



Molecular Biology Research Unit



Application of PCR

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Application

1. Diagnosis of infectious diseases (Medical uses): PCR is a highly sensitive tool in the diagnosis of various diseases in human, animals and plants.
- PCR allows rapid and highly specific diagnosis of infectious diseases, including bacteria or viruses.

Application

- **PCR also permits identification of non-cultivable or slow-growing microorganisms such as Mycobacteria spp, anaerobic bacteria, or viruses from tissue culture assays and animal models.**
- **Discrimination of non-pathogenic from pathogenic strains by virtue of specific genes.**

Application

- 2. The spread of a disease organism through populations** of domestic or wild animals can be monitored by PCR testing. Especially the appearance of new virulent sub-types. The sub-types of an organism that were responsible for earlier epidemics can also be determined by PCR analysis.
- 3. Detection of genetic diseases:** The occurrence of genetic diseases can be identified by the length of Restriction fragment length polymorphism (RFLP).

Application

4. The amount of virus ("viral load"): can also be quantified by PCR-based DNA quantitation techniques.
5. Detection of Mutation: In case of genetic diseases, there is a mutation resulting in a detectable change in the length of the restriction fragment.

Application

6. Diagnosis of retroviral infection and cancers.

Many forms of cancer involve alterations to **oncogenes**

7. sex determination of embryos.

8. Prenatal testing:

Application

9. **Forensic science**: PCR is very important for the identification of criminal through the DNA fingerprinting technique is used in forensic science.
10. **Gene Therapy**: PCR helps to monitor the gene in gene therapy
11. **Genomic studies**: PCR helps to compare the genomes of two organisms and identify the difference between them.

Application

12. Evolutionary studies: It plays an important role in phylogenetic analysis. Minute quantities of DNA from any source such as fossilized material, hair, bones, mummified tissues can be amplified using PCR technique.

Application

13. Tissue typing: vital to organ transplantation.

As of 2008, there is even a proposal to replace the traditional antibody-based tests for blood type with PCR-based tests.

14. Research applications:

DNA sequencing, DNA cloning, Sequence-tagged sites, gene expression and genetic mapping.

Application

15. PCR in Comparative Studies of Genomes:

The differences in the genomes of two organisms can be measured by PCR.

PCR has revolutionized the studies in palaeontology and archaeology. The movie 'Jurassic Park' has created public awareness of the potential applications of PCR!



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