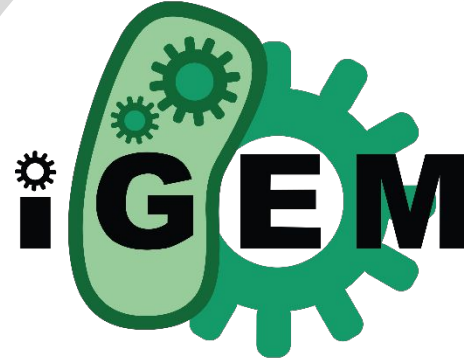




POWER UP YOUR FUTURE

Science Technology Engineering Arts Math



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Bioengineering Summer Camp 2018

August 1, 2018

Brought to you by RAIN, Graduate Tacoma's STEAM Network,
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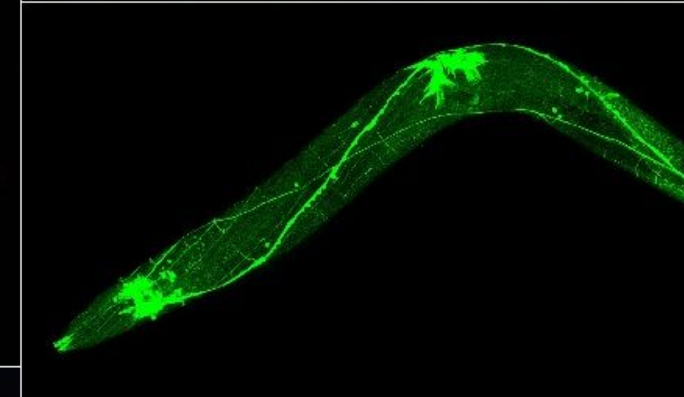
What's the difference between Cloning and Genetic Engineering?

- Cloning is a process by which identical copies of an organism are made. The copy, or clone, possesses exactly the same genetic material as the original organism.
 - Identical twins are an example of naturally occurring clones.
- Bacteria, many plants and even some higher life forms can reproduce asexually.
 - Dolly the sheep, cats, dogs, rabbits, deer, mules and other mammals have been successfully cloned.



