UHN Microarray Centre

Publications using UHNMAC arrays for Chromatin Immunoprecipitation on microarrays (ChIP-on-chip)

Researchers have used UHNMAC human CpG island (CGI) arrays for genomic research including ChIP-on-chip. ChIP-on-chip has also been performed using Yeast ORF arrays. Recent articles are listed first, in alphabetical order.

Human CGI arrays

References	Summary
Frontini M, *et al*. A ChIP-chip approach reveals a novel role for transcription factor IRF1 in the DNA damage response. Nuc Acids Res 2009, 37(4):1073	Using ChIP-chip (HCGI12K arrays), 202 new binding sites were identified for the transcription factor IRF1. Although previously found to regulate key processes in the immune system and in tumor suppression, IRF1 was also found to be involved in the interstrand crosslink (ICL) DNA damage response pathway.
Hoemme C, *et al*. Chromatin modifications induced by PML-RARα repress targets in leukemogenesis as analyzed by ChIP-Chip. Blood, 2008, 111:2887	Using ChIP-chip (HCGI 12K arrays), 372 direct genomic PML-RARα targets, including regulators of global transcriptional programs and critical regulatory genes for cell-cycle control and apoptosis, were identified. The binding of PML-RARα to target promoters and the resulting histone modifications resulted in mRNA repression of functionally relevant genes. This study concludes that the transcription factor PML-RARα regulates key cancer-related genes.
Huang W, *et al*. The Interferon Consensus Sequence-binding Protein (ICSBP/IRF8) Represses PTPN13 Gene Transcription in Differentiating Myeloid Cells. Biol Chem 2008, 283(12):7921-35	CGI arrays were screened with chromatin that co-immunoprecipitated with interferon consensus sequence-binding protein (ICSBP/IRF8) in order to identify ICSBP target genes. Using this technique, we identified PTPN1, which encodes Fas-associated phosphatase 1 (a ubiquitously expressed protein-tyrosine phosphatase), as an ICSBP target gene. This study identified a mechanism for increased survival of mature myeloid cells in the ICSBP-deficient murine model and in human myeloid malignancies with decreased ICSBP expression.
Miao F, *et al*. Histone Methylation Patterns Are Cell-Type Specific in Human Monocytes and Lymphocytes and Well Maintained at Core Genes. J Immunology 2008, 180:2264-2269	Researchers used ChIP combined with microarrays to map histone H3K9 dimethylation (H3K9Me2) patterns in gene coding and CGI regions in human monocytes and lymphocytes. The results of this study demonstrate that monocytes and lymphocytes have distinct epigenomes and that H3K9Me2 may have a role in the regulation of genes required for immune response and cell-type specificity.

Human CGI arrays (continued)

References	Summary
Ponzielli R, *et al*. Optimization of experimental design parameters for high-throughput chromatin immunoprecipitation studies. Nucleic Acids Res. 2008, 36(21):e144	This study is the first to provide a comprehensive evaluation of experimental ChIP-chip design parameters. Parameters specific to ChIP-chip, such as antibody purity, amplification method for enriched DNA, and the array hybridization control were evaluated, in addition to parameters previously evaluated for gene expression studies.
Zhang Y, *et al*. Identification and characterization of CCAAT/Enhancer Binding proteinδ (C/EBPδ) target genes in G0 growth arrested mammary epithelial cells. BMC Mol Biol 2008, 9:83	CCAAT/Enhancer Binding Proteinδ (C/EBPδ) target genes were identified using ChIP-chip. The identification and validation of such target genes provides new insight into the role of C/EBPδ in mammary epithelial cell biology.
Wu J, *et al*. Diverse histone modifications on histone 3 lysine 9 and their relation to DNA methylation in specifying gene silencing. BMC Genomics 2007, 8:131	Using ChIP-chip, histone modifications acetyl-H3K9 and dimethyl-H3K9 were profiled in the mouse leukemia cell line L1210. This study found that acetyl-H3K9 shows an inverse relationship between DNA methylation and histone acetylation in regulating gene silencing, and that dimethyl-H3K9 appears to be less distinct in relation to promoter methylation.

Yeast ORF arrays

References	Summary
Schafer G, *et al*. The *Saccharomyces cerevisiae* linker histone Hh01p is essential for chromatin compaction in stationary phase and is displaced by transcription. PNAS 2008, 105(39):14838	Using Yeast 6.4K arrays, Schafer *et al.* investigated the role of the linker histone H1 in *S. cerevisiae* and conclude that linker histone Hho1p has a limited role in transcriptional regulation.