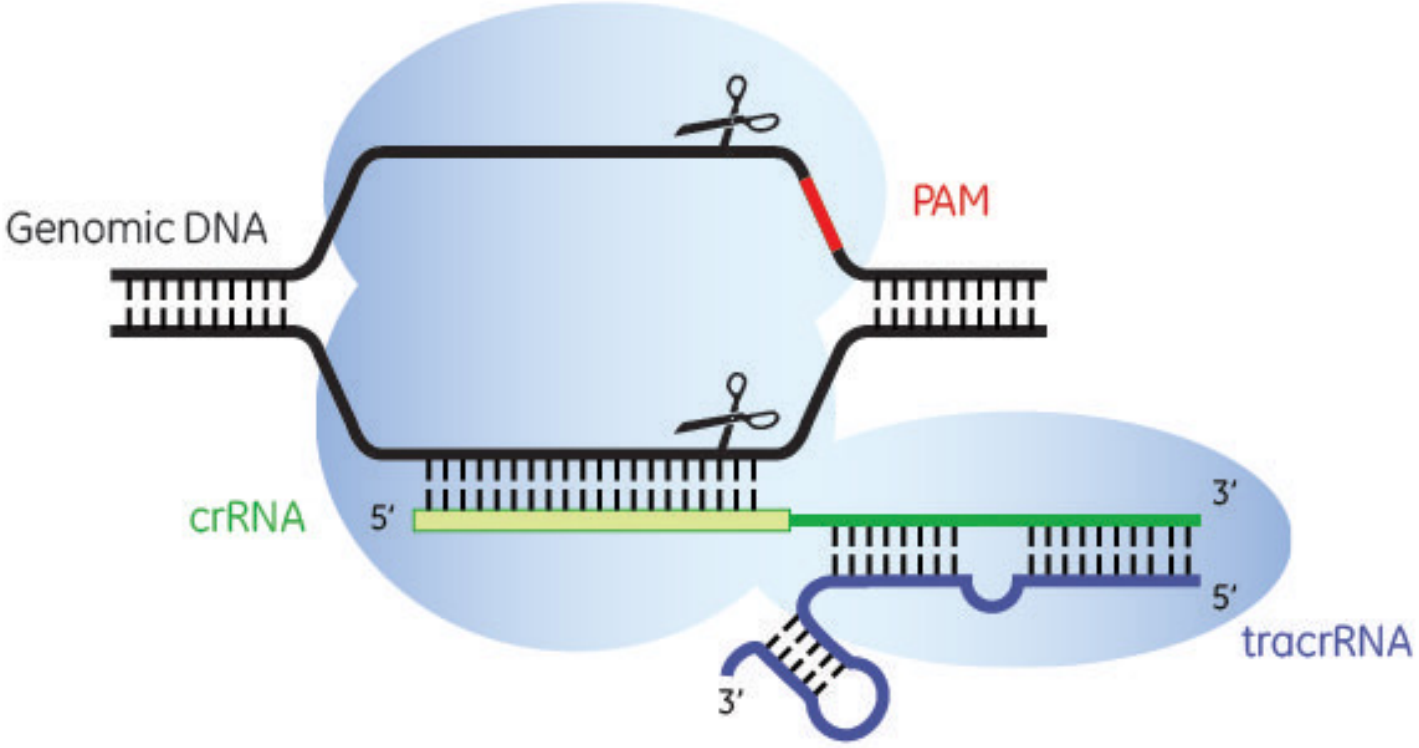
Repeat Expansion Genotyping With PacBio No-Amp & Repeat-Analysis

