Polymerase Chain Reaction (PCR) and Microarray

Student Activity

1. What do the initials PCR stand for?

a) polymerization chain reactor
b) polymerase chain reaction
c) polymerization containing reaction
d) polymerase chain reading

2. Who invented PCR?

a) Francis Crick
b) Rosalind Franklin
c) Albert Einstein
d) Kary B Mullis

3. What is the purpose for which PCR is used?

a) to amplify DNA
b) to isolate DNA
c) to study the function of DNA
d) to observe the expression of DNA

4. Which of the following best describes the mixture placed in a PCR vial at the beginning of the PCR procedure?

a) the original DNA sample, Ribonuclease, primers and buffer solution
b) the original DNA sample, PCR enzyme, the four nucleotide bases and primers
c) the original DNA sample, DNA polymerase, the four nucleotide bases and primers
d) the original DNA sample, DNA polymerase, buffer

5. What happens to the DNA when we heat it to 90-95oC for 30 seconds in the first step of the PCR procedure?

a) the DNA strands separate
b) the primers bind to the single DNA strands
c) DNA polymerase extends the new strand by adding bases to the primer segments that are already attached
d) the PCR process repeats itself

6. What is the optimum temperature for the enzyme DNA polymerase used in the PCR process?

a) $40^{o}C$
b) $55^{o}C$
c) $72^{o}C$
d) $90^{o}C$

7. How many copies of a single original DNA strand would you expect to find after about 30 cycles of the PCR process?

a) 100 000
b) 1 000 000
c) 10 000 000
d) 1 000 000 000

8. A microarray is:

a) a collection of microbes
b) an array of microscopic holes
c) a regular array of genic DNA attached to a glass, silicon or nylon chip
d) a type of microscope

9. What is "gene expression"?

a) DNA that is known to contain genes that can be expressed
b) the sequence of DNA that is related to a gene

c) the production of mRNA and proteins that occurs when a gene is transcribed at certain times in the life of the cell
d) the movement of genes from one cell to the other

10. How do we see the hybridized spots on an array?

a) the spots are just big enough for us to see
b) the cDNA or mRNA probe has been labeled with a fluorescent tag that the computer can detect
c) the spots turn orange
d) only the hybridized spots stay on the chip

11. Can we determine how much mRNA is expressed in the cell?

a) Yes, because the computer is able to analyze each hybridized spot and calculate how much is present from the amount of fluorescence it detects
b) No, there is way too much mRNA for us to see any differences
c) No, mRNA amounts cannot be quantified
d) Yes, because we can see how much brighter the spots are than ones that are not hybridized