The DNA Chip
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The DNA chip is a fairly new concept in the world of integrated circuits. The idea behind the concept is to use an IC to test the different functions of a given chunk of DNA. These chunks of DNA also known as genes have been in the past very hard to work with. When the scientist tested the gene they had to put it in a controlled environment and test each of the genes functions one at a time. There are a few major problems with this line of thinking, the first being time. It's obvious that this could be a very time consuming process, first setting up the experiment then testing the one function that the scientist wishes to study, then repeat the experiment with a different set of variables. Another problem for the scientist is the fact that they are unable to see what the gene will do under its normal circumstances when it will most likely be multitasking.

A solution to this problem has been found in the DNA chip. The chip takes a gene and analyzes it while it is doing more then one function. In the end solving a lot of problems with time and the amount of labor it takes to set up the experiments.

The chip uses an array of cells to hold the DNA while the experiment is going on. Probes are use to sample what is going on in each of the cells. The single probe can monitor more then one function of the DNA code being sampled. The chip uses florescent labels to identify what part of the DNA is active at different intervals in the study.
The process for getting the DNA into the cells of the array isn't quite as easy as it is made out to be. First you have to prep the cells you want to use by extracting the DNA. Then you have to use and RNA primer to get cDNA. You then would put the cDNA into the cells of the array, each of these cells would have a DNA base in the cell so that the cDNA has something to bind with. Once the binding has occurred you wash out any cDNA that is not bound to a base pair and start the analysis of the DNA. The chip uses green and red lasers to detect what sequences of DNA have bound together in each cell. Fist the array is scanned with the green laser, then the information is stored in a computer. Then the array is scanned with the red laser and that is also stored into the computer. Finally the two images are superimposed on one another and you would get an output reading of something much like this array:
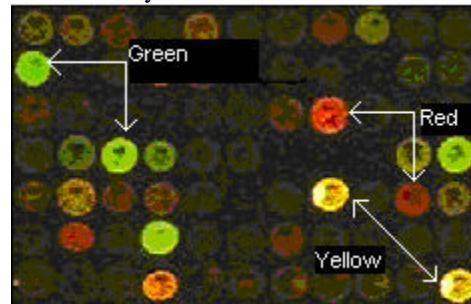
The Red dots are where there is one form on the DNA, Green dots are a different form of DNA and the yellow dots are cells in which both forms of DNA are found. Once you know what DNA is in each of the cells then you can study what each function of the gene sequence is.

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