Brett Bowman

January 17th, 2018

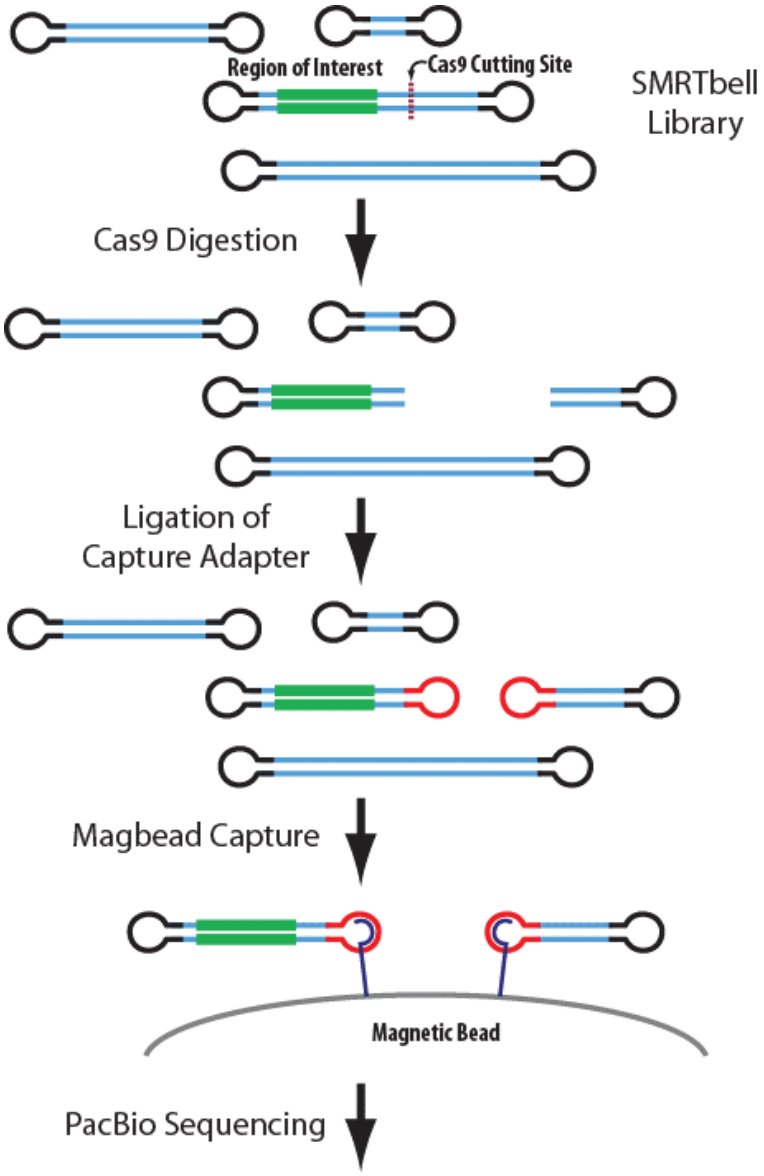
NO-AMP TARGET ENRICHEMENT – CRISPR/CAS9 SYSTEM



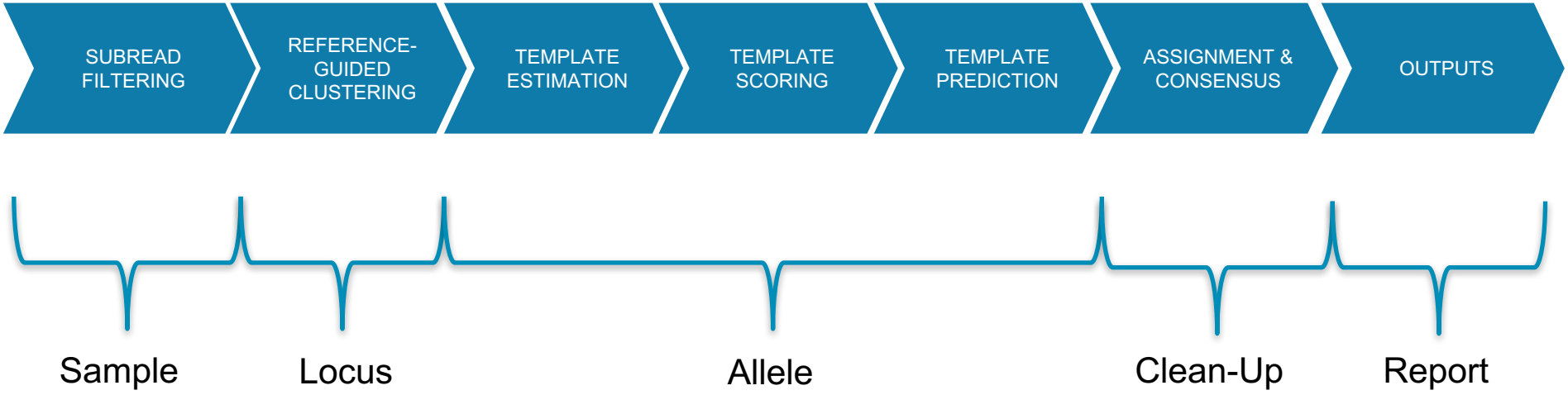
Some *in vivo* applications:

