

Advancing the science of tomorrow today.

SmartChip Human Long Non-Coding RNA-1 Panel

Reproducible Results. Novel Content. NGS Validation.

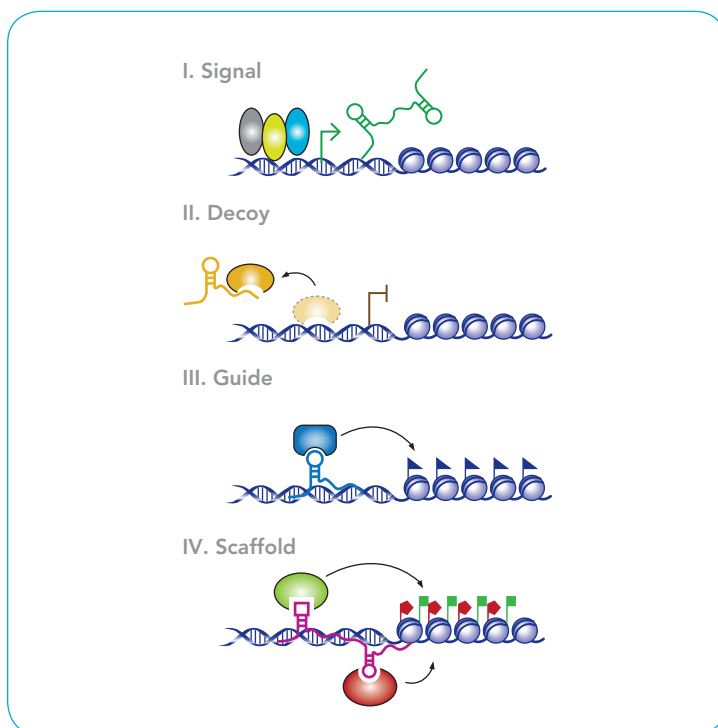


Figure 1. Four proposed mechanism of lncRNA function.
1) Signaling transcription factors to promote transcription
2) Competing with transcription factors through a decoy mechanism
3) Recruiting chromatin-modifying enzymes as guide molecules
4) Acting as scaffolds to bring together ribonucleoprotein complexes.

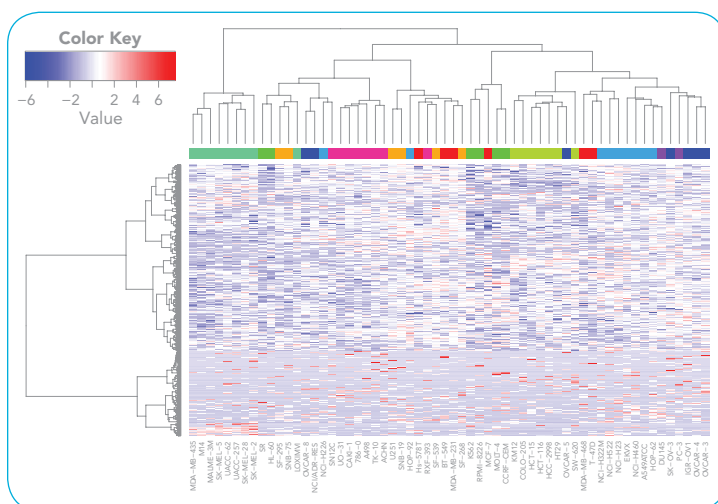


Figure 2. Profiling expression of 1700 lncRNAs in NCI-60 cell lines using SmartChip Human lncRNA-1 Panel. The data clearly demonstrate the wide range of expression levels of these 1700 lncRNAs. As indicated by the heatmap, lncRNA expression patterns can be largely grouped by tissue types.

Understand the role of long noncoding RNA: the new 'dark matter'

Long described as transcriptional noise or “dark matter”, lncRNAs are now seen as key regulators of transcription and epigenetic modification, with possible involvement in processes as diverse as cancer progression, embryonic pluripotency, and differentiation (see Figure 1). Next generation sequencing (NGS) is responsible for a rapid expansion in the discovery of lncRNAs and a resulting need for precise, methods with low error rates to validate your findings. Real-time PCR offers precision, specificity, and sensitivity—and the results are easy to interpret. Couple this ideal validation technique with the high throughput capabilities of WaferGen Biosystems SmartChip Human lncRNA-1 Panel, and you can now interrogate samples for expression of 1,700 well-characterized lncRNA species in about an hour.

MIQE-compliant assays developed to enhance your experimental success

The field of lncRNA research is in the midst of a rapid discovery phase, but that doesn't mean your reagents have to be “experimental”. In collaboration with Biogazelle, we've designed the SmartChip Human lncRNA-1 Panel to maximize your investigation of lncRNA expression. They contain triplicate, predisposed PCR assays that have been extensively validated and annotated. In addition, we've ensured that the lncRNA assays in this SmartChip Panel are both compliant with the Minimum Information for Publication of Quantitative Real-Time PCR Experiments (MIQE) guidelines, and curated against the latest versions of genomic databases.

To understand lncRNA expression levels across a wide variety of well-characterized biological samples and simultaneously validate the the SmartChip Human lncRNA Panel, we profiled lncRNA expression in the NCI-60 cell lines. These are a set of 59 human, cancer cell-lines derived from diverse tissues, such as brain, blood, bone marrow, breast, colon, kidney, lung, ovary, prostate, and skin. As can be seen in Figure 2, the resulting heatmap shows that 97% of the 1700 lncRNA assayed are expressed reproducibly in at least one of the cell lines. A snapshot of the tissue-specificity, that appears to be a hallmark of lncRNA expression, was confirmed with well-characterized HULC and GOMAFU lncRNAs and is shown in Figure 3.

