



SHARPR-MPRA (Systematic High-Resolution Activation And Repression Profiling With Reporter-Tiling Massively Parallel Reporter Assay)

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SUMMARY

UCLA researchers in the Department of Biological Chemistry have developed a method to screen hundreds to thousands of genes to identify their regulatory functions.

BACKGROUND

Genetic reporter assays are used to uncover novel functions of genes in normal and disease states. Recent advancements such as the development of 'Massively Parallel Reporter Assays' (MPRAs) have further increased the efficiency. MPRAs utilize large libraries of nucleotides that also include a unique reporter gene, which can then be used to identify the regulatory regions. However, current MPRAs can only identify 2-3 regions at a time, limiting the information obtained and do not distinguish between activating and repressing genes.

INNOVATION

UCLA researchers have developed a method to identify hundreds to thousands of regulatory regions from MPRAs. Their approach uses a combination of experimental and computational steps and is called systematic high-resolution activation and repression profiling with reporter tiling using MPRA (SHARPR-MPRA). They tested their technology in two cell lines expressing 4.6 million nucleotides targeting 15000 putative regulatory regions and identified known regulatory genes. Their method also distinguished between known activating and repressing genes providing previously unknown information about the genetic motifs.

APPLICATIONS

Identifying activating and repressing genetic elements

ADVANTAGES

- ▶ Coupled to MRSA, an established method that is already in use
- ▶ Can distinguish between activating and repressing genetic motifs, ‘dual-role’ genes and motifs that attenuate active chromatin states

RELATED MATERIALS

- ▶ Ernst J, Melnikov A, Zhang X, Wang L, Rogov P, Mikkelsen TS, Kellis M. ‘Genome-scale high-resolution mapping of activating and repressive nucleotides in regulatory regions.’ Nature Biotechnology 2016

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20200040410	02/06/2020	2017-224

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OTHER INFORMATION

KEYWORDS

High throughput sequencing,
massively parallel reporter assays,
MPRA

CATEGORIZED AS

- ▶ **Research Tools**
 - ▶ Nucleic Acids/DNA/RNA
 - ▶ Screening Assays

RELATED CASES

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