Explain functional Genomics w.r.t its applications

* Functional genomics is the study of how genes and intergenic regions of the genome contribute to different biological processes
* A researcher in this field typically studies genes or regions on a genome-wide scale, with the hope of narrowing them down to a list of candidate genes or regions to analyze in more detail
* The goal is to determine how the individual components of a biological system work together to produce a particular phenotype
* It focuses on dynamic expression of gene products in a specific context
* E.g.
  + A specific

What is cDNA? Explain the protocol for cDNA generation

* cDNAs are Complementary DNAs
* Double stranded
* One strand is DNA complementary to mRNA, second strand is identical to mRNA seq only T is replaced by U
* Synthesis
  + cDNA molecule generation is a twostep process
    - First step
      * mRNA molecules are used as a template for production of DNA partner strand
      * Reverse transcriptase reverses roles of the molecules by using RNA as a template for DNA production

Unit 3

Write a short note on proteomics and its types

* Proteome is the sum of all the proteins in an organism, a tissue or the sample under study
* Proteomics is the study of composition, structure, function and interaction of the proteins directing the activities of each living cell
* Types of proteomics:
* Functional: Identification of interactions
  + Protein-protein
  + protein-DNA
  + protein-RNA
* Structural: interactions affecting protein structure
  + Metal ions
  + Toxin
  + Drugs
* Differential
  + Differences in protein expression

Write a short note on protein microarray

* Protien microarrays, also known as protein chips, are miniaturized and parallel assay system
* It contains small amounts of proteins in a high density format
* Allows simultaneous determination of a great variety of analytes from small amounts of samples within a single experiment
* Typically prepared by immobilizing proteins onto a microscope slide using a standard contact spotter
* Popular types of slide surfaces incude aldehyde and epoxy derivatized glass surfaces for random attachment through amines
* Methods of arraying proteins are:
  + Robotic method
  + Ink jetting method
  + Piezoelectric spotting
  + Photoliyhography
* There are three types of protein microarrays
  + Analyticl protein microarray
  + Reverse phased protein microarray
  + Functional protein microarray

Write a short note on types of protein microarrays

* There are three types of protein microarrays
  + Analytical protein microarray
    - The most representative class of analytical microarrays is the antibody microarray
    - First model to demonstrate the application of antibody arrays was the analyte labeled assay format
    - In this format proteins are detected after antibody capture using direct protein labeling