## Supporting Text

**Estimating Selection on Alu Transposable Elements.** To make sure our estimation procedure does not dramatically overestimate the negative selection coefficients in human populations, we estimated selection coefficients for Alu elements, which are apparently not under negative selection (1, 2). The data consisted of 239 polymorphic elements that were identified in the Human Genome Database and were screened in four populations (African-American, Asian, German and Egyptian) (3). Our estimation of the best estimate for $N_e s$ is -0.31, and this estimate is not significantly different from zero ($P > 0.05$, likelihood ratio test). The fact that neutrality is not rejected for this larger set of transposable element data identified in the human population indicates that the strong negative selection coefficient found for the smaller set of full-length (FL) Ta1 data is not spurious.

**Consistency of the Estimation Procedure.** We have estimated selection coefficients based on the frequency distributions for FL and truncated (TR) elements using the maximum likelihood approach. To internally check whether this approach is appropriate, we determined whether the observed frequency distributions are similar to the theoretically expected ones given the best estimates for $s$ from our model. Observed frequency distributions similar to the distributions expected from the model would support the appropriateness of the maximum likelihood (ML) model. For full-length elements the expected distribution (based on $N_e s = -1.97$) and the observed distribution are shown in Fig. 2 A and B. For TR elements, the expected ($N_e s = -0.28$) and observed distributions are shown in Fig. 2 C and D. In both cases, the observed distributions are not significantly different than the expected distributions ($P > 0.10$, G test). This finding lends further evidence that the estimation procedure used is correct.

**Testing the Effect of Insert Length.** To test whether the length of a truncated element determines how deleterious it is, we divided the set of truncated elements in two classes, short and long, for various cutoffs. We then performed Mann-Whitney and Kolmogorov-Smirnov tests to determine if the frequency distributions between the two classes had significantly different medians or distribution shapes. Our results (Table 2) revealed no differences between means or distributions for any of the length cutoffs chosen. Thus, there is no evidence that the length of a truncated element determines its selective effect. It may be the case, however, that we are limited in detecting such selective differences because the number of elements in subclasses of the TR elements is relatively small.

**The Increase in Selection Since the Beginning of Ta1 Amplification.** To determine whether FL Ta1 elements were less deleterious during the earlier stages of the Ta1 amplification than current polymorphism data indicates we examined the fixed FL and TR elements in our sample. If selection pressure on FL and TR elements has remained constant over time, we should be able to use the selection coefficients estimated from the polymorphism data to estimate the ratio (R) of the polymorphic (P) to fixed (F) FL ratio, $\frac{P_{fl}}{F_{fl}}$, to the corresponding TR ratio, $\frac{P_{tr}}{F_{tr}}$. More precisely, let $R = \left. \frac{P_{fl}}{F_{fl}} \middle/ \frac{P_{tr}}{F_{tr}} \right.$. An expected value of $R$ given selection coefficients from the polymorphism data that is smaller than the observed value would indicates that selection may have been weaker on FL elements in the past. The expected value of $R$ can be calculated as follows:

The probability of fixation is given by $f(N,s) = \frac{e^{-2s}-1}{e^{-4Ns}-1}$ (4), and the expected number of fixed alleles in the population $F = \mu \cdot f(N,s) \cdot t$ where $\mu$ is the rate of Ta1 insertion, and $t$ is the time until a Ta1 insertion becomes unrecognizable due to degenerating mutations. The expected number of observed polymorphic alleles can be given by $P = \mu \cdot \int_0^1 y\bar{\tau}[y,N,s]dy$ (*Materials and Methods*) given all the assumptions discussed above. Let $s_{fl}$ be the selection coefficients of FL elements, $s_{tr}$ be the selection coefficients of TR elements. Then the ratio $R$ is given by $\frac{f(N,s_{tr}) \cdot \int_0^1 y\bar{\tau}[y,N,s_{fl}]dy}{f(N,s_{fl}) \cdot \int_0^1 y\bar{\tau}[y,N,s_{tr}]dy}$. We calculated $R$ conservatively based on the lower bound of the 95% confidence interval of $s_{fl}$ and the best estimate for $s_{tr}$. Based on this conservative estimate the expected $R = 5.3$. By contrast, the observed value of $R$ in our data is 1.15 and is significantly different than the conservative expected ratio, $P < 1 \times 10^{-6}$. This result indicates that far more FL elements have been fixed in the past than more recently. Therefore, selection against FL Ta1 insertions may have may have increased with time, implying that the Ta1 family has become more deleterious as the amplification has proceeded.

**Legend to Figure 2**

The expected and observed distributions for FL elements are shown in A and B, respectively (the expected distribution is based on $N_e s = -1.96$). A G test reveals that these distributions are not significantly different ($P > 0.8$). The expected and observed distributions for the TR elements are shown in C and D, respectively (expected based on $N_e s = -0.28$). A G test reveals that these distributions also are not significantly different ($P > 0.13$)

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