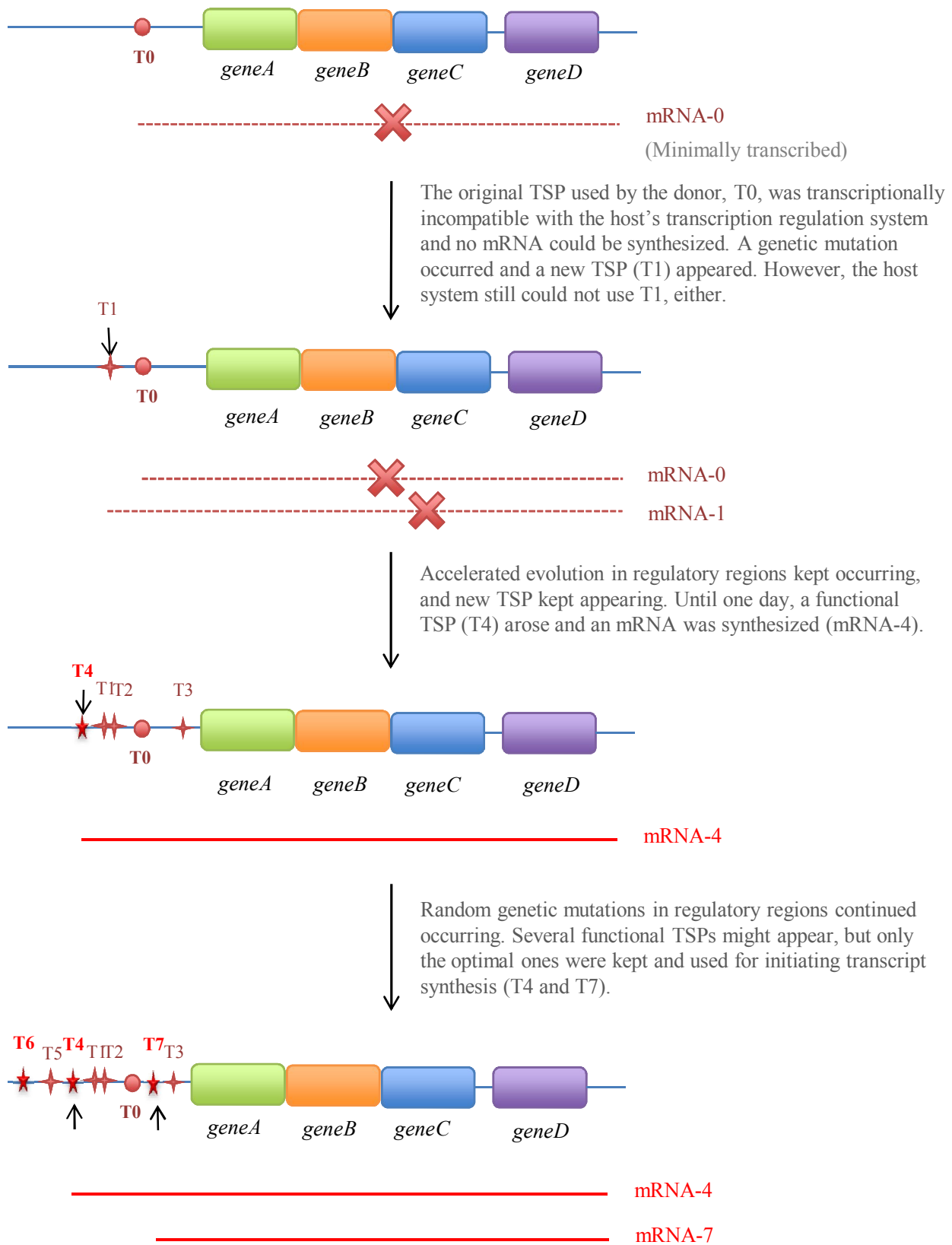


**Additional File 10:**

The two diagrams of the proposed reasons for why TSPs are enriched in GI regions.

- (A), Evolution of regulatory region. To eliminate the fitness cost by non-optimal codon usage or absonant transcripts of GI, accelerated evolution in regulatory regions will result in TSPs accumulation in GI region.
- (B), Re-shape of GI region. Following the event of HGT, the GI region might undergo gene loss/acquisition and genetic rearrangements. During this process, former operon was broken and more transcription units probably formed. Newly formed transcription units carry or call for the new TSPs during evolution.

(A)



(B)

