

## GENE EXPRESSION ANALYSIS

Gene expression analysis is often an integral component of feed and vaccine trials. Xelect is a spin-out company from a University research group with substantial expertise in fish genomics and gene expression analysis including experimental design and normalisation strategies. Xelect offers a complete and confidential gene expression service at **very competitive prices**.

The genomes of salmonids have undergone two rounds of whole genome duplication (WGD) relative to their last common ancestor with humans. Around 15% and 50% respectively of the duplicated genes (paralogues) from these WGD events have been retained in extant species. The regulatory regions of gene paralogues have diverged in sequence with evolution such that individual paralogues may have very different expression patterns. Differences in coding sequence between paralogues can also lead to proteins with distinct functions. It is not uncommon for particular paralogues of the same gene to be upregulated and downregulated in response to the same treatment. It is therefore essential to understand whether paralogues are present before designing a qPCR study to measure gene expression signatures. It is also essential that primers are designed that will distinguish between paralogues (i.e. to know what you are really measuring). Failure to take these factors into account may lead to misleading results and faulty interpretation of the data.

Before quoting for any job Xelect will carry out a **free consultation** to investigate whether there are paralogues of the genes of interest. If paralogues are present we recommend an initial screening of pooled samples to assess whether paralogues show differential expression across treatments. In such cases we recommend designing primers to measure each paralogue individually. If there is no evidence of differential paralogue expression we will design primers to amplify all the paralogues present reducing the cost of the trial.

The prices quoted below include primer design, full statistical analysis and an easy to interpret report. The following provides a guide to pricing and we will provide a full quotation on request.

- RNA extraction and cDNA synthesis £25/sample
- qPCR per gene with appropriate reference genes £17/sample

### Some examples of publications using gene expression from Xelect staff

Amaral, I.P.G. and Johnston, I.A. (2012) Circadian expression of clock and putative clock-controlled genes in skeletal muscle of the zebrafish. *Am. J. Physiol. Regul. Integr. Comp. Physiol.* 302, R193–R206.

Macqueen, D.J., Garcia de la serrana, D., Johnston, I.A. (2013). Evolution of ancient functions in the vertebrate insulin-like growth factor system uncovered by study of duplicated salmonid fish genomes. *Mol. Biol. Evol.* 30 (5), 1060–1076.

Garcia de la serrana, D., and Johnston, I.A. (2013). Expression of heat shock protein (Hsp90) paralogues are regulated by amino acids in skeletal muscle of Atlantic salmon. *PLOS ONE*, 8 (9) e74295 DOI: 10.1371/journal.pone.0074295.