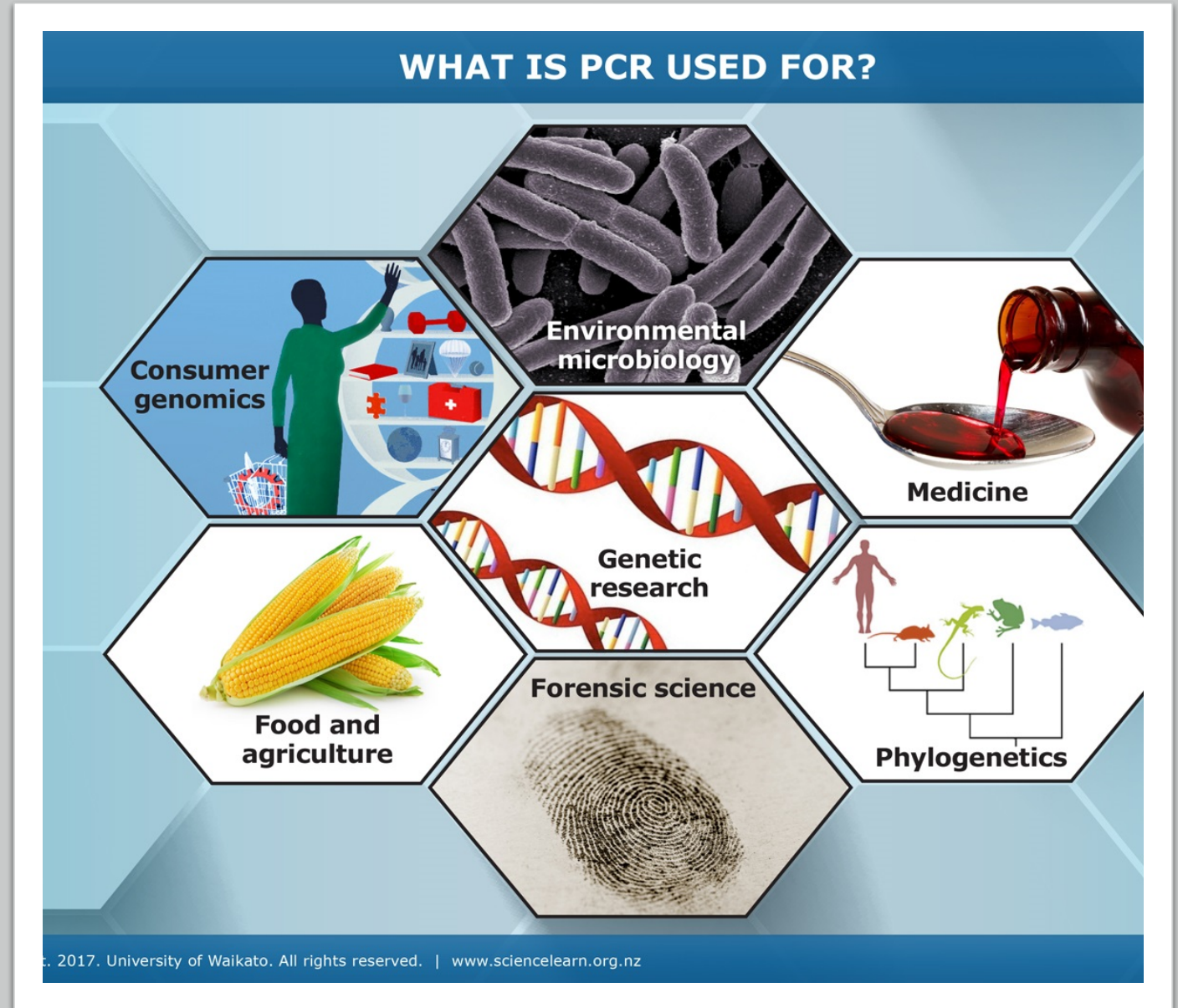
What's the difference between Cloning and Genetic Engineering?

- Genetic engineering refers to processes in which scientists manipulate genes to create purposefully different versions of organisms—and, in some cases, entirely new living things.
- Geneticists have even introduced genes from one species to another.
 - genetically engineered organism usually would not occur naturally through sexual reproduction.



Polymerase Chain Reaction (PCR)

- **Polymerase chain reaction, or PCR,** is a technique to make many copies of a specific DNA region *in vitro* (in a test tube rather than an organism).
- PCR relies on a thermostable DNA polymerase, ***Taq* polymerase**, and requires DNA **primers** designed specifically for the DNA region of interest.
- In PCR, the reaction is repeatedly cycled through a series of temperature changes, which allow many copies of the target region to be produced.
- PCR has many research and practical applications. It is routinely used in DNA cloning, medical diagnostics, and forensic analysis of DNA.



Evolution of PCR (6:51)

