

Publication

Annotation of expressed sequence tags for the East African cichlid fish *Astatotilapia burtoni* and evolutionary analyses of cichlid ORFs

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Title Annotation of expressed sequence tags for the East African cichlid fish *Astatotilapia burtoni* and evolutionary analyses of cichlid ORFs

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BACKGROUND: The cichlid fishes in general, and the exceptionally diverse East African haplochromine cichlids in particular, are famous examples of adaptive radiation and explosive speciation. Here we report the collection and annotation of more than 12,000 expressed sequence tags (ESTs) generated from three different cDNA libraries obtained from the East African haplochromine cichlid species *Astatotilapia burtoni* and *Metriaclicma zebra*. **RESULTS:** We first annotated more than 12,000 newly generated cichlid ESTs using the Gene Ontology classification system. For evolutionary analyses, we combined these ESTs with all available sequence data for haplochromine cichlids, which resulted in a total of more than 45,000 ESTs. The ESTs represent a broad range of molecular functions and biological processes. We compared the haplochromine ESTs to sequence data from those available for other fish model systems such as pufferfish (*Takifugu rubripes* and *Tetraodon nigroviridis*), trout, and zebrafish. We characterized genes that show a faster or slower rate of base substitutions in haplochromine cichlids compared to other fish species, as this is indicative of a relaxed or reinforced selection regime. Four of these genes showed the signature of positive selection as revealed by calculating Ka/Ks ratios. **CONCLUSION:** About 22% of the surveyed ESTs were found to have cichlid specific rate differences suggesting that these genes might play a role in lineage specific characteristics of cichlids. We also conclude that the four genes with a Ka/Ks ratio greater than one appear as good candidate genes for further work on the genetic basis of evolutionary success of haplochromine cichlid fishes.

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