**Supplementary Data**

**Redesigning Recombinase Specificity for Safe Harbor Sites in the Human Genome**

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**Short title:** Redesigning recombinase specificity

>GFP-ZFR-Bin-XbaI Fwd

TTAATTAAGAGTCTAGACGGAGGCGTGCAGAAAATAACCATTTTCTGCACGCCTCCAGATCTAGGAGGAATTTAAAATGAG

>GFP-ZFR-HindIII Rev

GATGAACTGTACAAATAACTGCAGGGAGGCGTGCAGAAAATAACCATTTTCTGCACGCCTCCCCAAGCTTCTCTAGGTCAGT

>GFP-ZFR-Bin(3,2)-XbaI Fwd

TTAATTAAGAGTCTAGACGGAGGCGTGCAGAAAANNACCATTTTCTGCACGCCTCCAGATCTAGGAGGAATTTAAAATGAG

>GFP-ZFR-Bin(6-4)-XbaI Fwd

TTAATTAAGAGTCTAGACGGAGGCGTGCAGANNNTAACCATTTTCTGCACGCCTCCAGATCTAGGAGGAATTTAAAATGAG

>GFP-ZFR-Bin(10-7)-XbaI Fwd

TTAATTAAGAGTCTAGACGGAGGCGTGNNNNAAATAACCATTTTCTGCACGCCTCCAGATCTAGGAGGAATTTAAAATGAG

>GFP-ZFR-Tn21-XbaI Fwd

TTAATTAAGAGTCTAGAAGGAGGCGTGGGTTGAGGCATACCCTAACCCACGCCTCCAGATCTAGGAGGAATTTAAAATGAG

>GFP-ZFR-Tn21-HindIII Rev

ACTGACCTAGAGAAGCTTTTGGAGGCGTGGGTTAGGGTATGCCTCAACCCACGCCTCCCTGCAGTTATTTGTACAGTTCATC

> GFP-ZFR-Tn21(3,2)-XbaI Fwd

TTAATTAAGAGTCTAGAAGGAGGCGTGGGTTGAGNNATACCCTAACCCACGCCTCCAGATCTAGGAGGAATTTAAAATGAG

> GFP-ZFR-Tn21(6-4)-XbaI Fwd

TTAATTAAGAGTCTAGAAGGAGGCGTGGGTTNNNGCATACCCTAACCCACGCCTCCAGATCTAGGAGGAATTTAAAATGAG

> GFP-ZFR-Tn21(10-7)-XbaI Fwd

TTAATTAAGAGTCTAGAAGGAGGCGTGNNNNGAGGCATACCCTAACCCACGCCTCCAGATCTAGGAGGAATTTAAAATGAG

**Table A. Primers Used in this Study.**

>TN21

MTGQRIGYIRVSTFDQNPERQLEGVKVDRAFSDKASGKDVKRPQLEALISFARTGDTVVVHSMDRLARNLDDLRRIVQTLTQRGVHIEFVKEHLSFTGEDSPMANLMLSVMGAFAEFERALIRERQREGIALAKQRGAYRGRKK

>Bin

MKIGYARVSTGLQNLNLQEDRLNQYGCEKIFSDHISGAKSKRPGLDRAIEFARSGDTIVVWRLDRLGRNMADLITLVNELNNRGVSFHSLEENITMDKSSSTGQLLFHLFAAFAEFERNLILERSSAGRIAARARGRYGGRPEK

>H1 zinc-finger

sGSGEPYKCPECGKSFSRSDVLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPYKCPECGKSFSQSSHLVRHQRTHTGKKT

>Gin (H106Y)

MLIGYVRVSTNDQNTDLQRNALVCAGCEQIFEDKLSGTRTDRPGLKRALKRLQKGDTLVVWKLDRLGRSMKHLISLVGELRERGINFRSLTDSIDTSSPMGRFFFYVMGALAEMERELIIERTMAGLAAARNKGRIGGRPPK

>TN3 (G70S, D102Y, E124Q)

MRIFGYARVSTSQQSLDIQIRALKDAGVKANRIFTDKASGSSTDREGLDLLRMKVEEGDVILVKKLDRLSRDTADMIQLIKEFDAQGVAVRFIDDGISTDGYMGQMVVTILSAVAQAERRRILQRTNEGRQEAKLKGIKFGRRRT

>Sin (Q115R)

MIIGYARVSSIDQNLERQLDNLKTFGVEKIFTEKQSGKSVENRPVFQEALNFVRMGDRFVVESIDRLGRNYDEIIETVNYLKEKDVQLMITSLPMMNEVTGNPLLDKFMKDLIIQILAMVSEQERNESKRRQAQGIQVAKEKGVYKGRPLL

>Beta (N95D)

MAKIGYARVSSKEQNLDRQLQALQGVSKVFSDKLSGQSVERPQLQAMLNYIREGDIVVVTELDRLGRNNKELTELMNAIQQKGATLEVLNLPSMDGIEDENLRRLINNLVIELYKYQAESERKRIKERQAQGIEIAKSKGKFKGRQHK

**Table B. Amino Acid Sequences of Proteins used in this Study.**