POLYMERASE CHAIN REACTION



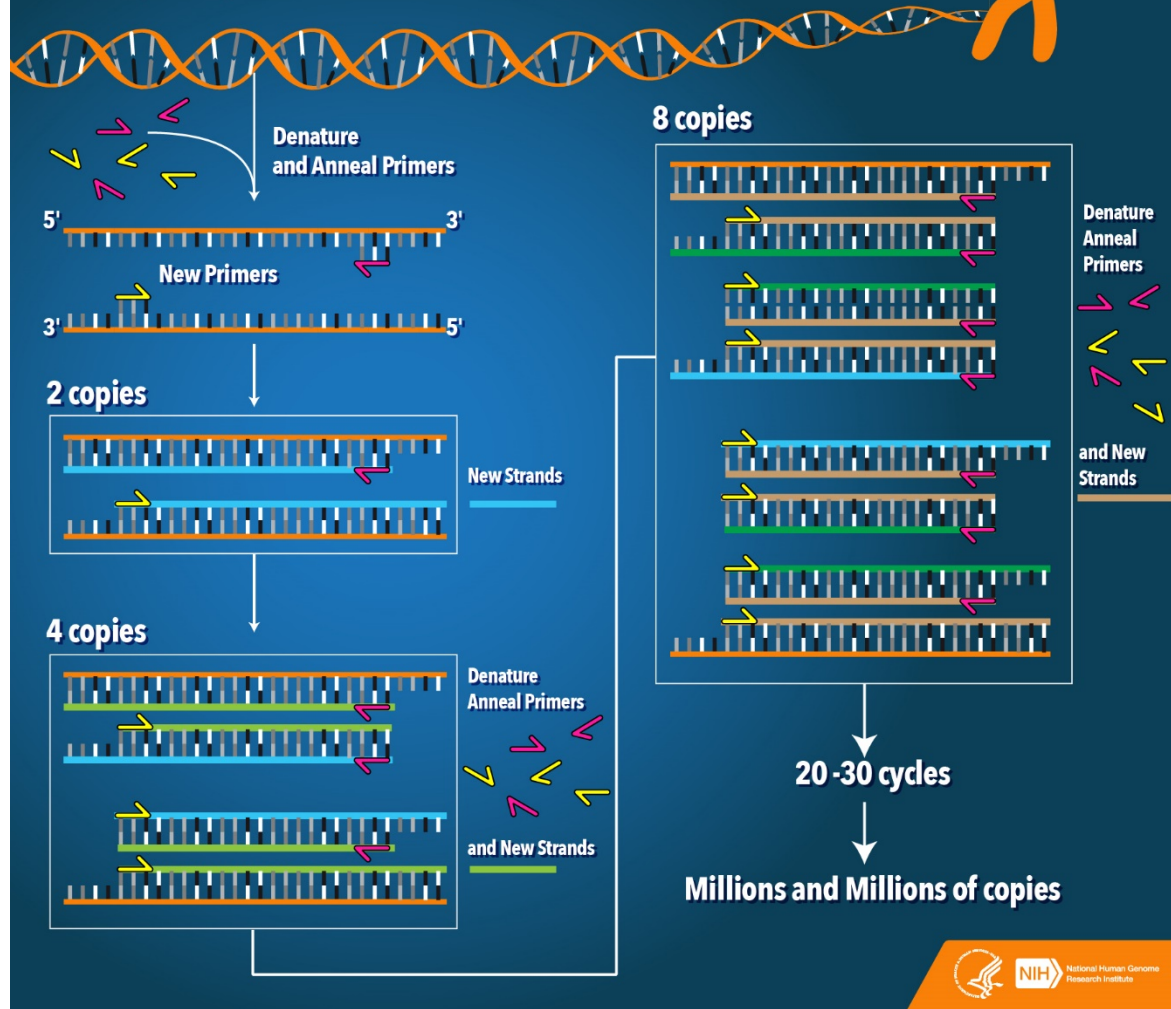
Introduction to PCR (2:10)





