

Genome Chips and Microarray Technology

Using Biotechnology for Plant Research

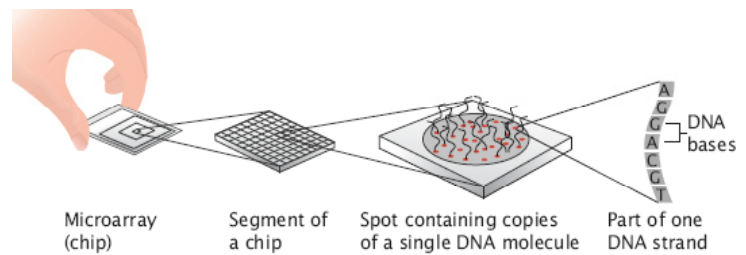
Of the tens of thousands of genes in a plant cell, only some of these genes are expressed or “switched on” at a given time.

A “switched on” gene is one that is transcribing the mRNA, while a switched off gene is one that is not producing mRNA. But which genes are active?

In the past it was only possible to check the activity of a few genes. Genome chip and microarray technology now allows us to study the activity of large numbers of genes simultaneously or even the entire genome!



Affymetrix Gene Chip



The contents of a gene chip

This technology means that it is now possible for us to:

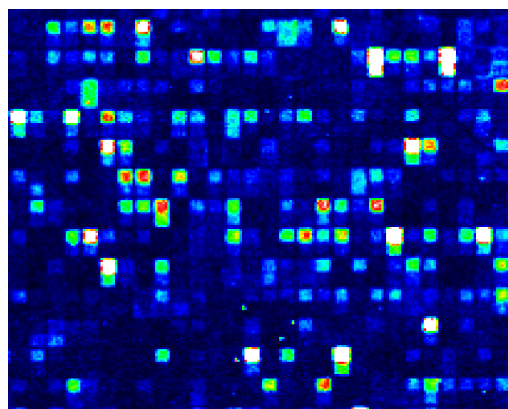
- 1) identify which genes are active and which genes are switched off
- 2) compare gene expression in different cell types
- 3) compare active genes in the same cells under different conditions

Plant Energy Biology use this technology to look at the way in which a plant’s genes interact during energy production and energy use in the plant cell.

Lots of Spots!

The different coloured squares on the microarray let us know if a binding site has been activated.

This tells us whether a gene is active or inactive. Different coloured spots indicate different levels of gene activity and inactivity.



A segment of a microarray

How it works!

We isolate the mRNA from the plant cell and make copy DNA (cDNA).

The single stranded DNA spots on the genome chip provide binding sites for injected cDNA from the plant cell.

We read the genome chip with a specialised computer and get a microarray reading.

For more information on microarray and genome chip technology go to www.affymetrix.com