

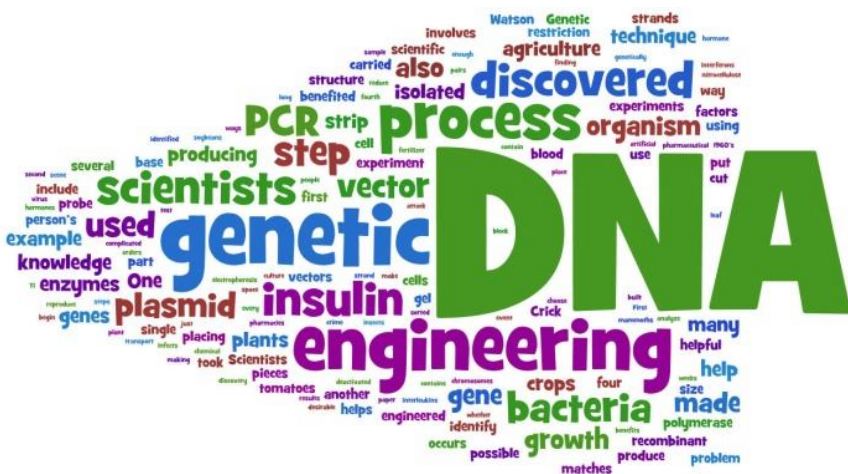
April, 2013

二零一三年四月號

WHAT IS GENETIC ENGINEERING?

Genetic engineering(基因工程) is the alteration of genetic code by artificial means, and is therefore different from traditional selective breeding.

Genetic engineering examples include taking the gene that programs poison (毒物) in the tail of a scorpion (蠍子), and combining it with a cabbage (捲心菜). These genetically modified cabbages kill caterpillars because they have learned to grow scorpion poison (insecticide 殺蟲劑) in their sap.



Genetic engineering also includes insertion of human genes into sheep so that they secrete (分泌) alpha-1 antitrypsin (抗胰蛋白酶) in their milk - a useful substance in treating some cases of lung disease.

Genetic engineering has created a chicken with four legs and no wings.



Genetic engineering has created a goat with spider genes that creates "silk" in its milk.

Genetic engineering works because there is one language of life: human genes work in bacteria, monkey genes work in mice and earthworms. Tree genes work in bananas and frog

genes work in rice. There is no limit in theory to the potential of genetic engineering.

Genetic engineering has given us the power to alter the very basis of life on earth.

Genetic engineering has been said to be no different than ancient breeding methods but this is untrue. For a start, breeding or cross-breeding, or in-breeding (for example to make pedigree dogs) all work by using the same species. In contrast genetic engineering allows us to combine fish, mouse, human and insect genes in the same person or animal.

Genetic engineering therefore has few limits - except our imagination, and our moral or ethical code.

Pros of Genetic Engineering

Better Taste, Nutrition and Growth Rate

Crops like potato, tomato, soybean and rice are currently being genetically engineered to obtain new strains with better nutritional qualities and increased yield. The genetically engineered crops are expected to have the capacity to grow on



lands that are presently not suitable for cultivation. The manipulation of genes in crops is expected to improve their nutritional value as also their rate of growth. Biotechnology, the science of genetically engineering foods, can be used to impart a better taste to food.

Pest-resistant Crops and Longer Shelf life

Engineered seeds are resistant to pests and can survive in relatively harsh climatic conditions. The plant gene At-DBF2, when inserted in tomato and tobacco cells is seen to increase their endurance to harsh soil and climatic conditions. Biotechnology can be used to slow down the process of food spoilage. It can thus result in fruits and vegetables that have a greater shelf life.

Genetic Modification to Produce New Foods

Genetic engineering in food can be used to produce totally new substances such as proteins and other food nutrients. The genetic modification of foods can be used to increase their medicinal value, thus making homegrown edible vaccines available.

Modification of Genetic Traits in Humans

Genetic engineering has the potential of succeeding in case of human beings too. This specialized branch of genetic engineering, which is known as human genetic engineering is the science of modifying genotypes of human beings before birth. The process can be used to manipulate certain traits in an individual.

Cons of Genetic Engineering

May Hamper Nutritional Value

Genetic engineering in food involves the contamination of genes in crops. Genetically engineered crops may supersede natural weeds. They may prove to be harmful for natural plants. Undesirable genetic mutations can lead to allergies in crops. Some believe that genetic engineering in foodstuffs can hamper their nutritional value while enhancing their taste and appearance.



May Introduce Harmful Pathogens

Horizontal gene transfer can give rise to new pathogens. While increasing the immunity to diseases in plants, the resistance genes may get transferred to the harmful pathogens.

May Lead to Genetic Defects

Gene therapy in human beings can have certain side effects. While treating one defect, the therapy may lead to another. As one cell is responsible for many characteristics, the isolation of cells responsible for a single trait is indeed difficult.

