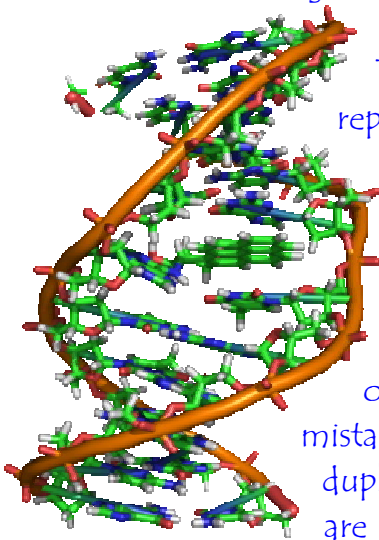


Are Mutations (突變) the Raw Materials of Evolution (演化)?

Mutation is a change in the sequence of an organism's DNA caused by high-energy sources such as radiation or by chemicals in the environment. They can also appear spontaneously (自然地) during the replication (複製) of DNA. Mutations generally fall into two types: point mutations (點突變) and chromosomal aberrations (染色體畸變). In point mutations, one base pair is changed. The human genome, for example, contains over 3.1 billion bases of DNA, and each base must be replicated for cell division to occur. Mistakes, although surprisingly rare, do happen. About one in every 10^{10} base pair is changed. The most common type of mistake is a point substitution. More uncommon is deletion, point duplication (複製) and insertion (插入). Chromosomal aberrations are larger-scale mutations that can occur during meiosis in unequal crossing over events, slippage during DNA recombination or due to the activities of transposable events. Genes and even whole chromosomes can be substituted, duplicated, or deleted due to these errors.



Mutations are essential to evolution. Every genetic feature in every organism was, initially, the result of a mutation. The new allele (等位基因) spreads via reproduction, and differential reproduction is a defining aspect of evolution. A mutation also allows an organism to feed, grow or reproduce more effectively causing the mutant allele to become more abundant over time. Soon the population may be quite ecologically and physiologically different from the original population that lacked the adaptation. Even deleterious mutations can cause evolutionary change, especially in small populations, by removing individuals that might be carrying adaptive alleles at other genes. For instance, natural selection (自然選擇) in some ancestral snakes has favored enzymes with increasingly more aggressive properties, but the mutations have been random, creating different venoms in different groups of snakes. Snake venoms are actually a cocktail of different proteins with different effects, so genetically related species have a different mixture from other venomous snake families. They have many different species that inherited a slight advantage in venom power from their ancestors, and as mutations accumulate the diversity of venoms and diversity of species increased over time. Although the history of many species has been affected by the gradual accumulation of tiny point mutations, sometimes evolution works much more quickly.



Time traveler - 'The Grandfather paradox'(祖父悖論)



Time travel is impossible as exemplified by the famous grandfather paradox. Imagine you build a time machine. It is possible for you to travel back in time, meet your grandfather before he produces any children (i.e. your father/mother) and kill him. Thus, you would not have been born and the time machine would not have been built, a paradox.

Perhaps the craziest of the time travel paradoxes was

cooked up by Robert Heinlein in his classic short story "All You Zombies."

A baby girl is mysteriously dropped off at an orphanage in Cleveland in 1945. "Jane" grows up lonely and dejected, not knowing who her parents are, until one day in 1963 she is strangely attracted to a drifter. She falls in love with him. But just when things are finally looking up for Jane, a series of disasters strike. First, she becomes pregnant by the drifter, who then disappears. Second, during the complicated delivery, doctors find that Jane has both sets of sex organs, and to save her life, they are forced to surgically convert "her" to a "him." Finally, a mysterious stranger kidnaps her baby from the delivery room.

Reeling from these disasters, rejected by society, scorned by fate, "he" becomes a drunkard and drifter.

Not only has Jane lost her parents and her lover, but he has lost his only child as well. Years later, in 1970, he stumbles into a lonely bar, called Pop's Place, and spills out his pathetic story to an elderly bartender (酒保). The sympathetic bartender offers the drifter the chance to avenge the stranger who left her pregnant and abandoned, on the condition that he join the "time travelers corps." Both of them enter a time machine, and the bartender drops off the drifter in 1963. The drifter is strangely attracted to a young orphan woman, who subsequently becomes pregnant.

The bartender then goes forward 9 months, kidnaps the baby girl from the hospital, and drops off the baby in an orphanage back in 1945. Then the bartender drops off the thoroughly confused drifter in 1985, to enlist in the time travelers corps. The drifter eventually gets his life together, becomes a respected and elderly member of the time travelers' corps, and then disguises himself as a bartender and has his most difficult mission: a date with destiny, meeting a certain drifter at Pop's Place in 1970.