- Gene silencing
- Homology-directed repair
- Transient gene silencing or transcriptional repression
- Transient activation of endogenous genes
- Transgenic animals and embryonic stem cells

NO-AMP TARGET ENRICHMENT – OVERVIEW

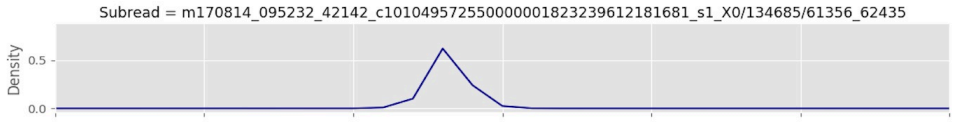


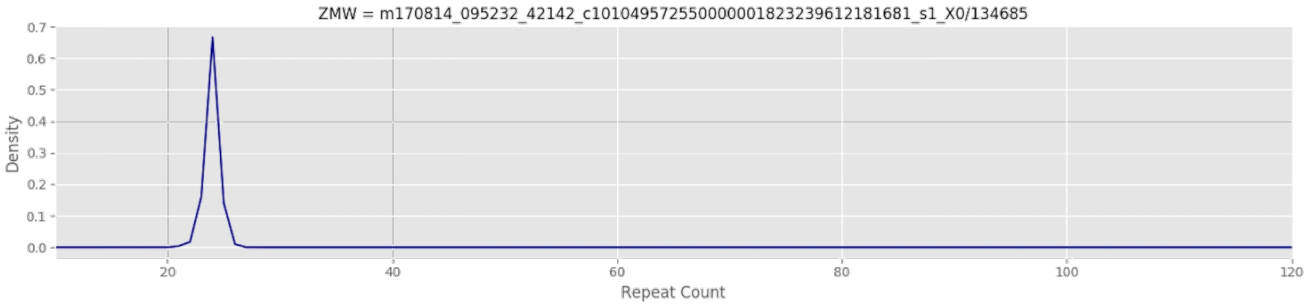
REPEAT ANALYSIS WORKFLOW – OVERVIEW



REPEAT ANALYSIS WORKFLOW – TEMPLATE SCORING BY SUBREAD

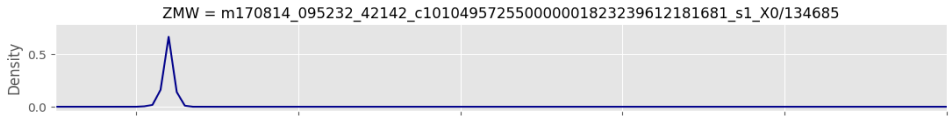
SUBREAD FILTERING → REFERENCE-GUIDED CLUSTERING → TEMPLATE ESTIMATION → **TEMPLATE SCORING** → TEMPLATE PREDICTION → ASSIGNMENT & CONSENSUS → OUTPUTS

