



Genomic Arabidopsis Resource Network

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Last places for GARNet meeting, register fast!

I have a small number of places still available for the GARNet meeting. If you would like to attend, register as soon as possible at <http://garnet.arabidopsis.org.uk>.

Introduction: Why Affymetrix at NASC?

By David Craigon (NASC Sys admin / Database developer)

Most people reading this will already know that GARNet is a consortium of service providers for Arabidopsis research in the UK. NASC (the Nottingham Arabidopsis Stock Centre) is a part of this consortium. Amongst our roles in GARNet is to provide an Affymetrix GeneChip service for transcriptome analysis. In this article, I am going to describe the progress we have made so far, and what the future holds for our service.

The new generation of transcriptomic analysis techniques promise to revolutionise discovery of gene function, especially in species with complete genome sequences like Arabidopsis. High density arrays of nucleic acids allow the large scale and high throughput analysis of the function and interrelationships of many genes at once: recent microarrays can analyse the complete genome of a species with a modest number of genes like Arabidopsis. Furthermore, it is possible to probe for genes that have only been computationally predicted. One of the most popular microarray technologies is the Affymetrix "GeneChip". These are one-colour microarrays manufactured in bulk by Affymetrix using a custom process. GeneChips have the advantages of high reproducibility and relative ease-of-use. These chips can produce tens-of-thousands of simultaneous readings of mRNA transcript abundance. Most of the Affymetrix equipment in the UK academic sector is owned centrally by universities and institutes and is run as a central service for the local users. Due to the high cost, there are less than 15 of these pieces of equipment in the academic and charitable sectors in Britain.

NASC has been funded to offer an Arabidopsis Affymetrix Service to everyone who wishes to use it. Labs and Institutions that could not otherwise afford access to this technology can use it by proxy by using our service. Furthermore, we specialise in Arabidopsis (and very occasionally other plant species) and so every chip adds to our freely available public database. Early experiments were performed on chips with 8,200 probes (developed by Affymetrix in association with Novartis). However, anyone applying to our service after July gets to run on the brand new complete Arabidopsis genome 22,814 gene chip courtesy of TIGR annotation.

Progress on our Affymetrix Service

We started our worldwide service in February 2002. To date we have run over 100 chips, and processed 10 customers. Customers have come primarily from across the UK, but also from as far as South Africa, the USA and the Netherlands, (with an order from Poland yet to come). Research topics processed include mutant vs. wild type studies, circadian rhythm, meristem activity and cross species comparison. These customers have grown the plants to their satisfaction, extracted total RNA, and sent their samples to us. These samples are processed and labelled at NASC, then run on one of our chips. The data is prepared and then a CD-ROM is sent to the customer with all the data files including an annotated spreadsheet for every chip run. For the first two rounds of applications, the price per chip was only £100. This is the cost of materials used, but not the cost of the chip or the staff time, which have both been paid for on your behalf by the BBSRC. Applications are made through the GARNet homepage.

Currently, the major obstacle facing us meeting our target of 1000 chips processed by February 2003 is the

delay in RNA samples arriving. Although we have 10 customers processed, at the time of writing, we have over 20 waiting to be processed. Every application made to our service has to be scrutinised by our Steering Committee taking up their valuable time. Please do not apply unless you are ready to produce RNA in 3 months, maximum! If you are on the list of people who have been accepted and have not sent us your RNA, please do so quickly, or let us know you are no longer interested. Leaving us in the dark will not impress the steering committee in future applications!

Sharing the Data If you have applied for our service, or are just curious as to how it's going, visit our order tracking webpage. Here you will find a list of all the applications accepted, along with details as to how the experiments are progressing. (and if you want to know who has been holding out on giving us RNA, the information is all available there! hmmm!). This of course is just the beginning of data sharing at NASC. By the GARNet meeting in September, we hope to have a rudimentary portal available, so you can download all of our data so far that is publicly available directly from the database rather than from our current static list of Excel spreadsheets.

From any given microarray experiment, the amount of analysis possible typically far exceeds the amount of analysis the original researcher had intended. The sharing of data to make data mining projects possible is a BBSRC priority- it is not possible to keep any data run on our service private indefinitely. All data run on our service will be publicly available in a maximum of six months (and often sooner). A three or six month grace period can be applied for as part of the general application and is to allow the researchers who made the RNA to get first crack at analysing the data. This also encourages researchers to submit more details about the biological data, since future additions to the database may enrich their own data. It is easy to see that with our target of 1000 chips and beyond, a formidable data resource can be built at NASC. We will, of course, also be sharing our data with other public repositories worldwide.

.p .That concludes my look at our Affymetrix service. If you would like any more information on our service, or any other aspect of NASC, look at <http://arabidopsis.info> or feel free to email me at david@arabidopsis.info. We hope to be running your RNA sometime soon!

David J Craigon, Nottingham Arabidopsis Stock Centre

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