The question is: Who is Jane's mother, father, grandfather, grandmother, son, daughter, granddaughter, and grandson? The girl, the drifter, and the bartender, of course, are all the same person. These paradoxes can make your head spin, especially if you try to untangle Jane's twisted parentage. If we draw Jane's family tree, we find that all the branches are curled inward back on themselves, as in a circle. We come to the astonishing conclusion that she is her own mother and father! She is an entire family tree unto herself.



~>_<~ Relax a moment! :::>_<:::

Science is never boring but interesting. Our universe is much bigger than you have thought.

If I have seen further it is by standing on the shoulders of giants.

Isaac Newton



	6		8		9		
3				2		6	
	4				3	7	1
6					4		2
		4	3	8		1	
5			7				9
	7	1	2			9	
	3			7			1
		5			9	3	

Please welcome to join our lunch time video show activity. There are many exciting videos are waiting for you!

Previous Answer:

1	4	5	3	2	7	6	9	8
8	3	9	6	5	4	1	2	7
6	7	2	9	1	8	5	4	3
4	9	6	1	8	5	3	7	2
2	1	8	4	7	3	9	5	6
7	5	3	2	9	6	4	8	1
3	6	7	5	4	2	8	1	9
9	8	4	7	6	1	2	3	5
5	2	1	8	3	9	7	6	4

Science Quiz (1/3-31/3)

- Q1. Mutations can appear spontaneously during the replication of DNA. (T/F)
 Q2. Mutations are not necessary for evolution. (T/F)
 Q3. Free wills of organisms determine the nature of mutation. (T/F)
 Q4. Grandfather paradox has been used to argue that the General Relativity is wrong. (T/F)
 Q5. Who is Jane?

(1).Jane's mother (2) Jane's grandfather (3). Jane's son (4). Bartender
 A. (1)only B. (1),(3)and(4) C. (1),(2),(3)and(4) D. None of the above
 Previous Answers (1/1-31/1): Q1. A Q2. F Q3. T Q4. F Q5. D

You can use the answer sheet on the right to answer the question. Collection box is put on the book shelf of the Staff Room. The students who answer all correct will be given a special gift. Everyone can submit one answer sheet only. Thanks for your participation!

Name: _____

Class: _____ (____)

1. _____

4. _____

2. _____

5. _____

3. _____

Hope you can find out the answers and know more about Science!

SCIENCE SOCIETY 2011-12

CHAIRPERSON: MAK SHUN KI 麥順淇 4E

COMMITTEE MEMBER:

LAU WAI NIM 劉威念 4A, LEE KA HANG 李嘉恒 4A, TANG PUI KEI

鄧珮琦 4A, LAM HO LIM 林皓廉 4D, WONG CHUN FUNG 黃進鋒 4D,

CHAU IRIS 周雅詩 4E & CHIK CHUNG YIN 植頌然 4E

We are going to hold a science competition "Pearl over the canyon" 《深谷還珠》 on 9th March in hall. See you!

科普講座名稱	日期	時間	地點	講員
「靈機妙動」	3月10日 (六)	2:30 - 4:00pm	香港科學 館演講廳	陳帆工程師(機電工程署署 長)
「風雲」	3月17日 (六)	2:30 - 3:15pm	香港科學 館演講廳	韓志強工程師(土木工程拓 展署署長)
「息變」	3月17日 (六)	3:15 - 4:00pm	香港科學 館演講廳	林偉喬先生(副政府資訊科 技總監顧問服務及營運)
輻射防護與 健康	3月24日 (六)	2:30 - 3:30pm	香港科學 館演講廳	潘昭邦博士(衛生署放射衛 生部高級物理學家)

**Lunch Time Video Show: Mar 2012 地球歷險記
(12:20p.m.) @ Chem Lab Rm512**

Date	Name of Program	Area
2/3 (Fri)	Expedition Antarctica 南極大遠征 (Part II)	Adventure 探險
9/3 (Fri)	Monster Fish Of The Congo 剛果神祕大魚 (Part I)	Adventure 探險
16/3 (Fri)	Monster Fish Of The Congo 剛果神祕大魚 (Part II)	Adventure 探險
23/3 (Fri)	Riddles of the Dead : Titanic's Ghosts 謎中 謎：鐵達尼號的幽靈 (Part I)	Adventure 探險
30/3 (Fri)	Riddles of the Dead : Titanic's Ghosts 謎中 謎：鐵達尼號的幽靈 (Part II)	Adventure 探險