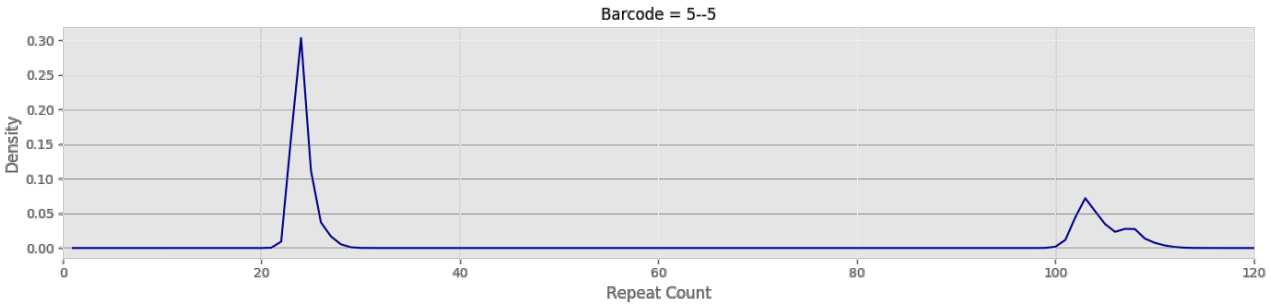




REPEAT ANALYSIS WORKFLOW – TEMPLATE SCORING BY ZMW

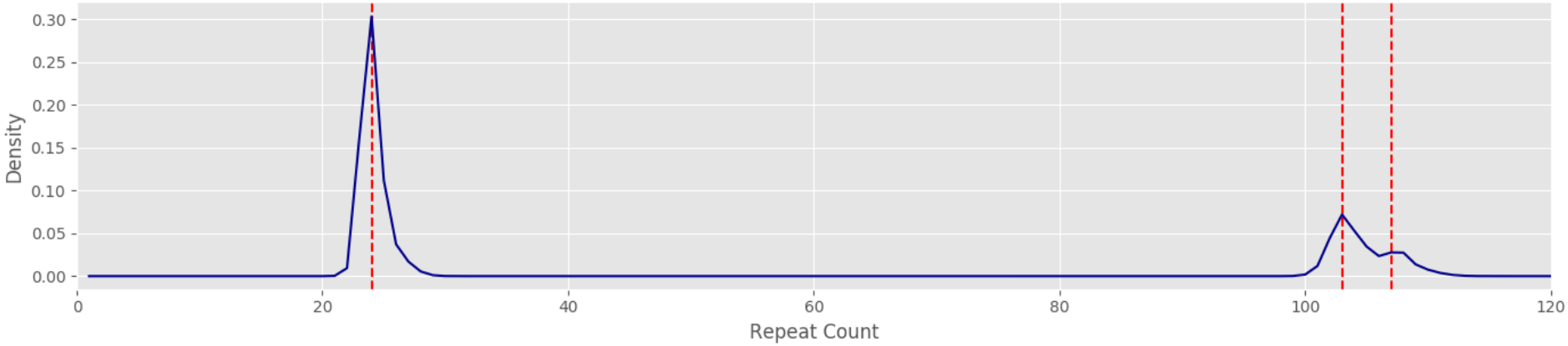
SUBREAD FILTERING → REFERENCE-GUIDED CLUSTERING → TEMPLATE ESTIMATION → **TEMPLATE SCORING** → TEMPLATE PREDICTION → ASSIGNMENT & CONSENSUS → OUTPUTS





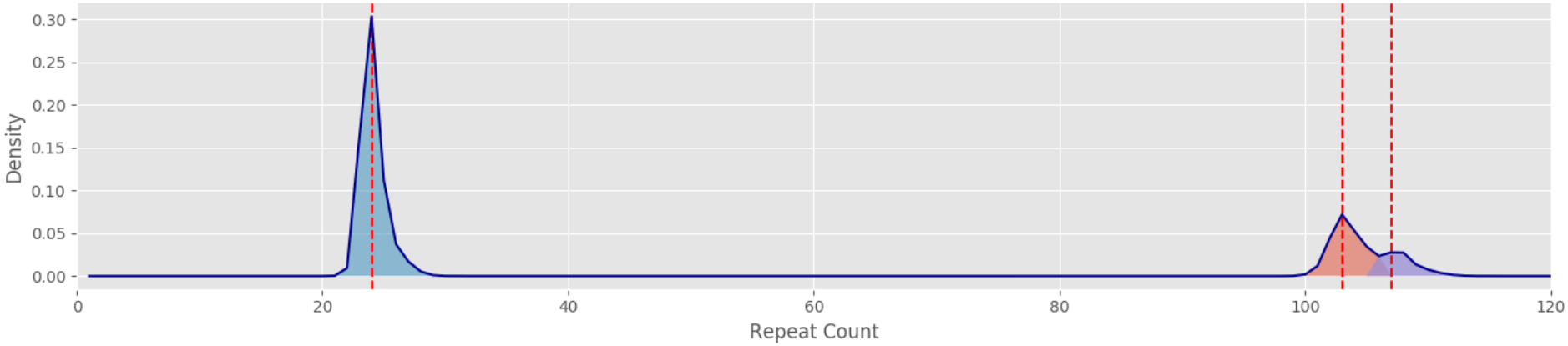
REPEAT ANALYSIS WORKFLOW – TEMPLATE PREDICTION