「水的巡禮」講座系列

| 題目及講者 | 日期 | 時間 |
|---|--------------------|----------------|
| 水的科學 - 地上水，天上來？ 講者：陳龍生教授 (香港大學地球科學系教授) | 13.4.2013 (星期六) | 下午 2:30 – 3:15 |
| 水的科學 - 望天打卦 講者：何建宗教授 (香港公開大學科技學院院長) | 13.4.2013 (星期六) | 下午 3:20 - 4:05 |

註：每次講座完畢後都附有 25 分鐘(4:05pm -4:30pm)答問時間

語言：粵語 (conducted in Cantonese)

地點：香港科學館演講廳

免費活動，即場入座，座位先到先得。

查詢電話：2732 3223 (星期一至五：上午九時至下午一時；下午二時至五時，公眾假期除外)

TIME TO RELAX!

Previous Challenging Question

$$\begin{aligned}
 a &= b \\
 a^2 &= ab \\
 a^2 + a^2 &= a^2 + ab \\
 2a^2 &= a^2 + ab \\
 2a^2 - 2ab &= a^2 + ab - 2ab \\
 2a^2 - 2ab &= a^2 - ab \\
 2(a^2 - ab) &= 1(a^2 - ab) \\
 2 &= 1
 \end{aligned}$$

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | 2 | | | 5 | 7 | | 1 | |
| | 5 | 9 | 8 | 2 | | | | |
| 6 | | | | | | | | |
| | | 1 | | | 5 | 3 | | |
| | | | 2 | | 9 | | | |
| | | 8 | 1 | | | 7 | | |
| | | | | | | | | 6 |
| | | | | 7 | 6 | 9 | 8 | |
| | 8 | | 9 | 3 | | | 7 | 5 |

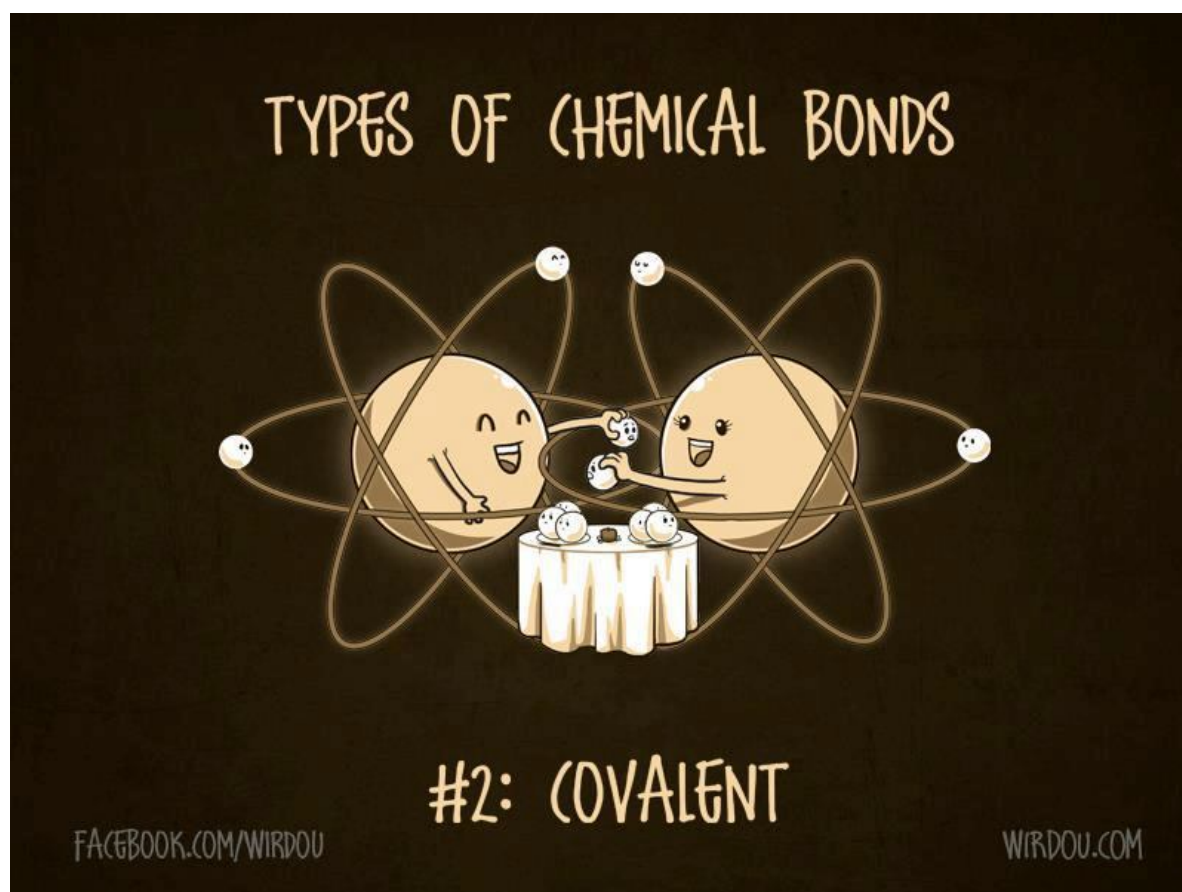
Solution:

In the 2nd last step:
 $2(a^2 - ab) = (a^2 - ab)$
 we would never factor out "1":P

Previous Sudoku Answer:

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

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