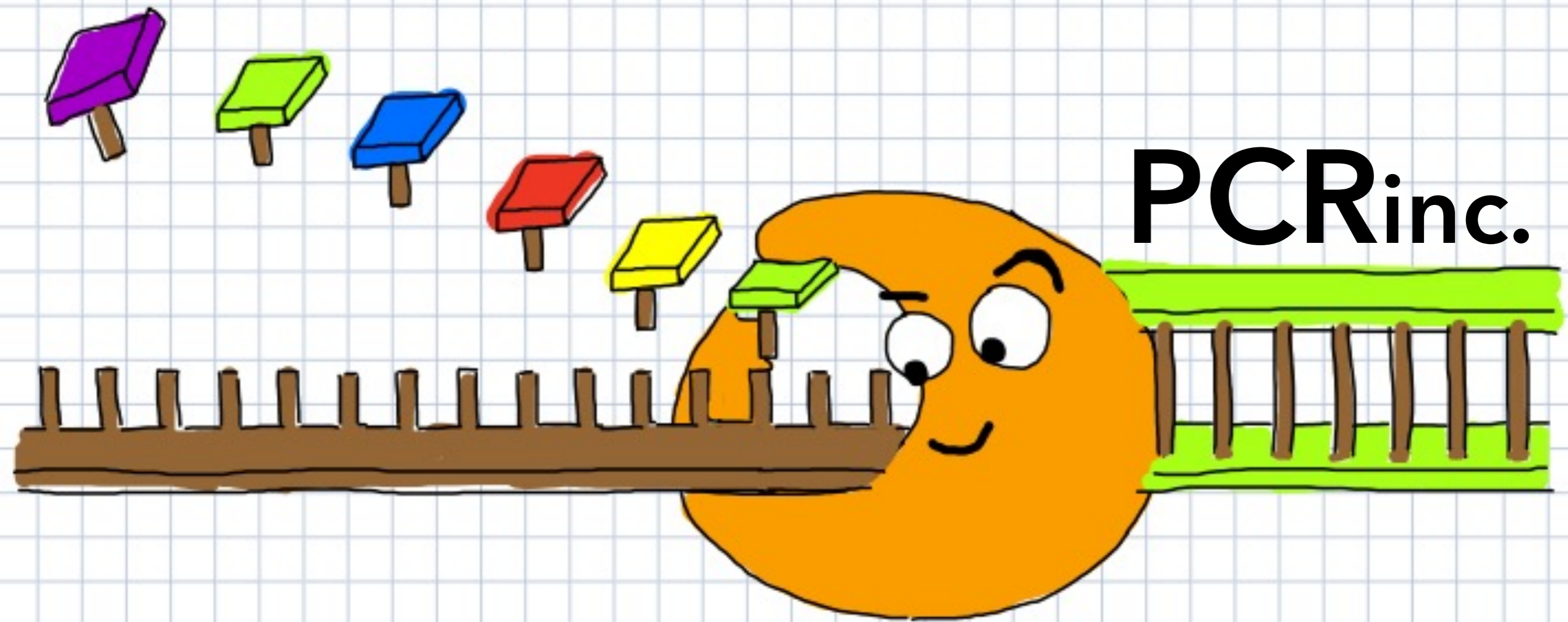


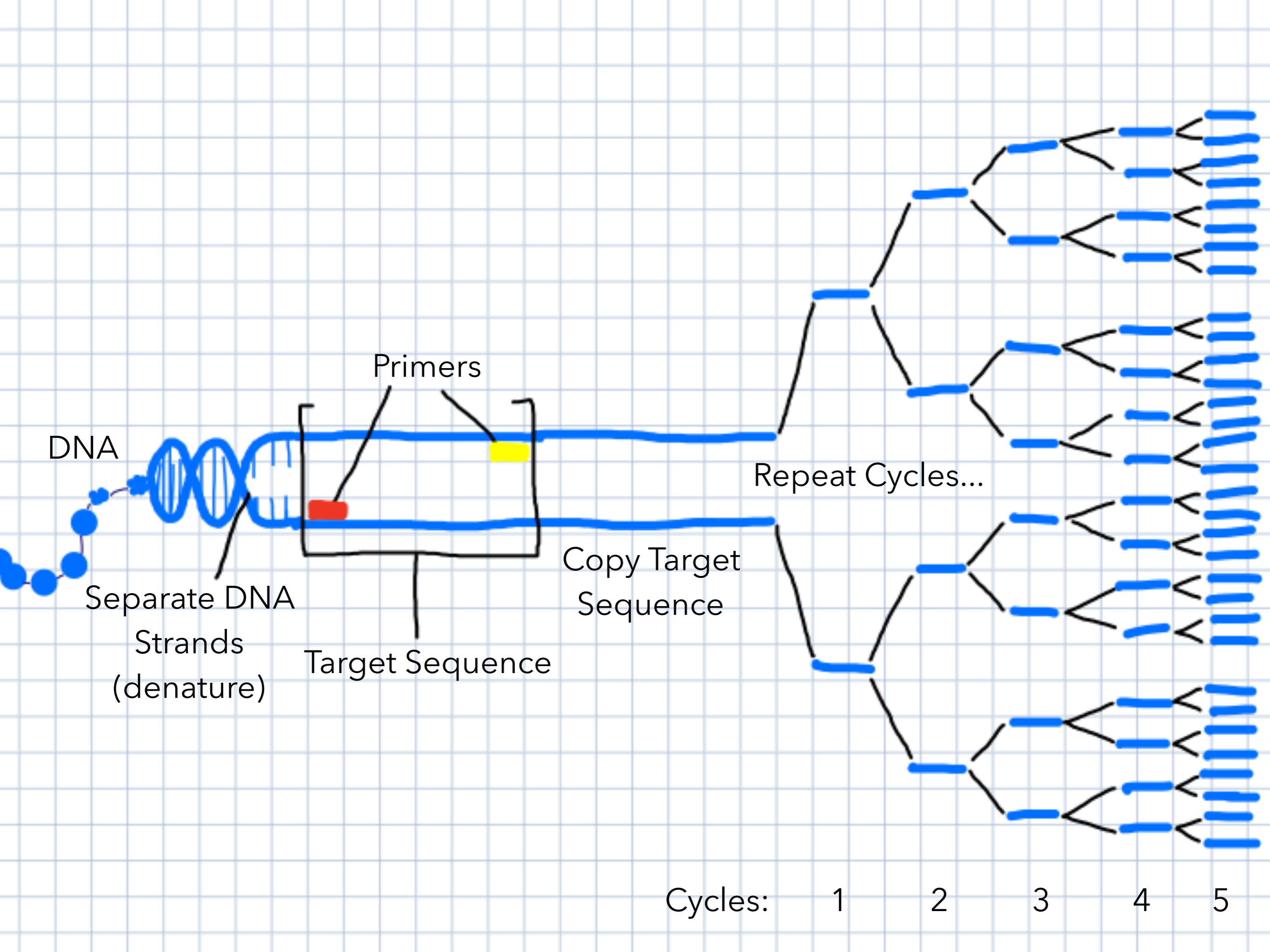
Polymerase Chain Reaction

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How does it work?

Here, at PCR Inc., we amplify segments of DNA using PCR. A sample of DNA is heated to its denaturing point, which allows us to separate the DNA into two strands. Then, we use an enzyme called reverse transcriptase, which allows us to create a complementary RNA strand. We can then use this strand to create two new strands of DNA, using the original strands as templates.



How does it work?

[http://www.youtube.com/watch?
v=2KoLnlwoZKU&sns=em](http://www.youtube.com/watch?v=2KoLnlwoZKU&sns=em)

Inventor

PCR was invented by Kary Mullis. When he came up with the idea of PCR in 1983, he was working in Emeryville, California for Cetus, one of the first biotechnology companies. There, he was in charge of making short chains of DNA for other scientists. Mullis has written that he discovered PCR while driving on the Pacific Coast Highway 128 one night on his motorcycle. He was playing in his mind with a new way of analyzing mutations in DNA when he realized that he had actually invented a method of amplifying any DNA region. He later went on to be awarded a Nobel Prize for his discovery.





Current Applications

PCR has numerable uses...

- diagnoses of genetic diseases
- DNA fingerprinting
- locate bacteria and viruses
- study human evolution
- clone the DNA of an Egyptian mummy
- establish paternity or biological relationships

Bioethical Considerations

Since PCR can amplify DNA fragments so quickly and easily, some believe outside sources can obtain copies of the amplified DNA without the original owners permission. This is the main reason why PCR can be considered "unethical". Also, if PCR determines that a person carries a fatal gene, insurance companies many not insure this person.

Pros & Cons

PROS

- Large number of samples completed at once
- Identifies organisms that are usually hard to culture
- Amplifies small amounts of DNA (can detect very low numbers of organisms in a sample).

CONS

- Not sensitive to antimicrobial data
- Complex assay
- Price of equipment and kits is expensive

Case Study

In April 1998, a 72-year old woman disappeared from her home. She was last seen entering in her friend's son's car. It was believed that she had been murdered. An unidentified, badly decomposed body was discovered in the suspect garage in July of 1999. The body was wrapped in a sheet, a blanket, a carpet and packed into a cardboard box. An autopsy revealed that the cause of the death was compression of the victim's neck. Two grey hairs were extracted from the scene and PCR was used to amplify the DNA present in each strand. It was then determined by the DNA of the hair who the victim was.

Conclusion

<http://youtu.be/x5yPkxCLads>