SUBREAD FILTERING → REFERENCE-GUIDED CLUSTERING → TEMPLATE ESTIMATION → TEMPLATE SCORING → **TEMPLATE PREDICTION** → ASSIGNMENT & CONSENSUS → OUTPUTS



REPEAT ANALYSIS WORKFLOW – ASSIGNMENT & CONSENSUS

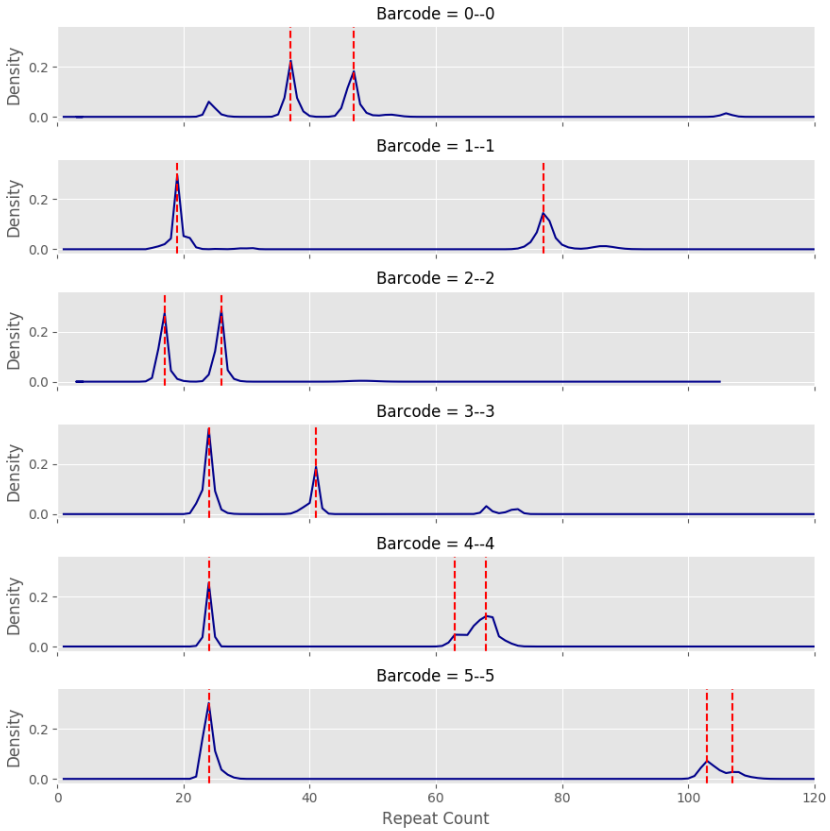
SUBREAD FILTERING → REFERENCE-GUIDED CLUSTERING → TEMPLATE ESTIMATION → TEMPLATE SCORING → TEMPLATE PREDICTION → **ASSIGNMENT & CONSENSUS** → OUTPUTS