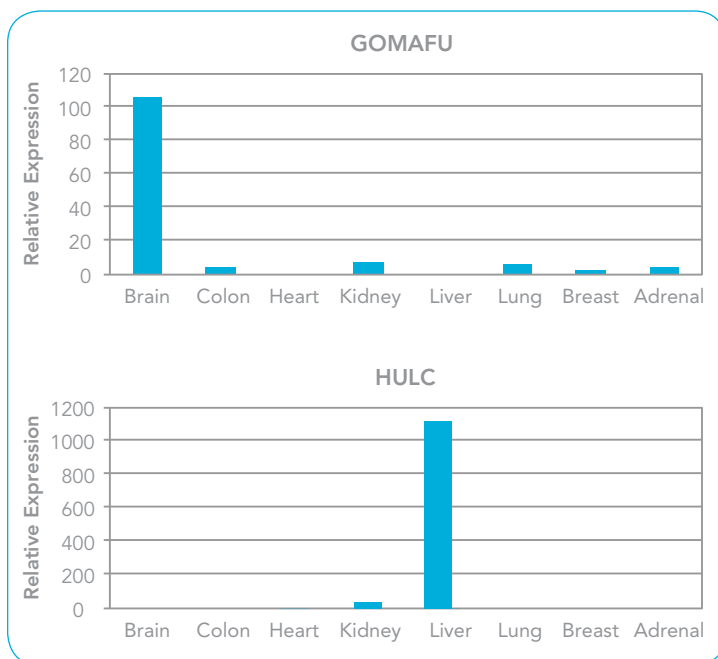


Figure 3. The predicted high expression levels of HULC and GOMAFU in liver and brain, respectively, are clearly demonstrated in these experiments.

Integrate mRNA, miRNA and lncRNA expression information to advance biological understanding

As the paradigm of DNA → messenger RNA (mRNA) → protein shifts to include noncoding RNAs such as microRNA (miRNA), and now lncRNA, understanding the interactions between these transcription products is extremely important. Now a single platform—the SmartChip Real-Time PCR System—makes these experiments achievable. Our expression analysis of the NCI-60 cell lines also included both mRNA and miRNA targets to provide a detailed view of the interactions of the different RNA species. Specifically, we used the SmartChip Human Oncology Panel, which targets ~1,200 mRNAs associated with cancer and cancer-related pathways, and the SmartChip Human miRNA Panel, which is collection of assays for ~1,100 biologically relevant miRNAs. Figure 4 shows some of the RNA interactions that we were able to document in the NCI-60 cell lines using the SmartChip Real-Time PCR System. Together, this type of integrated coding and noncoding RNA analysis can reveal complex interactions that may prove to be pivotal in the understanding of gene regulation and its effect on development, cancer, and other diseases, and neurobiology.

Please contact us to learn more about the complete NCI-60 study, and how we can help you achieve your research goals. We offer thousands of validated PCR assays across biological pathways and, for other targets, we can design assays for you.

If you are planning a new study, validating existing research, want us to run some of your samples, or have an idea you want to bounce off us, get in touch and we'll be happy to help.

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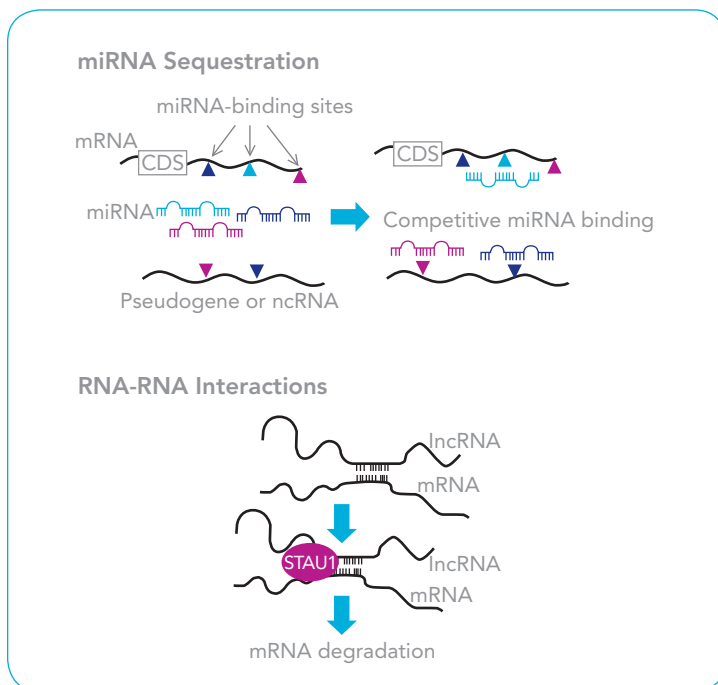


Figure 4. lncRNA, miRNA, and mRNA are subject to complex interactions. Profile, validate, and quantify them using the SmartChip Real-Time PCR System.

Ordering Information

Part Number	Description
430-000103	SmartChip Human lncRNA-1 Panel V1.0
450-000013	SmartChip Human lncRNA-1 Panel V1.0 Application Run, per sample



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