

Microarrays for Environmental Toxicology Water Flea (*Daphnia magna*)



The freshwater crustacean, *Daphnia magna*, is one model system used for evolutionary/ecological genetics and genomic studies. Microarrays, solid support matrices that contain oligonucleotide probes, represent thousands of unique genes from an organism. RNA from these organisms translates into a “snapshot” of the genes being expressed at the time the RNA is collected. This RNA is labeled with a cyanine dye and hybridized to the probes on the microarray. The resultant gene expression patterns are biologically relevant and, when used in ecotoxicology studies, can help identify molecular and genetic mechanisms associated with exposure to environmental contaminants.

EcoArray has released a state of the art 60-mer oligonucleotide microarray to examine gene expression patterns in Daphnia magna.

Our *Daphnia* microarray was constructed by first assembling sequence from publicly held accessible databases¹ to identify non-overlapping, unique sequences (singlets and contigs). Homology searches (Blast) were performed on these sequences in order to provide annotation (gene name) and ontology (gene function) information where present. A total of 4,936 contigs were assembled. Probes, 60-bases in length, were designed using Agilent’s web-based E-Array program.

The content of our *Daphnia* microarray is located on our web site and contains 4936 contigs of which:

- 2,255 are annotated and represented by one probe for the forward strand.
 - 247 are annotated and represented by one reverse complement for the probe.
 - 2,434 are un-annotated and represented by one sense and one antisense probe.
- Thus, we designed a total of 7,370 probes.

EcoArray’s microarrays have a unique format. Each slide contains 8 individual 15K arrays, generating the most data at the lowest cost.

Each of these 7,370 probes is represented twice within each 15K feature array. Microarrays are manufactured for EcoArray by Agilent Technologies, Inc. in an “8-pack” (8 individual 15K arrays per slide) format, which allows for maximum information at lowest cost. Each of the arrays on the slide may be hybridized with a unique sample. Probes are synthesized *in situ* using Agilent’s inkjet based “SurePrint” technology. These arrays are manufactured on superior quality 1” x 3” (24.2 mm x 76.2 mm) treated glass slides for overall excellent performance. This process minimizes variability across each production lot (batch to batch) and provides the highest consistency in slide-to-slide comparisons.



¹ *Daphnia* sequences were obtained from 1) the GenBank Nucleotide database (*Daphnia magna*, n=12,082), 2) Genome Project ID 13036 (n=11,964), and 3) all sequences in the Gene Expression Omnibus (GEO) database (accession number GPL2888).



HOW TO PURCHASE:

These microarrays are sold in two different package configurations:

- **The Complete Package:** With the complete package, you receive not only the arrays, but also complete sample processing in our laboratory. The package includes preparation and quality checks of the RNA samples, labeling with cyanine dyes, hybridization, scanning, quantitative estimates of gene expression with Agilent's Feature Extraction software, and basic analyses with GeneSpring software. You will receive an EcoArray CD with the scanned images and metrics, raw data, analyzed data (graph, etc.), instructions on use of the databases, and customer support. Please contact EcoArray for a quote.
- **The Array Only Package:** This package is intended for researchers who are very familiar with RNA extraction, target labeling and who have access to the specialized equipment (hybridization oven and chambers, and a high resolution 5 micron platform scanner) necessary for processing arrays. Please contact EcoArray for authorization to purchase the arrays directly from Agilent.

The minimum number of arrays that must be purchased and run is 8 (one slide). EcoArray and Agilent offer academic and government discounts where applicable.

Publishing and research use agreement:

EcoArray charges a small licensing/research use agreement fee for each array, which will be billed separately. Our Research Use Agreement is pretty standard -- the only significant limitation is that researchers not use the array for commercial purposes. The research agreement permits publication under MIAME standards.

Data Sharing Program

Additional discounts are available to members of the Data Sharing Program. (See our web site for details on the Data Sharing Program.)

For more information, visit our web site at: www.ecoarray.com

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