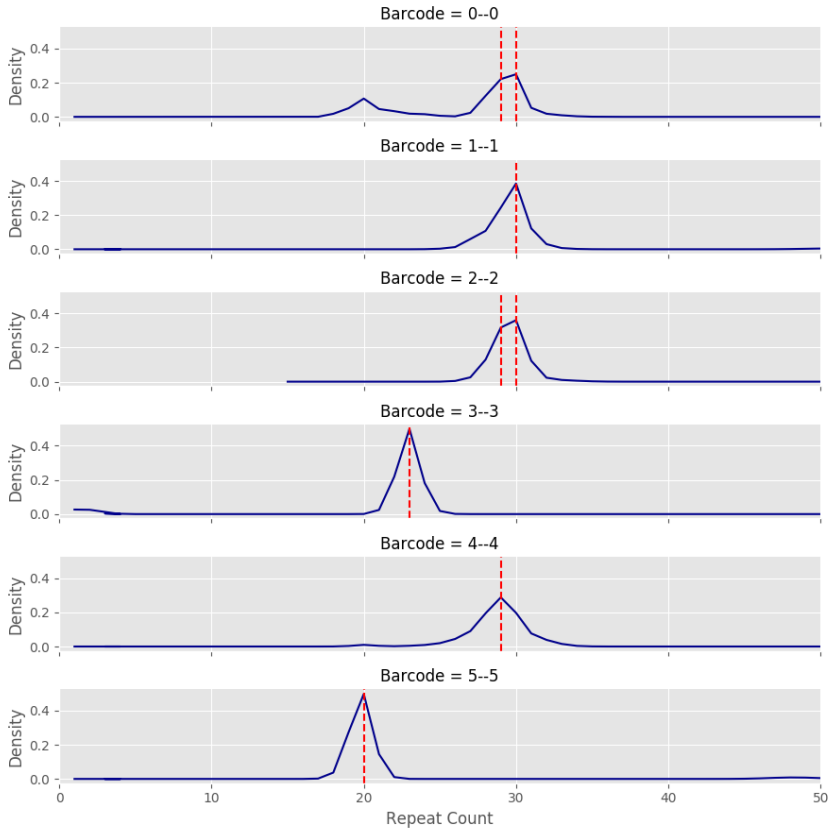
REPEAT ANALYSIS WORKFLOW – OUTPUTS

SUBREAD FILTERING → REFERENCE-GUIDED CLUSTERING → TEMPLATE ESTIMATION → TEMPLATE SCORING → TEMPLATE PREDICTION → ASSIGNMENT & CONSENSUS → **OUTPUTS**

HTT



FMR1



REPEAT ANALYSIS WORKFLOW – OUTPUTS

SUBREAD FILTERING → REFERENCE-GUIDED CLUSTERING → TEMPLATE ESTIMATION → TEMPLATE SCORING → TEMPLATE PREDICTION → ASSIGNMENT & CONSENSUS → **OUTPUTS**

repeat_analysis.fastq

```
@Barcode5--5_Cluster1_Phase0_NumReads308 CAGx24
GATCCTTTCCGCATGGGCCTGCGCCCGCGCTCGGCGCCCCCTCCACGGCCCCGCCCCGTCCATGGCCCCGTCCTTCATGGGCGAGCCCCTCCATGGCCCTGCCCCTC
CGCGCCCCACCCCTCCCTCGCCCCACCTCTCACCTTCCTGCCCCGCCCCCAGCCTCCCCACCCCTCACCGGCCAGTCCCCTCCCCTATCCCGCTCCGCCCCTCAGCCG
CCCCGCCCCTCAGCCGGCCTGCCTAATGTCCCCGTCCCCAGCATCGCCCCGCCCCGCCCCCGTCTCGCCCCGCCCCTCAGGCGGCCTCCCTGCTGTGCCCCGCCCC
GGCCTCGCCACGCCCCTACCTCACCACGCCCCCCGCATCGCCACGCCCCCCGCATCGCCACGCCTCCCTTACCATGCAGTCCCGCCCCGTCCCTTCCTCGTCCCGCCT
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...
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repeat_analysis_mapping.5—5.HTT.csv