PCR - Polymerase Chain Reaction

NHGRI FACT SHEETS
genome.gov

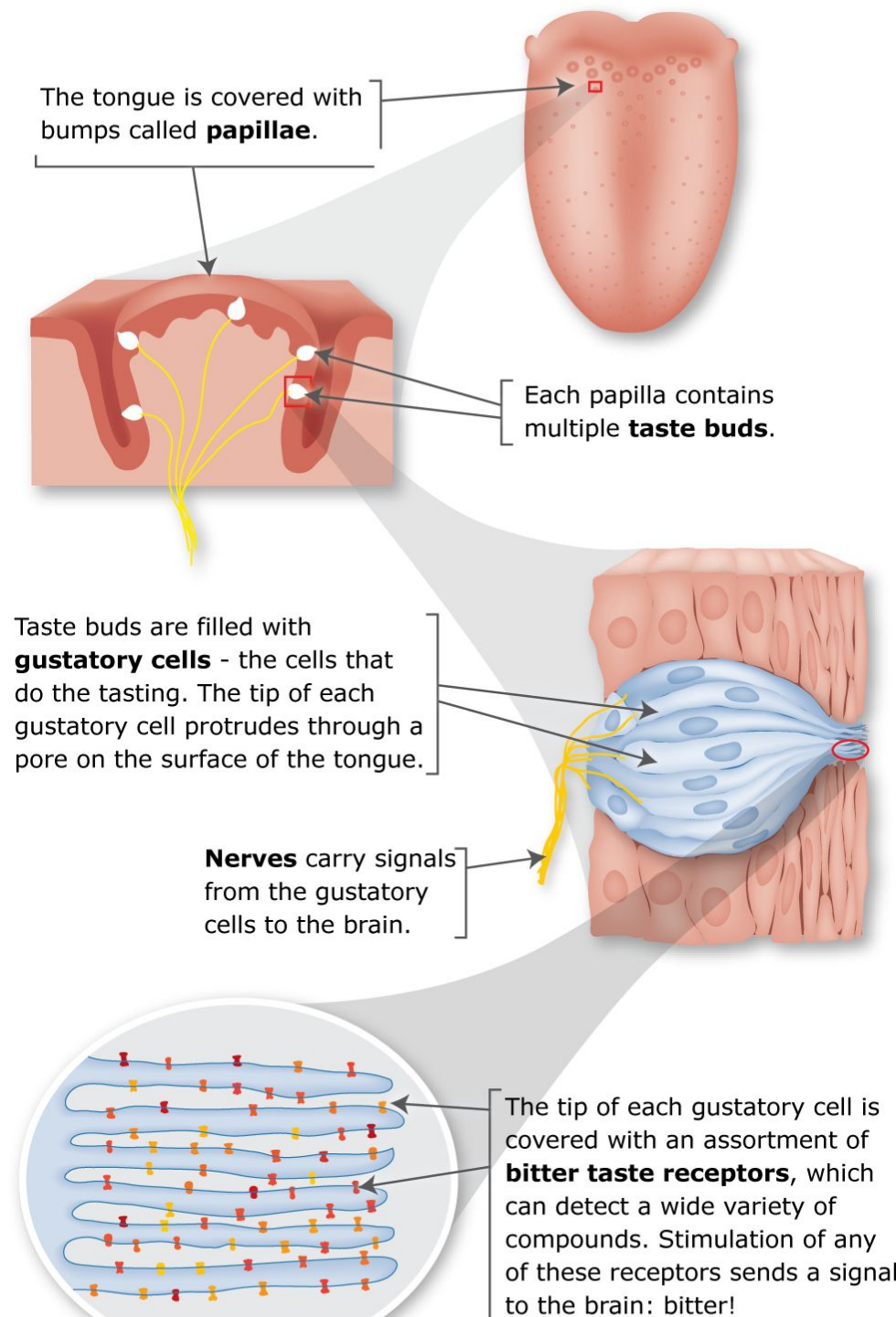


PTC – Phenylthiocarbamide (also known as phenylthiourea)

- In 1931, a chemist named Arthur Fox was pouring some powdered PTC into a bottle. When some of the powder accidentally blew into the air, a colleague standing nearby complained that the dust tasted bitter. Fox tasted nothing at all. Curious how they could be tasting the chemical differently, they tasted it again. The results were the same. Fox had his friends and family try the chemical then describe how it tasted. Some people tasted nothing. Some found it intensely bitter, and still others thought it tasted only slightly bitter.

PTC Taste

- the chemical structure of PTC resembles toxic alkaloids found in some poisonous plants.



Genetics of PTC Tasters

