

Supplemental Methods: Primers used in this study. (The specific multiplex tag sequences used are listed in the GEO data submission file).

UPTAG Primer Sequences

(Illumina Adaptor sequence, **unique multiplex tag**, U1):
AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT**xxx**
GATGTCCACGAGGTCTCT

U1 UPTAG primers above were used with a modified U2c* kanMX sequence:
CAAGCAGAAGACGGCATACGAGCTCTTCCGATCTtggatgcaaatgattatacatgg
(Illumina Adaptor sequence, **kanMX sequence**) to amplify the YKO UPTAG barcodes from each sorted population. The size of the amplicons from this PCR reaction is ~350bp.

DNTAG Primer Sequences

(Illumina Adaptor sequence, **unique multiplex tag**, D1)
AATGATACGGCGACCACCGAGATCTACACTCTTTCCCTACACGACGCTCTTCCGATCT**xxx**
CGGTGTCGGTCTCGTAG

D1 DNTAG primers above were amplified with a modified D2c* sequence:
CAAGCAGAAGACGGCATACGAGCTCTTCCGATCTtaacgccgccatccagtgtcg (Illumina Adaptor sequence, **kanMX sequence**) to amplify the YKO DNTAG barcodes from each sorted population. The size of the amplicon from this PCR reaction is ~180bp.

References

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Schild D, Ananthaswamy HN, Mortimer RK. 1981. An endomitotic effect of a cell cycle mutation of *Saccharomyces cerevisiae*. *Genetics* **97**: 551-562.

Svoboda A. 1978. Fusion of yeast protoplasts induced by polyethylene glycol. *J Gen Microbiol* **109**: 169-175.