```
SubreadId,Barcode5--5_Cluster1_Phase0_NumReads308,Barcode5--5_Cluster1_Phase1_NumReads99,Barcode5--5_Cluster1_Phase2_NumReads55
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...
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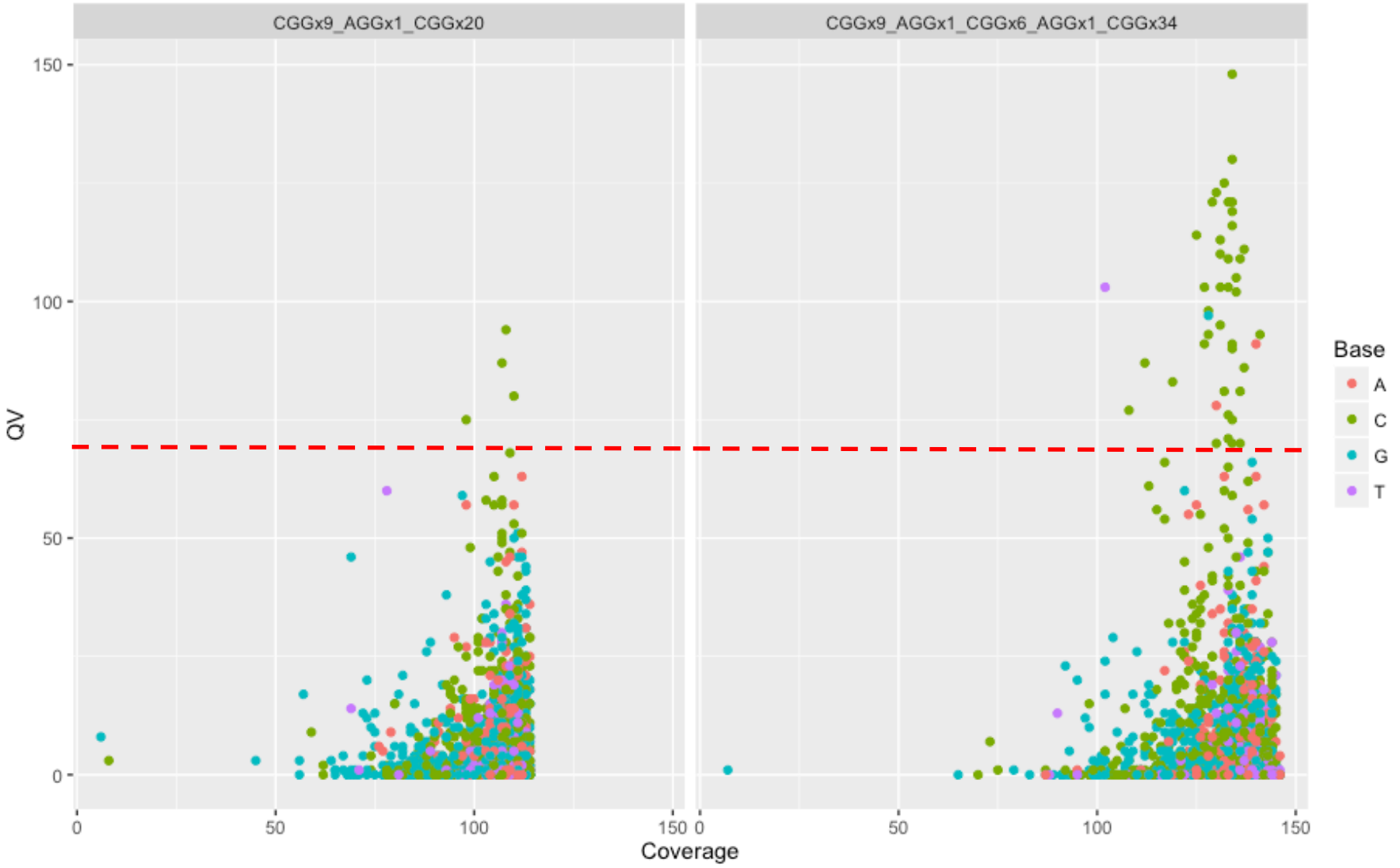
… AND NON-AMPLIFIED TARGETS RETAIN METHYLATION



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