**Supplementary file to “HyDrop enables droplet based single-cell ATAC-seq and single-cell RNA-seq using dissolvable hydrogel beads”**

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 **HyDrop-ATAC**

 **ATAC Reaction in bulk**

 **5-GTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXX CTGTCTCTTATACACATCT-3**

 **3-TCTACACATATTCTCTGTC XXX...XXXXXXXXXXXXGACAGAGAATATGTGTAGACTGCGACGGCTGCT-5**

 **Linear PCR amplification in Emulsion**

 **Gap Fill step**

 **5-GTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGA**

 **3-CAGAGCACCCGAGCCTCTACACATATTCTCTGTCXXXXXXXXXXXX...XXXXXXXXXXXXGACAGAGAATATGTGTAGACTGCGACGGCTGCT-5**

 **Barcode captures fragment**

 **5-TTTTTTTTAATACGACTCACTATAGGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGG-3**

 **3-CAGAGCACCCGAGCCTCTACACATATTCTCTGTCXXXXXXXXXXXX...XXXXXXXXXXXXGACAGAGAATATGTGTAGACTGCGACGGCTGCT-5**

 **Linear PCR**

 **5-TTTTTTTTAATACGACTCACTATAGGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGA-3**

 **3-CAGAGCACCCGAGCCTCTACACATATTCTCTGTCXXXXXXXXXXXX...XXXXXXXXXXXXGACAGAGAATATGTGTAGACTGCGACGGCTGCT-5**

 **5-TTTTTTTTAATACGACTCACTATAGGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGA-3**

 **5-TTTTTTTTAATACGACTCACTATAGGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGA-3**

 **:**

 **:**

 **5-TTTTTTTTAATACGACTCACTATAGGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGA-3**

 **PCR amplification in bulk (post emulsion breakage)**

 **Sequencing library preperation**

 **5-TTTTTTTTAATACGACTCACTATAGGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGA-3**

 **3-** **GTGTAGACTGCGACGGCTGCTGCGAGGTGCTCACATCTAGAGCCACCAGCGGCATAGTAA-5**

 **5-CAAGCAGAAGACGGCATACGAGATCGCTCAGTTCCTGTCCGC\**

 **\GGAAGCAGTGGTATCAACGCAGAGTAC-3**

 **/CCTTCGTCACCATAGTTGCGTCTCATGAAGGACACTCGTCGATGACGAGCCTGAATAGCTCATGGGACCGACTTAATCAGAGCACCCGAGCCTCTACACATATTCTCTGTCXXXXXXXXXXXX...XXXXXXXXXXXXGACAGAGAATATGTGTAGACTGCGACGGCTGCT-5**

 **3-AAAAAAAATTATGCTGAGTGATATC/**

 **5-CAAGCAGAAGACGGCATACGAGATCGCTCAGTTCCTGTCCGCGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGACGCTCCACGAGTGTAGATCTCGGTGGTCGCCGTATCATT-3**

 **3-GTTCGTCTTCTGCCGTATGCTCTAGCGAGTCAAGGACAGGCGCCTTCGTCACCATAGTTGCGTCTCATGAAGGACACTCGTCGATGACGAGCCTGAATAGCTCATGGGACCGACTTAATCAGAGCACCCGAGCCTCTACACATATTCTCTGTCXXXXXXXXXXXX...XXXXXXXXXXXXGACAGAGAATATGTGTAGACTGCGACGGCTGCTGCGAGGTGCTCACATCTAGAGCCACCAGCGGCATAGTAA-5**

 **Sequencing**

 **Sequencing product (single ended, with custom primers, deprecated manner of sequencing)**

 **I7 read (HyDrop custom primer) R1**

 **<--GACAGGCGCCTTCGTCACCATAGTTGCGTCTCATG <--GACAGAGAATATGTGTAGACTGCGACGGCTGCT**

 **5-CAAGCAGAAGACGGCATACGAGATCGCTCAGTTCCTGTCCGCGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGACGCTCCACGAGTGTAGATCTCGGTGGTCGCCGTATCATT-3**

 **3-GTTCGTCTTCTGCCGTATGCTCTAGCGAGTCAAGGACAGGCGCCTTCGTCACCATAGTTGCGTCTCATGAAGGACACTCGTCGATGACGAGCCTGAATAGCTCATGGGACCGACTTAATCAGAGCACCCGAGCCTCTACACATATTCTCTGTCXXXXXXXXXXXX...XXXXXXXXXXXXGACAGAGAATATGTGTAGACTGCGACGGCTGCTGCGAGGTGCTCACATCTAGAGCCACCAGCGGCATAGTAA-5**

 **CTGTCCGCGGAAGCAGTGGTATCAACGCAGAGTAC--> CTGTCTCTTATACACATCTGACGCTGCCGACGA-->**

 **R2 (HyDrop custom primer) I5 read (or via graft)**

 **Sequencing product (dual ended, standard primers, used in paper BUT will require custom recipe on some sequencing machines for long index!)**

 **I7 read R1**

 **<--CAGAGCACCCGAGCCTCTACACATATTCTCTGTC <--GACAGAGAATATGTGTAGACTGCGACGGCTGCT**

 **5-CAAGCAGAAGACGGCATACGAGATCGCTCAGTTCCTGTCCGCGGAAGCAGTGGTATCAACGCAGAGTACTTCCTGTGAGCAGCTACTGCTCGGACTTATCGAGTACCCTGGCTGAATTAGTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGXXXXXXXXXXXX...XXXXXXXXXXXXCTGTCTCTTATACACATCTGACGCTGCCGACGACGCTCCACGAGTGTAGATCTCGGTGGTCGCCGTATCATT-3**

 **3-GTTCGTCTTCTGCCGTATGCTCTAGCGAGTCAAGGACAGGCGCCTTCGTCACCATAGTTGCGTCTCATGAAGGACACTCGTCGATGACGAGCCTGAATAGCTCATGGGACCGACTTAATCAGAGCACCCGAGCCTCTACACATATTCTCTGTCXXXXXXXXXXXX...XXXXXXXXXXXXGACAGAGAATATGTGTAGACTGCGACGGCTGCTGCGAGGTGCTCACATCTAGAGCCACCAGCGGCATAGTAA-5**

 **GTCTCGTGGGCTCGGAGATGTGTATAAGAGACAG--> CTGTCTCTTATACACATCTGACGCTGCCGACGA-->**

 **R2 I5 read (or via graft)**