Agilent SureSelect CD Baylor Human CoRSIV Panel

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Advantages of targeted NGS for CoRSIV methylation analysis

Analysis of CoRSIVs via an NGS workflow offers several advantages over array technologies, including:

- Flexibility to design probes over any region of interest
- Ability to assay regions unavailable to array analysis due to known array hybridization artifacts (for example, transposable elements)
- Ability to detect more methylation quantitative trait loci (mQTL) over a smaller number of CpGs
- Increased cost-effectiveness for NGS analysis through a multiplex workflow

"SureSelect target enrichment allowed us to conduct a population-level analysis of DNA methylation at human CoRSIVs, even those within highly repetitive regions. By multiplexing at the capture step, we achieved excellent read depth in targeted regions, at a competitive per-sample cost."

Targeted next-generation sequencing for population epigenetic studies

Agilent Community Designs for next-generation sequencing (NGS) are targeted sequencing panels established in collaboration with subject matter experts in different research fields. These NGS designs are available as custom, made-to-order panels that provide you with robust and cost-effective sequencing results that focus on genes or regions of your interest.

The Waterland team aims to understand how nutrition and other environmental influences during prenatal and early postnatal development affect individual susceptibility to various diseases later in life. To do this, they study DNA methylation using NGS.

The team has identified several human genomic regions that display systemic interindividual variation in CpG methylation, named correlated regions of systemic interindividual variation (CoRSIVs). The systemic nature of interindividual variation at these regions means that peripheral blood DNA can be used to assess individual-level methylation profiles.

CoRSIVs are typically only 200 to 300 bp long and include five to 10 CpG dinucleotides, although the largest span several kb and involve hundreds of CpGs. This panel incorporates baits targeting 9926 CoRSIVs and allows comprehensive profiling of these regions using NGS technology.[1]

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The SureSelect CD Baylor human CoRSIV panel design

- Designed to include 9926 CoRSIVs identified and described in the 2019 study by Gunasekara et al[2]
- Contains probes covering previously identified regions of systemic interindividual variation (SIV)[3], regions of epigenetic supersimilarity[4], probes to estimate blood cell composition[5,6], Chr Y regions to indicate sample sex, and imprinting control regions[7]
- Includes total capture size of 21.13 Mb
- Designed with our latest probe manufacturing technology, using machine learning for probe placement and targeting of both strands
- Improved design with non-performing probes removed
- Allows use in a single-plex capture workflow with Agilent SureSelect XT methyl-seq target enrichment system, or in a multiplexed capture workflow with third party reagents

References

1. Gunasekara, C.J. et al. Systemic Interindividual Epigenetic Variation in Humans is Associated with Transposable Elements and Under Strong Genetic Control. Genome Biol, **2023**, 24:2.
2. Gunasekara, C.J. et al. A Genomic Atlas of Systemic Interindividual Epigenetic Variation in Humans. Genome Biol, **2019**, 20:105.
3. Silver, M.J. et al. Independent Genomewide Screens Identify the Tumor Suppressor VTRNA2-1 as a Human Epiallele Responsive to Periconceptional Environment. Genome Biol, **2015**, 16:118.
4. Van Baak, T.E. et al. Epigenetic Supersimilarity of Monozygotic Twin Pairs. Genome Biol, **2018**, 19:2.
5. Houseman, E.A. et al. DNA Methylation Arrays as Surrogate Measures of Cell Mixture Distribution. BMC Bioinformatics, **2012**. 13:p. 86.
6. Jaffe, A.E.; Irizarry, R.A. Accounting for Cellular Heterogeneity is Critical in Epigenome-wide Association Studies. Genome Biol, **2014**. 15(2): p. R31.
7. Monk, D., et al. Recommendations for a Nomenclature System for Reporting Methylation Aberrations in Imprinted Domains. Epigenetics, **2018**. 13(2): p. 117-121.

Table 1. Ordering information for the Agilent SureSelect CD Baylor human CoRSIV panel. *Note: part numbers cover the capture probe libraries only. Library prep and target enrichment kits must be purchased separately.*

Product	Part number
SureSelect CD Baylor Human CoRSIV 16	5282-0030
SureSelect CD Baylor Human CoRSIV 96	5282-0031
SureSelect CD Baylor Human CoRSIV 96A	5282-0032
SureSelect CD Baylor Hu. CoRSIV PCPool 6	5282-0033
SureSelect CD Baylor Hu. CoRSIV PCPool 30	5282-0034
SureSelect CD Baylor Hu. CoRSIV PCPool 30A	5282-0035

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Agilent has not performed verification and validation on these panels.

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