

(A) PWM1-R3

A| -0.20067| 0.167054| 0.969401| 0.820981| -0.788457| -0.788457|
 C| -0.78845| -2.3979| -0.788457| -2.3979| -0.788457| -0.788457|
 G| 0.435318| 0.969401| -2.3979| -0.200671| -0.200671| -0.788457|
 T| 0.167054| -2.3979| -0.200671| -0.200671| 0.820981| 0.969401|

(B) PWM2-R3

A| -0.788457| 1.21302| -2.3979| -2.3979| 0.820981| -2.3979|
 C| -0.200671| -0.788457| 1.21302| 1.31568| -0.788457| 0.167054|
 G| -0.200671| -2.3979| -2.3979| -2.3979| -0.200671| -0.788457|
 T| 0.646627| -2.3979| -0.788457| -2.3979| -0.788457| 0.820981|

(C) PWM3-R3

A| -0.893818| -0.526093| -0.893818| -0.893818| 0.276253| -0.04652| -0.257829|
 0.405465| 0.127833| -1.4816| -0.04652| -0.04652| -0.257829| -0.257829|
 -0.893818| 0.127833| 0.127833| -0.257829| -0.257829| 0.276253| -0.526093|
 0.879249| -1.4816| 0.276253| 0.800778| -0.04652| 0.405465| 1.01983|
 0.127833| 0.127833| 0.276253|
 C| -1.4816| 0.405465| -0.526093| -0.04652| 0.276253| 0.127833| 0.127833|
 -0.257829| -0.893818| 0.127833| -0.04652| -0.526093| -0.893818| -0.257829|
 -0.04652| 0.127833| -0.257829| -0.526093| -0.526093| -0.04652| -0.04652|
 0.276253| 0.62253| -0.257829| -1.4816| -0.04652| -0.257829| -0.893818|
 0.405465| 0.519875| 0.276253|
 G| 1.01983| -0.257829| 0.800778| 0.405465| -0.04652| -0.257829| 0.276253|
 -0.526093| -1.4816| 0.71562| 0.405465| 0.405465| 0.800778| 0.405465|
 0.276253| -0.893818| 0.127833| 0.276253| -0.04652| -0.257829| 0.405465|
 -3.09104| 0.127833| 0.405465| -0.257829| -0.04652| -0.893818| -1.4816|
 -0.893818| -0.526093| -0.257829|
 T| -0.526093| 0.127833| -0.257829| 0.127833| -0.893818| 0.127833| -0.257829|
 0.127833| 0.800778| -0.526093| -0.526093| -0.04652| -0.526093| -0.04652|
 0.276253| 0.276253| -0.04652| 0.276253| 0.519875| -0.04652| -0.04652|
 -1.4816| -0.257829| -0.893818| -0.257829| 0.127833| 0.276253| -0.526093|
 -0.04652| -0.526093| -0.526093|

Figure S4. The R3 versions of random position weight matrices constructed by randomly shuffling columns within individual genuine matrices followed by randomly shuffling numbers within each column in these intermediate random matrices. (A) PWM1-R3 constructed from PWM1. (B) PWM2-R3 constructed from PWM2. (C) PWM3-R3 constructed from PWM3.