

# Practical Uses of PCR

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# Uses of PCR: Forensics

PCR's ability to amplify even the smallest amount of DNA from samples collected at a crime scene gives the method great power when used in criminal forensics.

The DNA from body fluid, hair, or other tissue samples is amplified to create a nearly unique pattern for each individual. This pattern can then be compared to suspects in the case.

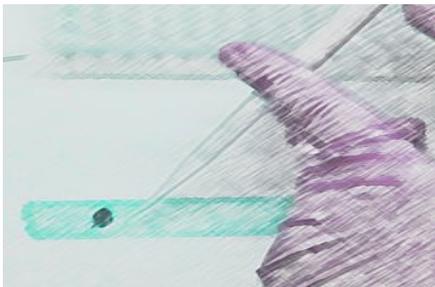
The infamous OJ Simpson case was the first one in which the technique of PCR became widely publicized.

# Uses of PCR: GMO Food Detection

Genetically-modified foods (GMO foods) are widely grown in the USA and other countries.

For various reasons, some countries require exporters to indicate the percentage of GMO content in grain and food shipments.

PCR can be used to accurately measure the exact quantity of genetically-modified food in a shipment, by “looking” at the DNA that makes up the food!

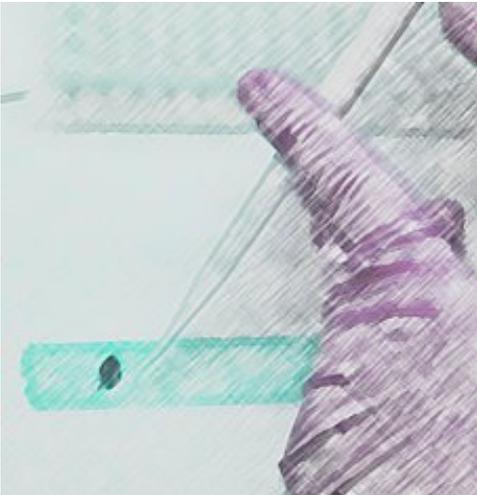


# Uses of PCR:

PCR's power at identifying individual genetic makeup has made it invaluable for use in paternity testing.

By amplifying specific DNA fragments from parents or close relatives, it is possible to reconstruct relatedness between individuals.

PCR can not only identify relationships between people today, but can also be used to identify historical family relationships!



# Uses of PCR:

## Archaeology

PCR has been used for many scientific studies in the field of archaeology:

Reconstructing the Dead Sea Scrolls.

Identification of paint pigments in cave paintings.

Determining relatedness between individuals in ancient ossuaries.

Constructing dinosaurs from blood preserved in amber specimens. (!)

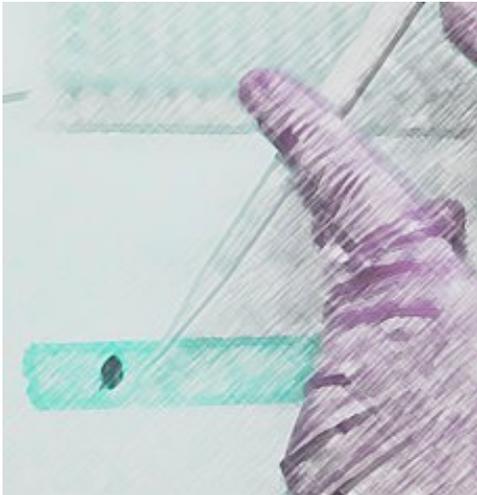


# Uses of PCR:

PCR is now invaluable in modern disease diagnosis.

PCR can identify disease-causing organisms much earlier than other methods, since it looks for the DNA of the organism itself, not its proteins or its effect on our immune system.

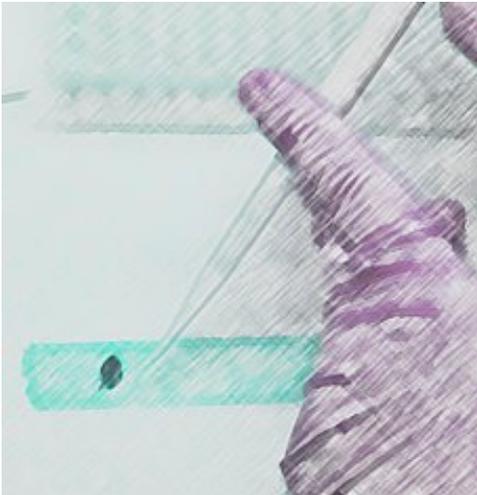
PCR has even been used to diagnose diseases of the past, by amplifying minute amounts of disease-related DNA in preserved specimens.



# Uses of PCR: Disease Treatment

PCR can not only be used in disease diagnosis, but also as an aid in the treatment of diseases.

For example, real-time PCR is used to directly monitor the amount of HIV virus in patients suffering from infection. By monitoring the amount of virus present, the drug therapy can be continually adjusted to maximize virus suppression.



# Uses of PCR:

## Wildlife Conservation



Because PCR can be used to identify not only individuals, but also can differentiate between species, it is often used in wildlife conservation research.

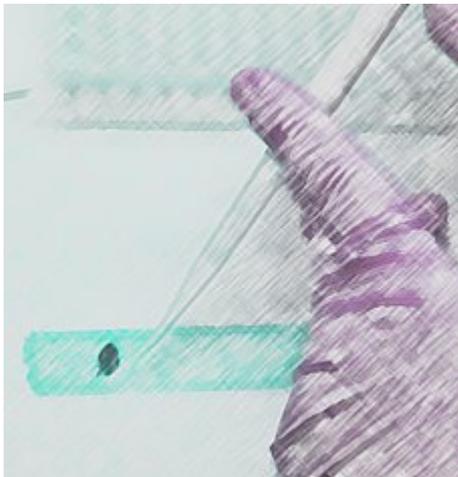
PCR can be used to monitor trade in products made from endangered species.

PCR can be used to monitor ecosystems for the presence of certain species.

PCR can be used even to monitor and identify individual animals!

# Uses of PCR:

## Basic Research



The Human Genome Project has identified tens of thousands of genes in the human genome. A key question is: what do these genes do? Part of the answer comes from determining when the genes are turned on and off, and what affects the level of gene expression. Quantitative PCR is a key component of determining the levels of gene expression, and is a critical tool in cancer research, disease studies, and developmental biology.

