耳
	<u>珠)</u>							
<u>Genetic d</u>	iagram	•						
Parents:	I	r r	Х	R	r			
	/	١		/	۱			
Gametes:	r	r		R	r			
(1st cr	oss 3rd;	1st cross 4	th; 2nd	cross 3rd;	2nd cro	oss 4th)		
Offspring :	Rr	rr		Rr	rr			
		(No earlo	obe)		(No ear	rlobe)		

Result: have earlobes: no earlobe = 1:1

Conclusion:

Here only come some basic ideas of genetics. There are still the blending theory and other specific terms which cannot be included. If you are interested in all these, you can definitely search on the Internet for more information or consider choosing Biology as your elective.

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	4			1		2	5	

RELAXING ZONE

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